The mediational role of affect regulation on the relation between attachment and alcohol use in college students

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The mediational role of affect regulation on the relation between attachment and alcohol use in college students

by

Dakota J. Kaiser

A dissertation submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of
DOCTOR OF PHILOSOPHY

Major: Psychology (Counseling Psychology)

Program of Study Committee:
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The student author, whose presentation of the scholarship herein was approved by the program of study committee, is solely responsible for the content of this dissertation. The Graduate College will ensure this dissertation is globally accessible and will not permit alterations after a degree is conferred.

Iowa State University

Ames, Iowa

2019

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ABSTRACT

Alcohol use is consistently ranked as one of the leading health risk behaviors globally and is a risk for which college students are particularly susceptible. Previous research has demonstrated a link between attachment style and alcohol use, and Hunter and Maunder (2016) have proposed a model surrounding the impact of attachment insecurities on disease risk and burden. Within their model, they indicate the link between insecure attachment and alcohol use is made through affect regulation difficulties, claiming that alcohol use serves as an external regulator for those with internal difficulties regulating affect, the latter which is itself associated with insecure attachment styles. I tested these tenets of the Hunter and Maunder (2016) model in a sample of college students; specifically, the mediational role of affect regulation on the relation between attachment style and alcohol use.

Using generalized structural equation modeling, I examined the mediational role of emotional dysregulation in a sample of 453 college students, using four separate outcome variables: 1) frequency of alcohol use; 2) quantity of alcohol use; 3) frequency of heavy episodic drinking; and, 4) overall alcohol use. Across these models, results consistently demonstrated a stable relation between emotional dysregulation and both attachment avoidance and anxiety. However, the four alcohol use outcome variables were not significantly related to emotional dysregulation, attachment anxiety, nor attachment avoidance. No significant indirect effects of emotional dysregulation were found for insecure attachment styles on reported alcohol use, in any of the four models. My results stand in contrast with previous, well-established findings in the literature. I discuss the limitations associated with my study, as well as implications for future investigations and clinical work.
CHAPTER 1. INTRODUCTION

The World Health Organization (2009) cites alcohol use as one of the top three contributors to disease and mortality worldwide. In particular, college students are in a vulnerable developmental period that increases their risk for developing long-term patterns of alcohol use and associated health risks (Jennison, 2004). One factor identified as influencing alcohol use among college students is attachment style (Bowlby, 1969; Golder, Gillmore, Speiker, & Morrison, 2005; Kassel, Wardle, & Roberts, 2007; Labrie & Sessoms, 2012) and its affective regulation components that may bring about alcohol consumption as an external way to cope with stressful emotions. In this study, I investigated the role of affect regulation as a mediator of the relation between general attachment style and alcohol use within a college student sample.

Hunter and Maunder (2016) propose that affect regulation, unhealthy external regulating behaviors, and disease risk can be understood through attachment theory. These authors argue that attachment style influences disease risk in two major ways by 1) influencing patient-provider interactions and by 2) increasing individuals' risk of contracting a disease. Further, these authors propose a complex, multi-path model explaining the mechanisms by which attachment insecurity relates to disease risk. The focus of my study is on the path within the Hunter and Maunder (2016) model that flows from attachment insecurity, to deficits in internal affect.

Attachment Insecurity → Deficits in Internal Affect Regulation → Use of External Regulators of Affect → Obesity, Addiction, Infection, Toxins → Disease Risk & Illness Burden

Figure 1. Partial Model of Hunter and Maunder's Model of Attachment and Health
regulation, to the consumption of alcohol as an external regulator of affect (see figure 1). In the following sections, I will briefly detail each step of the model examined in my study.

**Attachment Theory**

Attachment theory (Bowlby, 1969; Bowlby, 1973; Bowlby, 1980) is a highly influential developmental theory of personality and psychopathology, and offers a conceptualization of emotion, motivation, and behavior based primarily on enduring psychological effects learned from early caregiving relationships that affect individuals' sense of physical and emotional safety (Davila & Levy, 2006). Bowlby’s original works (1969, 1973, 1980) asserted that a child emotionally attaches to a caregiving adult, referred to as an attachment figure, and uses this relationship as a secure base to which they turn to in times of emotional distress. If the attachment figure is responsive to the needs of the child, the child is comforted and feels safe exploring new environments away from the attachment figure, but if the attachment figure is inconsistent, insensitive, or unresponsive to the child, the child is unable to use the attachment figure as a secure base, and becomes ambivalently anxious or avoidant toward the attachment figure and feels insecure regarding ventures into new environments.

Attachment theory asserts that this initial relationship with the attachment figure develops into an internal working model that provides individuals with a cognitive-emotional schema consisting of two main components. The first component is a set of expectations about the environment and what care and support individuals can expect from others (reflecting their experiences with their primary attachment figure). The second component is a set of cognitive and behavioral strategies used to regulate distressing emotions and navigate challenges based on the skills and support the individual has received from their attachment figure (Bowlby, 1969; Bowlby, 1973; Bowlby, 1980; Davila & Levy, 2006).
Modern attachment theory defines this internal working model as resulting in two interpersonal and affect regulation dimensions; attachment anxiety and avoidance (Bartholomew & Horowitz, 1991; Brennan, Clark, & Shaver, 1998; Fraley & Spieker, 2003a; Fraley & Spieker, 2003b). These dimensions range from secure (preferred) to insecure (less preferred) attachment styles, with higher levels of attachment anxiety or avoidance being less secure. These dimensions are based on the original conceptualization of attachment styles forwarded by Ainsworth et al. (1978).

Individuals who have learned to have positive expectations about their environment and attachment figures, utilize but not rely exclusively on others, and develop flexible affect regulation strategies, are described as having a secure attachment (low attachment anxiety and avoidance). Individuals who are high on attachment anxiety expect the environment and attachment figures to be inconsistent in responding to them, feel vulnerable when alone and distressed, and prefer affect regulation strategies that exaggerate their internal emotions. This results in clinging to others through fear of abandonment and brings about a tendency to hyper-signal their distress. Individuals who are high on attachment avoidance tend to have expectations that the environment and attachment figures will not adequately meet their needs. They feel vulnerable to the non-responsiveness of others when emotionally close to them and adopt strategies that minimize signaling to others their need for support during times of stress (Bartholomew & Horowitz, 1991; Brennan, Clark, & Shaver, 1998; Fraley & Spieker, 2003a; Fraley & Spieker, 2003b; Mikulincer, Shaver, & Pereg, 2003; Hunter & Maunder, 2016). These behavioral patterns are stable across time and predict behaviors in adolescence and young adulthood (Grossmann & Grossmann, 1991; Hamilton, 2000; Waters, Merrick, Treboux, Crowell, & Albersheim, 2000).
Adult Attachment and Affect Regulation

A key component of relational attachment is internal affect regulation. In adulthood, the internal working model continues to regulate emotional experiences (Mikulincer and Shaver, 2007). In securely attached individuals, the attachment system develops adult regulation strategies as the individual matures through adolescence and early adulthood. Individuals seek proximity to an attachment figure to gain comfort and safety less often, and instead acquire internal regulation strategies to experience feelings of security. Securely attached adults learn to internalize affect regulation strategies provided to them at early ages by their attachment figures. Conversely, insecurely attached adults tend to more frequently experience affect dysregulation (an inability to moderate distressing emotions and a greater sense of internal disturbance arising from such emotions) as a function of possessing fewer or less flexible strategies to soothe their internal distress. Although the specific deficits in affect regulation of anxiously or avoidantly attached individuals may differ, both anxious and avoidant attachment styles are correlated with the increased use of external strategies to regulate emotion (Mikulincer, Shaver, & Pereg, 2003; Schore & Schore, 2007; Marganska, Gallagher, & Miranda, 2013). Consumption of alcohol is one external behavioral strategy individuals may use to regulate their distressing emotions when their ability to regulate internally fails.

Alcohol Consumption as an External Regulator

Within health psychology, insecure attachment styles have predicted a number of negative health behaviors used as external emotional regulators (i.e. poor eating, drug use, alcohol use; McWilliams & Bailey, 2010). In this study, I specifically examine alcohol consumption as an external emotional regulator identified in the Hunter and Maunder (2016) model, because of the high risk for contracting associated diseases as identified by the World
Health Organization (2009), and the prevalence of alcohol use in the college student population as cited by the Center for Behavioral Health Statistics and Quality (2016; CBHSQ), a division of the Substance Abuse and Mental Health Administration.

Alcohol use has been associated with insecure attachment (Schindler et al., 2005; Flores, 2011; Schindler & Broning, 2015) and difficulty regulating affect (Berking et al., 2011; Paulus, Vujanovic, Wardle, 2016; Goldstein, Bradley, Ressler, & Powers, 2017; Tripp & McDevitt-Murphy, 2015; Paulus et al., 2017). The Hunter and Maunder (2016) model also asserts that the link between attachment and alcohol use is due to difficulty regulating emotions; however, no empirical investigation has directly examined if difficulties in affect regulation mediate the relation between attachment and alcohol use.

Alcohol Consumption in the College Student Population

College students endorse slightly higher rates and riskier patterns of alcohol use than in the general population. The CBHSQ found that 58% of college students (compared to 56% of US population) endorsed alcohol use in the past month and 39% of college students (compared to 27% of US population) endorsed heavy episodic drinking in the past month (CBHSQ, 2016). Alcohol use on college campuses is associated with higher rates of assault, risky behavior, unintentional injury, and death (Hingson, Heeren, Winter, & Wechsler, 2005). In college students 51% of traffic fatalities, and 38% of non-traffic accidental fatalities were alcohol related (CBHSQ, 2016). High levels of alcohol use in college increase the risk for developing an alcohol use disorder later in life (Jennison, 2004). Further, approximately 2% of college students experience an alcohol related health problem.

Attachment Style, Affect Regulation, and College Student Alcohol Consumption
The individual relationships between attachment style, affect regulation, and alcohol use in college students has been well established. College students report being motivated to consume alcohol as a way to manage stress (Baer, 2002; Core Institute, 2014), and alcohol use in college has been empirically associated with attachment style (Dawson, Allen, Marston, Hafen & Schad, 2014; Golder, Gillmore, Spieker, & Morrison, 2005; Kassel, Wardle, & Roberts, 2007; Labrie & Sessoms, 2012; Van der Vorst, Engels, Meeus, & Dekovic, 2006; Vungkhanching, Sher, Jackson, & Parra, 2004). The influence of affect regulation on alcohol use has also been empirically established in college populations (Dvorak et al., 2014; Kidorf and Lang, 1999; Klanecky, Woolman, & Becker, 2015; Aurora & Klanecky, 2016). Although the literature demonstrates the influence of attachment and affect regulation on alcohol use, no investigations have yet assessed the role of affect regulation as a mediator of the relation between attachment and alcohol use has been conducted.

**The Present Study**

The aim of my study was to assess the effect of insecure attachment on the use of alcohol as an external regulator, in a college sample, through the pathway laid out by the Hunter and Maunder model (2016). My work aimed to make several contributions to the literature. First, my study aimed to offer additional evidence concerning the influence of attachment style on alcohol use to highlight adult attachment style’s importance in the current and long-term physical health among college students. My study also examined the extent to which affect dysregulation mediates the relation between insecure attachment and the use of alcohol as an external emotional regulator. By better understanding these relations, researchers and practitioners can better identify early prevention and intervention strategies to reduce unhealthy external coping mechanisms and future disease risk for college students.
CHAPTER 2. LITERATURE REVIEW

Attachment Theory

Attachment theory is a prominent developmental theory of personality and psychopathology addressing interpersonal relationships and affect regulation. First proposed by Bowlby in his classic trilogy on Attachment (1969), Separation (1973), and Loss (1980), attachment theory has grown to be an influential theory in applied psychology, with 47,708 papers being published since the release of Bowlby’s first volume, and 20,752 works published since 2010 alone (American Psychological Association, 2019).

In his initial formulation of attachment theory, Bowlby integrated research from the fields of psychoanalysis, developmental psychology, cognitive psychology, ethology, and evolutionary biology to explain the bonding between infants and caregivers, as well as the long-term impact of this relationship dynamic on personality, interpersonal functioning, and affect regulation (Bowlby, 1969; Bretherton, 1992; Davila & Levy, 2006). Bowlby conceptualized the motives for human behavior through the lens of ethology and evolutionary biology as an innate behavioral system that increases the likelihood for survival. He asserted that the bond formed between a child and a caregiver, and the social desires of humans across the life span, were highly adaptive behavioral sets. Bowlby argued that infant behaviors like cooing, clinging to caregivers, preferring the faces of their caregivers, and crying after separation all increase a child’s chance of survival from an evolutionary perspective by seeking proximity to their caregiver and stimulating caregiver attention towards the infant (Bowlby, 1969; Simpson & Belsky, 2008).

Bowlby (1968) recognized the importance of the initial caregiving relationship in humans, that Harry Harlow (1958) and Konrad Lorenz (1937;1937) had earlier observed in animal models. The set of innate proximity seeking behaviors displayed by infants and the
complementary caregiving behaviors from attachment figures are the foundational pieces of the attachment system. This attachment relationship offers safety through proximity, and in turn uses the sense of safety to facilitate exploration and independence (Hazan, Gur-Yaish, & Campa, 2004; Zeifman & Hazan, 2016; Hunter, Maunder, & Le, 2016).

Through this basic reciprocal pattern of behaviors, the attachment system provides several functions: 1) it allows the child to use the attachment figure as a secure base from which to explore the world; 2) it permits the child to use the attachment figure as a safe haven to which they can return when the separation or exploration becomes frightening or distressing; 3) it facilitates seeking and maintaining proximity with an attachment figure through signaling and behaviors; and, 4) it enables separation protest to ensure the attachment figure continues to provide necessary security (Hazan, Gur-Yaish, & Campa, 2004; Zeifman & Hazan, 2016; Hunter, Maunder, & Le, 2016). Modern attachment theorists assert that the survival benefits of these attachment functions are evolutionarily adaptive in providing mechanisms for containing difficult emotions and in forming a coherent sense of self (Fonagy, 1999; Mikulincer & Shaver, 2016).

The Internal Working Model

The mechanism by which attachment contributes to the formation of the self is referred to the internal working model (Bowlby, 1973; Bretherton, 1991; Pietromonaco & Barrett, 2000). The internal working model is a cognitive-emotional schema with two main components or representations; an outward set of expectations of the environment (expectations and beliefs about relationships), and an internal guide on how to respond to the environment (beliefs about the self and affect regulation strategies; Pietromocaco & Barrett, 2000; Hunter, Maunder, & Le, 2016). These schemas in the internal working model guide thoughts, emotions, and behaviors in
attachment relevant situations or when the individual experiences distress (Davilia & Levy, 2006).

Bowbly (1973) drew on Piaget’s (1951; 1954) model of sensorimotor development to understand the internal working model. Bowlby conceptualized the formation of the internal working model to occur through a developmental process. In this process individuals interact with the world to create organized schemas, and then expand on those models by accommodating new experiences as their cognitive abilities like memory, perspective taking, problem solving, and mental testing develop. The internal working model forms from the behaviors and expectations of others that individuals learn within their relationship with their attachment figure, developing further as cognitive abilities progress and the individual gains more experience (Bretherton, 1999; Pietromocaco & Barrett, 2000). Children’s experience utilizing their attachment figures (i.e. utilizing a secure base, utilizing a safe haven, seeking and maintaining proximity, and utilizing separation protest) shape their growing sense of self and others. Caregiver consistency, responsiveness, and conferred security sets the course for levels of future insecurity in attachments.

**Attachment Styles**

Individual variations between internal working models are described as attachment styles. As individual internal working models are developed, variations in child-caregiver relationships lead to variations in attachment style. Ainsworth et al. (Ainsworth & Bell, 1970; Ainsworth, Blehar, Waters, & Wall, 1978), documented different attachment patterns by observing how children utilized their attachment figure as a secure base. To observe attachment behaviors, Ainsworth and Wittig (1969) created an observational paradigm known as the “strange situation.”
The observation was conducted by observing a mother and her child (ages 12-18 months) in a small room with one-way glass. The observation of the dyad took place in a series of eight episodes lasting about 3 minutes each. The observational episodes included: 1) the experimenter introduced mother and baby to the room (less than 1 minute); 2) the mother and baby were left alone for the child to explore the room while the mother observed but did not participate; 3) a stranger joined the mother and baby, conversing with the mother; 4) the mother left the baby and stranger alone while the stranger directed attention toward the child (first separation episode); 5) the mother returned and the stranger left (first reunion episode); 6) the mother left and the baby was left alone (second separation episode); 7) the stranger returned and attended to the child (second separation episode continues); 8) the mother returned and the stranger left (second reunion episode). During these eight episodes, the child’s behaviors were observed based on the amount of exploration the child engaged in, the child’s reaction to the separation from the attachment figure, the child’s stranger anxiety, and the child’s behaviors when they were reunited with the attachment figure (Ainsworth & Wittig, 1969; Ainsworth & Bell, 1970; Ainsworth, Blehar, Waters, & Wall, 1978).

These observations led these authors to the creation of three categorical styles of attachments: secure, avoidant (dismissing), and anxious (preoccupied, ambivalent, resistant). Ainsworth and Bell (1970) initially found that approximately 70% of children displayed a secure attachment style, approximately 15% of children displayed an anxious attachment style, and approximately 15% of children displayed an avoidant attachment style in their initial sample.

**Secure attachment.** Ainsworth et al. (1978) identified secure children as having appeared distressed when their mother left, avoiding the stranger while alone but interacting with the stranger when the mother was present, and appearing happy when the mother returned.
Bowlby (1980) considered a secure attachment as normative development. Children with secure attachments are more likely to have attachment figures who were sensitive to their distress signals, and consistent in responding to their needs (Levy, Blatt, & Shaver, 1998), leading to the formation of an internal working model that, “possess a representational model of attachment figures as being available, responsive, and helpful” (Bowlby, 1980, p. 242).

**Avoidant attachment.** Ainsworth et al. (1978) identified avoidantly attached children as having displayed no signs of distress when the mother left, showing indifference toward the stranger while continuing to play normally, and showed little interest when their mother returned. Children with avoidant attachment styles learn to not seek contact with their attachment figure when distressed, and become independent from their attachment figure (Behren, Hesse, & Main, 2007). These children are more likely to have caregivers that were insensitive or rejecting of their needs, who may have withdrawn from helping during difficult situations, or who were unavailable during times of emotional distress (Levy, Blatt, & Shaver, 1998). This pattern of unavailability and insensitivity leads to children developing an internal working model that; views others as undependable, expects needs to not be met, and downplays the signaling or displays of overt distress (Bretherton, Ridgeway, & Cassidy, 1990; Collins, Clark, & Shaver, 1996).

**Anxious attachment.** Ainsworth et al. (1978) identified anxiously attached children as displaying severe distress when their mother left, displaying notable fear toward and avoiding the stranger, resisting contact with their mother when she returned, and continuing to be distressed and having difficulty being comforted after reunion. These children display an ambivalent pattern with their attachment figures, demonstrating clingy and dependent behavior to maintain proximity, but also rejecting behavior when the attachment figure tries to engage in interaction.
These children also have difficulty using the attachment figure as a secure base to explore their surroundings, and do not derive comfort from proximity to the attachment figure (Behren, Hesse, & Main, 2007). Children who develop an anxious attachment style are more likely to have experienced inconsistent caregiving, which acts as an intermittent reinforcement schedule that can lead to strong patterns of hyper-signaling distress and insecurity (Levy, Blatt, & Shaver, 1998). This situation encourages the development of an internal working model that; is distrusting of others while craving proximity, views the self as dependent and more reliant on others, and utilizes hyper-signaling and over-displaying of distress to meet needs (Bretherton, Ridgeway, & Cassidy, 1990; Collins, Clark, & Shaver, 1996).

**Dimensional Measurement of Attachment Style**

Although the classification system of Ainsworth et al. (1978) was categorical, many attachment theorists conceptualize attachment styles as being dimensional in nature. This conceptualization asserts that attachment styles can be understood to exist on a continuum, ranging from those who are very secure and display secure attachment behaviors most of the times, to those who are very insecure and display insecure attachment behaviors most of the time (Cummings, 1990; Richters, Waters, & Vaughn, 1988, Waters & Deane, 1985). In the dimensional model, insecure attachment contains two continuous dimensions; anxious and avoidant attachment (Bretherton, Ridgeway, & Cassidy, 1990, Fraley & Spieker, 2003a).

**Continuous construct.** There is ample evidence for the continuous nature of attachment styles. First, the coding for Ainsworth et al.’s (1978) strange situation paradigm rests on continuous ratings. Although their findings were reported as a categorical classification, raters utilized continuously scaled “interactive behaviors” between mothers and children to determine categorical classifications. Ainsworth et al. 1978 found that 92% of the children could be
correctly classified using a linear combination of behavioral ratings. Through this, Ainsworth acknowledged the dimensional nature of attachment, but chose to utilize the categorical approach to “retain the picture of patterns of behavior,” and avoid reducing complex patterns of behavior to a simple scale and then “burying it in a welter of refined statistics” (p. 57). The choice to initially present attachment style as categories appears to be primarily a stylistic choice for communication purposes (Fraley & Spieker, 2003a).

In a taxometric investigation exploring the dimensional or categorical nature of the construct, data collected from 1,139 children in the National Institute of Child Health and Development Study of Early Child Care (1997), Fraley and Spieker (2003a) found graphically that behavioral ratings of children made during the strange situation paradigm better fit a continuous dimensional model than a discrete categorical model. In a later study of adults utilizing self-report questionnaires that assessed adult attachment style and more refined quantitative comparison methods, the average comparison curve fit indexes ranged from .20 to .47 indicating data better fit a dimensional model than a categorical model (Fraley, Hudson, Heffernan, & Segal, 2015).

**Dimensional construct.** In addition to being continuous, modern attachment theorist assert that attachment styles exist across two continuous dimensions; attachment anxiety and avoidance. These dimensions extend the work of Ainsworth et al. (1978) across bi-dimensional planes, with low values on both dimensions reflecting the secure attachment category, high values on anxiety and low values on avoidance reflecting the anxious attachment category, high values on avoidance and low values on anxiety reflecting the avoidant attachment category, and high values on both anxiety and avoidance reflecting the fearful or disorganized attachment category (Mikulincer & Shaver, 2007; Hunter and Maunder, 2016).
During the early development of self-report attachment instruments, Brennan and Shaver (1995) investigated the underlying dimensions of items on such measures. A discriminant function analysis produced two significant functions. The first function accounted for 68.2% of the variance in scores and differentiated avoidant individuals from secure individuals ($\chi^2 (14) = 201.30, p < .0001$). The second function accounted for 31.8% of the variance in scores and separated anxious individuals from secure and avoidant individuals ($\chi^2 (6) = 70.25, p < .0001$). The two combined functions predicted 72.6% of participants' categorical attachment style. Next, these authors analyzed items using an exploratory factor analysis with an Equamax rotation. Two factors with eigenvalues greater than one emerged and were labeled as avoidant and anxious attachment. These factors accounted for 71.3% of the variance in scores. This factor structure has been reproduced numerous times across a variety of attachment instruments (Dozier & Kobak, 1992; Koback et al., 1993; Brennan, Clark, & Shaver, 1998; Crowell, Fraley, & Shaver, 1999; Wei, Russell, Mallinckrodt, & Vogel, 2007; Fraley, Heffernan, Vicary, & Brumbaugh, 2011).

**Stability of Attachment into Adulthood**

The internal working model and corresponding attachment styles are stable constructs from infancy through adulthood. Bowlby (1973) asserted that attachment style as a behavioral set will continue on in life and occur automatically when activated by a threat or relational cue because it was the best strategy for surviving infancy, is a reinforced behavioral pattern, and has selected for through evolution (Simpson & Belsky, 2008; Hunter, Maunder, & Le, 2016). In support of this assertion, patterns of attachment security, anxiety, and avoidance have been observed in adult samples that reflect the same dimensional structure of attachment observed in children (Scharfe & Batholomew, 1994; Fraley & Waller, 1998; Maunder & Hunter, 2009). Although adults are not reliant on their parents in the same way they were as infants, the schema
of attachment figures develops across the lifespan to include other caregivers such as close
friends and romantic partners (Brennan, Clark, & Shaver, 1998; Fraley, Heffernan, Vicary, &
Brumbaugh, 2011).

Empirical evidence supports the moderate stability of attachment styles from childhood
through adulthood. A meta-analysis of longitudinal studies of attachment style from infancy (12
months) through early adulthood (ages 17-21) found a correlation of \( r = .27 \) for similarity of
attachment style (Fraley, 2002). Individual studies within the meta-analysis that controlled for
individuals at a higher risk for attachment instability or disruption in the attachment relationship
(e.g. adopted children, children who experienced trauma or suffered a major disruption in their
primary attachment relationship) found moderate correlations \( (r = .45-.50) \) between attachment
styles in infancy and early adulthood in those who had stable relationships and environments.

The stability of attachment style into adulthood can be understood from a prototype or
revisionist perspective. The prototype perspective asserts that the internal working model
contains an unchanged representation of the attachment figure developed during infancy, which
is used as a template for all future interpersonal relationships and affect regulation, and remains
unchanged as it is reactivated in new circumstances throughout the life span. In this perspective,
any changes to individuals' attachment style are attributed to their use of the prototypical internal
working model more so than an actual change in the internal working model itself (Fraley, 2002;
Sroufe, Egeland, & Kreutzer, 1990; Owens et al., 1995).

The revisionist perspective asserts that the internal working model is constantly updated
and adjusted to accommodate new life experiences. The stability of attachment style across the
life span stems from the reinforcing nature of long-term attachment relationships with caregivers
and romantic partners. Further, attachment has an influence on both relationship formation and
the interpretation of experiences that increases the likelihood of interacting with new attachment figures in a way similar to initial attachment figures. Individuals are more apt to interpret the behavior of others as similar to the behaviors of an initial attachment figure, select new attachment figures based on the caretaking style of initial attachment figures, and recapitulate the attachment relationship by enacting attachment behaviors that draw responses similar to those of initial attachment figures. Within this viewpoint, changes in attachment style stem from exposure to new relationships and new experiences, leading individuals to revise their internal working model to reflect these new experiences (Fraley, 2002; Kagan, 1996; Lewis, 1999).

**Genetic Influences of Attachment Style**

Bowlby’s formulation of attachment theory (1969; 1973; 1980) integrated scientific knowledge of developmental and cognitive psychology with a biological understanding of ethology and evolutionary biology. The understanding of attachment as an adaptive biological mechanism that increases the survival of the species has been a foundational component of the theory (Simpson & Belsky, 2008). However, the prevailing explanations of the formation of attachment style historically focus on the behaviors of caregivers and the environment without acknowledging any biological predispositions of the individual.

Theorists have begun to return to Bowlby’s assertion that evolutionary biology is a component of attachment style, which is formed by a combination of genetic and social factors. Fonagy (2001) asserted that genetics predispose an individual to develop certain attachment styles when exposed to certain social environments. With the advancement of genetic technology and a greater understanding of genetic influences of behavior, research in recent years has investigated the genetic influences of attachment style.
To better understand the genetic and environmental influences of adult attachment style, several twin studies have investigated the heritability of attachment style. A study of 244 pairs of twins, ages 23-24, recruited from the Italian Twin Database found that genetics accounted from 45% of the variability of attachment anxiety, 36% of the variability of attachment avoidance, and 62% of the variability of attachment security as measured by the Experience in Close Relationships Scale (Picardi, Fagani, Nistico, & Stazi, 2011). An investigation of 220 pairs of adult twins found that genetics accounted for 37% of the variability in attachment security, 43% of the variability of attachment avoidance, and 25% of the variability of attachment anxiety (Brussoni, Jang, Livesley, & MacBeth, 2005). These estimates are generally consistent with Plomin, DeFries, & McClearn’s (2008) assertion that across the literature, 40-60% of the variability in personality traits are due to genetic factors.

Polymorphisms of several genes have been identified as correlates of adult attachment style. In a sample of undergraduates, attachment anxiety was associated with polymorphisms of the DRD2 dopamine receptor gene, and attachment avoidance was associated with polymorphisms of the 5HT2A serotonin receptor gene, but found these genes accounted for only 20% of the variability of attachment style (Gillath, Shaver, Baek, & Chun, 2008). Some limited evidence has identified two polymorphisms of the OXTR oxytocin receptor gene are associated with higher rates of attachment anxiety in adults with mood disorders (Costa et al., 2009).

Although the literature supports the heritability of adult attachment style, there is considerable debate about the role of genetics in children’s attachment style. Studies of the genetic influences of attachment style in children is limited and fails to consistently replicate (Gillath, Shaver, Baek, & Chun, 2008). Several twin studies in infants and preschool children found no association between shared specific genotypes and attachment style (Bokhorst et al.,
Several studies have countered this trend and found limited evidence of genetic factors in children’s attachment style. A study of 551 pairs of twins at age 15 found a 40% heritability rate of attachment style (Fearon, Smeuli-Goetz, Viding, Fonagy, & Plomin, 2014). Lakotos and colleagues (2002), found that risk for a disorganized attachment was predicted by an interaction of two polymorphisms in the DRD4 dopamine receptor gene. A follow up study found that children carrying a specific haplotype (i.e., string of related genes from a single parent) at the DRD4 gene was a risk factor for disorganized attachment (Gervai et al. 2005). The oxytocin receptor gene has also been correlated with secure attachment, but only in non-Caucasian infants (Chen, Barth, Johnson, Gotlib, & Johnson, 2011).

Given the inconsistent results in the child literature, several studies have attempted to take a more nuanced look at genetic factors by examining the interaction of genetics and environment. Work by Van Ijzendoor & Bakermans-Kranenburg (2006) identified a polymorphism at the DRD4 gene location that moderated the association between a mother’s unresolved trauma and her infant’s risk for developing a disorganized attachment style, demonstrating the interaction of genetic and environmental influences on attachment style. Certain polymorphisms of the serotonin transporter gene have also been found to moderate the relationship between maternal responsiveness and attachment security Bakermans-Kranenburg, Van Uzendoorn, Bokhorst, & Scheungel, 2004). Spangler, Johann, Ronai, & Zimmermann (2009) found that a polymorphism in the serotonin transporter gene was associated with disorganized attachment, but only in infants who had mother’s that displayed low responsiveness to the child.
In summary, across the lifespan, research has observed weaker associations between genetic factors and attachment style early in life and stronger associations later in life. The shift in the relationship between genetic and environmental influences on attachment style emerge in adolescence, a time when the attachment system undergoes a period of reorganization as the primary attachment relationship shifts from a parental caregiver to peers and significant others (Fearon et al., 2014). Several hypotheses have emerged explaining the increasing influence of genetic factors as humans develop. First, theorists propose that during adolescence, attachment shifts from a relational and behavioral construct to a cognitive construct and suggest that this shift to a cognitive based system may rely less on prior environmental experiences and more on genetic predisposition (Steele, Steele, & Fonagy, 1996; Fearon et al., 2014). Others note that caregiver behaviors and children’s attachment style have a bi-directional relationship, and the genetic influence of the child’s behavior is observed later only after many iterations of this bidirectional parent-child interactions (O’Connor, Deater-Deckard, Fuller, Rutter, & Plomin, 1998; Rutter, Moffit, & Caspi, 2006; Kendler & Baker, 2007).

Affect Regulation and Attachment

Emotions and affect regulation are a central part of attachment theory (Bowbly, 1973; 1980). Bowbly asserted that humans rely on attachment figures for help with affect regulation “from cradle to grave” (1979, p. 129). The process of affect development and regulation within attachment theory has been proposed by Shaver, Schwartz, Kirson, and O’Connor (1987). These authors assert that internal emotions are sparked via a notable change or event in the external or internal world. This event leads to an appraisal in relation to individual goals, wishes, and concerns. Following this appraisal, specific emotions, thoughts, action tendencies, and physiologic responses arise. These lead to the expression and experience of emotion through
facial expressions, thoughts, and behaviors. This loop can be repeat itself, when the emotion, in turn, becomes or triggers a notable change or event in the internal or external world. The authors suggest that the affect regulation process can occur at any of these steps. Emotions and their regulation are assumed to be biologically adaptive and can occur with varying degrees of conscious awareness or automaticity (Shaver et al., 1987; Lazarus, 1991; Jenkins & Oately, 1996; Mikulincer & Shaver, 2007).

The attachment system is an affect regulation device that acts, in childhood, to regulate emotions though threat detection and proximity seeking. Mikulincer and Shaver (2007) suggest this regulation acts through three primary mechanisms in childhood. First, the attachment system monitors and appraises the internal and external environment for threatening events and activates attachment behaviors. Second, the attachment system monitors and judges the availability and responsiveness of the attachment figure. This mechanism is associated with the process of emotion formation, which varies according to the acquired internal working model. Third, the attachment system decides whether seeking proximity to the attachment figure will be useful in regulating the emotion and then implements particular signaling or regulation strategies. For anxious individuals these strategies can include increased vigilance, high levels of emotional expression, and dependent behaviors. For avoidant individuals these strategies can lead to the downplaying or dismissal of threats, denial of emotional arousal, and distancing behaviors.

Through ongoing behavioral reinforcement of these feedback loops and the resulting emotional stability brought about by individuals' internal working model, these strategies continue to be used to deal with distressing emotion and perceived threats. By adulthood, the generalization of secure, hyper-activating, and deactivating strategies progresses to encompass a wide variety of internal cognitive and behavioral patterns (Mikulincer & Shaver, 2007).
Secure attachment and affect regulation. Individuals with a secure attachment style are more likely to have developed self-soothing techniques and a broader array of constructive coping techniques that can be employed effectively and flexibly in a variety of environments (Epstein & Meier, 1989; Mikulincer & Shaver, 2007). These individuals have a variety of antecedent-focused affect regulation techniques that allow for the successful regulation of emotions. This antecedent-focused regulation strategy also allows for effective problem-solving strategies by reducing the likelihood of further negative internal or external events (Gross, 1999; Mikulincer & Shaver, 2007). According to Cassidy (1994, p. 233), “the experience of security is based not on the denial of negative affect, but on the ability to tolerate negative affect temporarily in order to achieve mastery over threatening or frustrating situations.”

Several studies support the association between secure attachment and flexible, problem focused affect regulation strategies. In a sample of medical patients experiencing stress related to a medical condition, Schmidt, Nachtigall, Wuethrich-Martone, & Strauss (2002) found securely attached persons were rated significantly higher on their ability to seek care from others \( F(3,126) = 5.40, p < .005 \), utilize acceptance as a form of coping \( F(3,126) = 6.41, p < .005 \), and utilize more flexible coping patterns \( F(3,126) = 10.90, p < .005 \). Similarly, in a sample of adults grieving the loss of a sibling, Cohen & Katz (2015) found securely attached persons were more flexible in their coping strategies than those rated higher on either attachment avoidance or anxiety \( F(1,146) = 12.23, p < .001 \). Across studies, individuals with greater attachment security had access to more regulating strategies and employed more flexible strategies in managing their distress.

Similar patterns emerge in college students. Marganska, Gallagher, and Miranda (2013) demonstrated that securely attached college students reported less self-perceived difficulty in
regulating their emotions as measured by the Difficulties in Emotional Regulation Scale. In this sample, higher levels of attachment security was associated with higher levels of emotional clarity ($r = .42, p < .01$), access to regulation strategies ($r = .34, p < .01$), accepting negative emotions ($r = .32, p < .01$), ability to pursue goals ($r = .22, p < .01$), high awareness of emotions ($r = .21, p < .01$), and good impulse control ($r = .20, p < .01$). Results demonstrate the connection between attachment security and greater access to a variety of flexible emotional regulation strategies in a young adult population.

**Avoidant attachment and affect regulation.** Individuals with high levels of attachment avoidance are more likely to utilize deactivating strategies in an attempt to regulate affect. They tend to minimize emotional states that activate their attachment system (Main & Weston, 1982), as emotional arousal is interpreted as vulnerability or weakness that threatens the safety of an avoidant person (Cassidy, 1994). Those with more attachment avoidance “down regulate,” to minimize closeness and maximize independence often at the cost of interpersonal relationships and tend to show low awareness of their emotional experience beyond their immediate discomfort. This strategy interferes with support seeking, problem solving, or the cognitive appraising of threats. In turn, this reduces their scope of affect regulation and problem-solving strategies to forms of suppression and denial (Mikulincer & Shaver, 2007).

Previous investigations demonstrate the association between attachment avoidance and down regulating emotional strategies. Holmberg, Lomore, Takacs, & Price (2011) found adults with an avoidant attachment preferred less social support in stressful situation from romantic partners ($B = -.60, p < .001$) and friends and family ($B = -.52, p < .001$). In medical patients, Schmidt et al. (2002) found that those with an avoidant attachment used denial as a coping strategy more frequently ($F(3,126) = 6.41, p < .005$) than those with secure or anxious
attachments, and were more rigid in their style of coping \((F(3,126) = 10.90, p < .005)\) than those with a secure attachment. Similarly, Turan, Osar, Turan, Ilkova, & Damci (2003) observed that an avoidant attachment, was correlated with endorsing the negative coping styles of behavioral avoidance \((r = .35, p < .01)\) and passive resignation \((r = .48, p < .001)\). Across the literature, empirical studies demonstrate a connection between attachment avoidance and more rigid and behaviorally avoidant regulation strategies.

This trend extends to the literature addressing college students’ attachment style and emotional regulation abilities and identifies patterns of minimizing emotional experiences. A sample of avoidantly attached college students endorsed a combination of high defensiveness \((F(2,108) = 5.56, p < .01)\) and high anxiety \((F(2,108) = 905, p < .01)\) as compared to their securely or anxiously attached peers, indicating defensiveness without resolution when asked to recall a sad, fearful, or angry memory from childhood (Mikulincer & Orbach, 1995). College students with higher levels of attachment avoidance endorse higher levels of non-acceptance of emotions \((r = .14, p < .05; \text{Marganska, Gallagher, & Miranda, 2013})\). In greater detail, Caldwell & Shaver (2012) reported that high levels of attachment avoidance was associated with higher levels of emotional suppression \((r = .62, p < .01)\), negative affect \((r = .23, p < .01)\), low emotional awareness \((r = .41, p < .01)\), low emotional clarity \((r = .44, p < .01)\), difficulty with mood adjustment \((r = .21, p < .01)\), and poor resilience \((r = .29, p < .01)\).

Further, the literature suggests that attachment avoidance is associated with interpersonal distancing as a specific emotional regulation strategy in college students. Students with higher levels of attachment avoidance report lower abilities to collaborate with others while solving stressful problems \((r = -.25, p < .01; \text{Lopez et al, 1997})\). In greater detail, Garrison, Kahn, Miller, and Sauer (2014) found college students with higher attachment avoidance endorsed lower levels
of emotional disclosure \((r = -0.21, \ p < 0.05)\), higher levels of emotional avoidance \((r = 0.26, \ p < 0.05)\), lower levels of disclosure tendencies \((r = -0.38, \ p < 0.001)\), and higher levels of emotional suppression \((r = 0.38, \ p < 0.001)\). Across studies, data support the relation between attachment avoidance and inflexible deactivating affect regulation strategies.

**Anxious attachment and affect regulation.** Mikulincer & Shaver (2007) suggest that individuals with higher levels of attachment anxiety are more likely to utilize hyperactivating strategies in an attempt to regulate affect, as they view negative emotions as congruent with their goals and worth exaggerating or maintaining, as these behaviors serve to alert others to unmet emotional needs. These hyperactivating strategies maintain a perception of the self as helpless and dependent on the attachment figure, which decreases the likelihood of problem-solving behaviors (Cassidy, 1994).

A body of empirical work demonstrates the association between attachment anxiety and hyperactivating emotional regulation. Attachment anxiety has been demonstrated to correlate with difficulties regulating emotions \((r = 0.51, \ p < 0.01;\) Pepping, Davis, & O’Donovan, 2013). Specifically, attachment anxiety has been shown to be related to amplified sadness \((r = 0.11, \ p < 0.001)\), exaggerated anger \((r = 0.31, \ p < 0.001)\), aggressive behavior \((r = 0.36, \ p < 0.001)\), and depressive symptoms \((r = 0.53, \ p < 0.001;\) Brenning & Braet, 2012). While those with higher levels of attachment anxiety display more emotions and signal their needs to others, their limited repertoire of emotion regulation strategies limits their abilities to effectively meet their needs. Schmidt et al. (2002) found that anxiously attached medical patients, despite displaying high levels of emotional distress, were less able to effectively seek attention and care from others \((F(3,126) = 5.40, \ p < 0.005)\) and used more rigid coping styles than those with secure attachments \((F(3,126) = 10.90, \ p < 0.005)\).
This pattern is well documented in the college student population. Samples of anxiously attached college students, were found to lack access to effective regulation strategies ($r = .42, p < .01$), less able to accept emotions ($r = .27, p < .01$), and lack emotional clarity ($r = .23, p < .01$; Marganska, Gallagher, & Miranda, 2013). Further, anxiously attached college students endorsed more rumination ($r = .60, p < .01$), negative affect ($r = .49, p < .01$), low emotional clarity ($r = .34, p < .01$), difficulty with mood adjustment ($r = .31, p < .01$), and poor resilience ($r = .60, p < .01$; Caldwell & Shaver, 2012). Similarly, Garrison et al. (2014) found anxiously attached college students to report higher emotional intensity ($r = .32, p < .001$), rumination ($r = .23, p < .05$), and brooding ($r = .48, p < .001$). This body of research supports the association between attachment anxiety and the inflexible use of hyper-activating and affect regulation strategies.

Although the theory indicates that college students with an anxious attachment use hyperactivating strategies because the display of emotion seems consistent with their goals, research indicates that this limited strategy is not effective in goal directed problem solving to adequately meet the needs of individuals. Samples of anxiously attached college students, were found to endorse less of an ability to collaborate with others to solve a stressful problem ($r = -.28, p < .01$; Lopez et al., 1997), poorly control impulsive behavior ($r = .36, p < .01$), and are unable to pursue goals ($r = .30, p < .01$; Marganska, Gallagher, & Miranda, 2013).

**Attachment Outcomes**

Insecure attachment styles are not inherently pathological; they are an adaptive strategy to ensure emotional needs are met (Simpson & Blesky, 2008). There are circumstances when an insecure attachment style is adaptive for an individual, but these styles employ a narrow scope of learned behaviors. This narrow and inflexible range of behaviors is often limiting in its ability to meet emotional needs in a complex adult environment that calls for greater flexibility.
(Mikulincer & Sheffi, 2000). The inflexibility of insecure attachment styles leads such individuals to employ attachment behaviors that do not match the demands or expectations of the adult environment (Hunter & Maunder, 2016). As the restricted range of behaviors misaligns with the complex environment, research finds that insecure attachment styles are related to a variety of negative outcomes in terms of mental and physical health.

**Attachment and general mental health.** Insecure attachment styles are consistently found at a higher rate in those with mental illness compared to the general population (Bakermans-Kranenburg & van Ijzendoorn, 2009). General psychological distress is associated with higher levels of attachment anxiety ($r = .53$) and avoidance ($r = .29$) Higher levels of attachment insecurity (attachment avoidance or anxiety) are associated with lower levels of self-esteem, self-efficacy (Mikulincer & Shaver, 2007), autonomy, competence, and relatedness (Wei, Shaffer, Young, & Zakalik, 2005). Attachment insecurity is also associated with higher levels of negative affect (Simpson, 1990), nervousness (Collins, 1996), shame (Wei, Shaffer, Young, & Zakalik, 2005), hopelessness (Wei, Heppner, & Mallinckrodt, 2003; Wei, Mallinckrodt, Russell, & Abraham, 2004), emotional reactivity, and emotional suppression (Lopez, Mitchell, & Gormley, 2002; Wei, Heppner, & Mallinckrodt, 2003).

**Depression and anxiety.** Attachment insecurity increases the risk for depression (Hunter & Maunder, 2016), with attachment anxiety ($\rho = .29, p < .01$) and avoidance ($\rho = .32, p < .01$) both correlated with scores on depression scales (Wei, Heppner, & Mallinckrodt, 2003; Rosenstein & Horowitz, 1996; Stovall-McClough & Dozier, 2016). Insecure attachment has also significantly predicted ($d = .41, p < .01$) the diagnosis of an anxiety disorder by age 17, (Bar-Haim, Dan, Eshel, & Sagi-Schwartz, 2007; Bosquet & Egeland, 2006; Brown & Harris, 1993; Warren, Huston, Egeland, & Sroufe, 1997).
Health outcomes. Insecure attachment is associated with a variety of negative health outcomes. In the National Comorbidity Replication Survey, a large scale (n = 5,645) nationally representative survey in the United States, attachment anxiety was associated with an increased risk for heart attack (OR = 1.43, 95% CI [1.10, 1.87]), stroke (OR = 1.41, 95% CI [1.11, 1.80]), non-cranial/spinal chronic pain (OR = 1.39, 95% CI [1.23, 1.56]), lung disease (OR = 1.39, 95% CI [1.08, 1.79]), ulcer (OR = 1.36, 95% CI [1.23, 1.50]), headaches (OR = 1.32, 95% CI [1.19, 1.47]), seizures (OR = 1.27, 95% CI [1.02, 1.59]), asthma (OR = 1.20, 95% CI [1.03, 1.41]), high blood pressure (OR = 1.19, 95% CI [1.07, 1.32]), and back or neck problems (OR = 1.13, 95% CI [1.03, 1.24]). Attachment avoidance was associated with an increased risk for non-cranial/spinal chronic pain (OR = 1.26, 95% CI [1.14, 1.38]), headaches (OR = 1.23, 95% CI [1.16, 1.31]), back or neck problems (OR = 1.19, 95% CI [1.10, 1.28]), ulcer (OR = 1.17, 95% CI [1.08, 1.27]), and asthma (OR = 1.12, 95% CI [1.01, 1.25]; McWilliams & Bailey, 2010).

Felitti et al. (1998) noted individuals with insecure attachments, exposed to four or more disruptive events in childhood (e.g., childhood abuse, violence against mother, living with a person who abused substances, parental incarceration, parental mental illness, or other disruptions in the attachment relationship) had an increased risk for alcoholism, drug abuse, depression, and suicide attempts 12 times greater than those who experienced no such disruptions. These same individuals had a higher risk for nicotine addiction, poor self-rate health, sexually transmitted diseases, and obesity two times greater than those who had no such exposure.

In a longitudinal study of risk and coping, individuals were followed from birth until age 32. Participants attachment style was rated at ages 12-18 months old, and health status was assessed at 32 years old. Attachment security was correlated with lower overall health concerns
lower rates of inflammatory diseases (i.e. coronary heart disease, asthma, diabetes, hypertension, and stroke; $r = -.27, p < .01$), and fewer non-specific health symptoms (i.e. dizziness, migraines, skin problems, chest pain, recurring stomach problems, back pain; $r = -.21, p < .05$). Attachment avoidance was not significantly associated with any of the assessed health concern clusters. Attachment anxiety correlated with higher overall health concerns ($r = .18, p < .05$), and higher rates of inflammatory diseases ($r = .24, p < .01$; Puig, Englund, Simpson, Collins, 2013).

The impact of attachment style on health is also observed at a physiological level. A longitudinal study of attachment and immune function assessed self-reported attachment style in a sample of female nurses, and then measured lymphocyte proliferation response and NK cell cytotoxicity, both indicators of overall immune health. High levels of attachment avoidance were associated with ($B = -.35, p < .005$) poorer immune system functioning (Picardi et al., 2013). In a sample of healthy married adults, attachment anxiety was associated with higher levels of cortisol ($b = .37, F = 8.46, p < .005$) and lower levels of immune health marker T-cells ($b = -.26, F = 15.49, p < .001$). Attachment avoidance was associated with high levels of cortisol ($b = .21, F = 5.44, p < .05$; Jaremka et al., 2013).

**Use of Alcohol**

According the National Survey on Drug Use and Health, 86.4% of adults in the US reported drinking alcohol at some point in their life, with 56% (136 million) drinking in the past month. In the same sample, in college students, 58.3% (20.4 million) drank in the past month 39.0% (13.6 million) reported heavy episodic drinking in the past month, and 10.9% (3.8 million) reported heavy drinking in the past month (CBHSQ, 2016).

**Risks of Alcohol Use**
Economic burden. In 2010, the estimated cost of excessive alcohol consumption was 249.0 billion dollars (approximately $2.05 per drink), equating to approximately 807 dollars for every person in the United States (Sacks, Gonzales, Bouchery, Tomedi, Brewer, 2015). This cost primarily comes from losses in workplace productivity (72% of total cost), health care expenses (11% of total cost), law enforcement and legal expenses (9% of total costs), and motor vehicle crashes (6% of total costs; Bouchery, Harwood, Sacks, Simon, & Brewer, 2011). Because of the limited number of economic variables assessed, the economic burden of alcohol consumption may be underestimated (Bouchery, Harwood, Sacks, Simon, & Brewer, 2011; Sacks, Gonzales, Bouchery, Tomedi, Brewer, 2015).

Health and safety. Alcohol use is a leading risk factor for death and disability across the planet. According to the World Health Organization alcohol use is a leading risk factor for death and Disability Adjusted Life Years globally (DALYs; a common measure of premature death adjusted for disability and poor health), with 3.3 million deaths (5.9%) and 139 million (5.1%) DALYs being attributed to alcohol use in 2012 (World Health Organization, 2014). In young adults, ages 15-49, alcohol is the number one risk factor globally for premature death and disability. In young adults ages 20-39, 25% of deaths globally are attributed to alcohol use (World Health Organization, 2014).

Alcohol use is cited by the World Health Organization (2014) to be a risk factor for over 200 diseases and injury-related health concerns. One major category of diseases associated with alcohol use is liver disease. In 2015, 47% (36,909 cases) of liver diseases cases involved alcohol use (Centers for Disease Control and Prevention, 2017). Alcohol related liver disease accounted for 33% of liver transplants in 2009 (Singal, Guturu, Hmoud, Kou, Salameh, Wiesener, 2013). In 2013, 47.9% of cirrhosis deaths were attributed to alcohol use (Yoon, Chen, & Yi, 2014).
Alcohol use is cited as a notable risk factor for cancer. In a meta-analysis, alcohol use was associated with an increased odds ratio for developing multiple forms of cancer. High level of drinking (100g per day) significantly increased (95% CI not including 1.0) the odds of cancer developing at the following sites; oral cavity and pharynx (OR = 6.01, 95% CI [5.46, 6.62]), esophagus (OR = 4.23, 95% CI [3.91, 4.59]), larynx (OR = 3.95, 95% CI [3.43, 4.57]), breast (OR = 2.71, 95% CI [2.33, 3.08]), liver (OR = 1.86, 95% CI [1.53, 2.27]), ovary (OR = 1.53, 95% CI [1.03, 2.32]), colon and rectum (OR = 1.38, 95% CI [1.29, 1.49]), stomach (OR = 1.32, 95% CI [1.18, 1.49]), and prostate (OR = 1.19, 95% CI [1.03, 2.31]; Bagnardi, Blangiardo, La Vecchia, & Corrao, 2001).

In a similar meta-analysis investigating selected non-cancer medical conditions, alcohol was associated with an increased odds ratio for a number of other medical conditions. High levels of drinking (100g per day) significantly increased the odds of liver cirrhosis (OR = 26.52, 95% CI [22.26, 31.59]), hemorrhagic stroke (OR = 4.70, 95% CI [2.28, 8.37]), ischemic stroke (OR = 4.37, 95% CI [2.28, 8.37]), essential hypertension (OR = 4.15, 95% CI [3.13, 5.52]), chronic pancreatitis (OR = 3.19, 95% CI [1.82, 5.59]), injuries and violence (OR = 1.58, 95% CI [1.27, 1.95]), and coronary heart disease (OR = 1.13, 95% CI [1.06, 1.21]). Contrary to other trends, at moderate levels of drinking (25g per day), alcohol use decreased the risk of coronary heart disease (OR = .81, 95% CI [.79, .83]). This trend was also true for ischemic stroke and gastroduodenal ulcer, but results were not significant (Corrao, Bagnardi, Zambon, & La Vecchia, 2004).

**Risks for college students.** Alcohol use during the collegiate years increases the risk for both immediate and long-term physical, social, and neurological consequences (Spear, 2002; Hiller-Strumhofel, 2004; Zeigler et al., 2005). Further, alcohol use patterns in college can
reinforce the course for alcohol use later in life. Jennison (2004), in a longitudinal study, indicated that those who drink heavily in college (i.e., six or more drinks on one occasion at least once in the past 30 days) are more likely to develop diagnosable alcohol dependence (OR = 5.78, 95% CI [5.77, 5.79]) and diagnosable alcohol abuse (OR = 9.34, 95% CI [9.33, 9.35]) than peers who did not drink heavily within the ten years following college.

Beyond these long-term health effects, alcohol use is also associated with more immediate negative outcomes in college students. According to the National Survey on Drug Use and Health, 1.9% of college students experience alcohol-related health problems. Of traffic fatalities in college-aged individuals, 51% were alcohol related. In that same population, 38% of non-traffic deaths due to accidental injury were alcohol related (CBHSQ, 2016). College students are also at risk for nonfatal injuries and negative health outcomes due to alcohol use. Hingson, Heeren, Winter, & Wechsler (2005) reported that 10.5% of college students have suffered injuries related to their drinking, and 8% of college students have had unprotected sex while under the influence of alcohol. This population is also at an increased risk for assault by individuals using alcohol with (12% reporting such incidents), and sexual assault by someone under the influence of alcohol (2% reporting such incidents).

*Academic risks in college.* The National Institute on Alcohol Abuse and Alcoholism (2015) indicated that 25% of college students report a negative academic consequence related to their drinking including missing class, falling behind in class, performing poorly on exams or papers, and receiving low grades. Thombs, Olds, Bondy, Winchell, Baliunas, & Rehm (2009) compared college students who drank less than 3 times per week to those that drank more frequently and found that heavier drinkers were six times more likely to have performed poorly on a recent test, and were five times more likely to have recently missed a class.
Factors Affecting Alcohol Use in College Students

Attachment and affect regulation are among many factors that influence alcohol use in college students and the general population. The biopsychosocial model (Engel, 1980; Melchert, 2015) offers a context in which the relations between attachment, affect regulation, and alcohol use operate in. A brief review of other factors influencing alcohol use in college students is offered below.

**Biological factors.** Several genetic factors can influence alcohol use. In a meta-analysis of family, twin, and adoption studies, Walters (2002) found a notable but modest with a moderate heritability rate of 30-36%. In those with diagnosed with alcohol use disorders, the meta-analytic data suggests a 49% heritability rate (Verhulst, Neale, Kendler, 2015).

Several specific risk factors have been identified. Several genetic polymorphisms have been associated with alcohol use and alcohol use disorders, most notably, the dopamine receptor (DRD4) gene (Ray et al., 2009). Further, gene variability influencing the metabolism of alcohol to acetylaldehyde, and the metabolism of acetylaldehyde to acetic acid has been demonstrated to effect alcohol use rates. Certain polymorphisms reduce the efficiency of the enzymes alcohol dehydrogenanse and aldehyde dehydrogenase to create a buildup of acetylaldehyde which creates flushness and nausea. These adverse reactions to alcohol reduce the likelihood of substantial alcohol use due to operant conditioning of associating even mild alcohol use with nausea. This biological mechanism is utilized in the pharmaceutical treatment for alcohol dependence disulfiram (Antibuse ®; Agrawal & Bierut, 2012; Barkley-Levenson & Crabbe, 2014).

**Psycho-social factors.** According to the 2015 National Survey on Drug Use and Health conducted by the CBHSQ (2016), rates of drinking differ based on several demographic
variables in the United States. Drinking rates differ by racial and ethnic status; those identifying as European American had the highest rates (lifetime: 86.3%; past month: 57.0%) followed by African Americans (lifetime: 72.8%; past month: 43.8%), Hispanic or Latino (lifetime: 72.5%; past month: 42.4%), American Indian (lifetime: 72.1%; past month: 37.9%), Asian (lifetime: 65.1%; past month: 39.7%) and Native Hawaiian or other Pacific Islander (lifetime: 64.6%; past month: 33.8%). Men (lifetime: 83.9%; past month: 56.2%) are more likely to drink than women (lifetime: 78.3%; past month: 47.4%) in the general population. In college aged individuals (18-25) rates of drinking between men (lifetime: 82.1%; past month: 59.5%) and women (lifetime: 82.7%; past month: 57.2%) are similar.

Drinking rates in US adults also differ by educational attainment. Those with a college degree had the highest levels of drinking (lifetime: 91.5%; past month: 69.2%), followed by those with an associate’s degree or some college (lifetime: 90.6%; past month: 60.2%), high school graduates (lifetime: 83.1%; past month: 46.8%), and those with less than a high school diploma (lifetime: 72.5%; past month: 35.4%). Similarly, drinking rates differed by employment status in US adults, with those employed full time drinking the most (lifetime: 91.8%; past month: 66.2%), followed by those employed part time (lifetime: 86.6%; past month: 57.7%), and those who are unemployed (lifetime: 82.3%; past month: 50.0%; CBHSQ, 2016).

Marshal et al. (2008), in a meta-analysis of substance use research for adolescent and early adult lesbian, gay, and bisexual individuals, found that sexually diverse persons are at greater risk for alcohol use in the past 30 days (OR = 2.55) and lifetime alcohol use (OR = 2.33) than their heterosexual peers. Fredriksen-Goldsen, Kim, Barkan, Muraco, & Hoy-Ellis (2013) found similarly higher levels of risk in a survey of older sexually diverse adults (men: OR = 1.65, 95% CI [1.24, 2.20]; Women OR = 1.77, 95% CI [1.27, 2.47])
**Age.** A large scale (n = 1,817) longitudinal study of college students using growth curve modeling suggests that the frequency of alcohol use ($t = 19.26$, $p < .001$) and quantity of alcohol ($t = 8.31$, $p < .001$) increased from age 18 to 21, but from age 21 to 23, there was no significant change in the frequency of alcohol use ($t = $ not published, $p = .24$), and a slight decrease in the quantity of alcohol consumed ($t = -3.39$, $p < .05$; Del Boca, Darkes, Greenbaum, & Goldman, 2004). In examining the period of time surrounding the 21st birthday, Fromme, Wetherill, & Neal (2010) found no significant difference in the amount of alcohol consumed before and after individuals turned 21 ($z = 1.04$, $p = .30$).

**Environmental.** In a national sample of college students (n = 1894), Weitzman, Nelson, & Wechsler (2003) identified several risk factors for higher levels of alcohol use, including attending a school with NCAA Division 1 sports (OR = 1.25, 95% CI [1.01, 1.54]), spending three or more hours a day socializing (OR = 1.57, 95% CI [1.27, 1.94]), being a member of a fraternity or sorority (OR = 2.62, 95% CI [1.88, 3.65]), and living a co-ed residence hall (OR = 1.90, 95% CI [1.55, 2.34]). In a similar large-scale study (n = 7061), Wechsler, Kuo, Dowdall (2000) identified living in a fraternity or sorority house (OR = 6.2, 95% CI [4.24, 8.98]), living in a co-ed residence hall (OR = 1.7, 95% CI [1.49, 1.96]), and having very easy access to inexpensive alcohol (OR = 3.3, 95% CI [2.51, 4.25]), all brought increased risk for high levels of drinking.

**Motivations and expectations.** A review of the literature on self-reported reasons for college students' use of alcohol identified three major themes including drinking for social purposes, drinking for emotional escape, and drinking to feel drunk (Baer, 2002). The Core Institute (2014) reported different perceptions among college students concerning the purpose of alcohol use. The majority of their sample reported that alcohol serves several social functions
(e.g., helps breaks the ice (75%), enhances social activities (74%), gives people something to do (72%), gives people something to talk about (67%), allows people to have more fun (63%), and facilitates sexual opportunities (52%). A significant minority of the sample reported that consuming alcohol makes it easier for them to deal with stress (44%). It is important to note that themes in the data point to the importance of social connect and stress management as motivators for college students’ alcohol use, which again provide some indication about the importance of the role of attachment and affect regulation, with alcohol use.

**Hunter and Maunder Model of Health and Attachment**

To understand how attachment style can influence the development and progression of diseases, Hunter and Maunder (2001; 2016) propose a three-path model (a fourth minor path of mental health is included in the 2016 revision) from attachment insecurity, to increased disease risk (See Figure 2).

The first path describes the role of insecure attachment styles and stress in disease development and progression. The authors assert that an exaggerated (anxious) or blunted (avoidant) stress response leads to an increased allostatic load, altered immune response, and other physiological reactions associated with hyper-activating (anxious) or deactivating (avoidant) responses. The authors describe this path being actuated by higher levels of perceived stress, more dysregulated emotional stress physiology, and decreased social support that is associated with insecure attachment styles (Hunter & Maunder, 2001; Hunter & Maunder, 2016).

The second path described concerns the role of affect regulation. The authors assert that deficits in internal affect regulation associated with insecure attachment styles leads to the greater use of external regulators of affect like alcohol use or other externalizing behaviors that
can bring health risks like addiction, obesity, or increased exposure to communicable diseases (Hunter & Maunder, 2001; Hunter & Maunder, 2016).

The third path describes the role of maladaptive health care behaviors like the over or under utilization of health care services, treatment non-adherence, patient provider communication or relationship difficulties, and other self-management behaviors. The authors assert that differences in the attention to and interpretation of symptoms, levels of dependency versus self-reliance, and narrative incoherence lead to an increase in maladaptive health care behaviors. These maladaptive healthcare behaviors increase the overall risk for poor health outcomes (i.e., disease acquisition, disease burden), both immediately and in the future (Hunter & Maunder, 2001; Hunter & Maunder, 2016).

Finally, in a 2016 revision of the model, a fourth minor path was added to acknowledge the influence of mental health in health care, both to acknowledge the illness and disability burden mental illness causes on its own and the role that poor mental health plays in developing and maintaining physical disease and illness. Authors suggest that this increase in mental illness in turn increases disease risk and illness burden (Hunter & Maunder, 2016).

**Alcohol Use and Attachment**

Hunter and Maunder, among other theorists (most notably Flores, 2011), indicate a strong connection between alcohol use and attachment styles. A body of longitudinal and cross-sectional research supports this assertion.

**Alcohol use and attachment longitudinal data.** Several longitudinal studies offer strong support of a link between early attachment patterns and later alcohol use. Henry, Oetting, & Slater (2009), in a large scale (n = 1064) US longitudinal study, indicated that adolescent attachment style accounted for a significant amount of variance in current alcohol use ($B = -.30$,
as well as one year later ($B = -.22$, $SE = .07$, $p < .01$). A similar large scale (n = 1,012) longitudinal study of Dutch children reported that attachment insecurity in childhood was correlated with alcohol use one year later ($r = .26$, $p < .01$; Van der Vorst, Engels, Meeus, & Dekovic, 2006). Longitudinal studies covering a longer period of time reported childhood attachment anxiety ($r = .23$, $p < .01$) and avoidance ($r = .17$, $p < .05$) at age 14 were correlated with drinking behavior at age 23 (Dawson, Allen, Marston, Hafen & Schad, 2014).

Vungkhanching, Sher, Jackson, & Parra (2004), reported those classified as having an avoidant attachment in childhood had increased odds of developing an alcohol use disorder 11 years later as compared to those with a secure attachment (OR = 2.13; 95% CI [1.23, 3.68]). Even after controlling for a family history of alcohol use disorder, those with a secure attachment still had lower odds of developing an alcohol use disorder when compared to those with an avoidant style (OR = 1.92, 95% CI [1.10, 3.36]).

**Alcohol and attachment cross-sectional data.** In addition to longitudinal data, a body of cross-sectional studies demonstrate the connection between adult attachment style and alcohol use. In a sample of US adults in the general population, alcohol use was correlated with overall attachment security ($r = -.13$, $p < .05$), attachment avoidance ($r = .28$, $p < .001$), and attachment anxiety ($r = .25$, $p < .001$; Mickelson, Kessler, & Shaver, 1997). In a sample of adults who were receiving outpatient treatment for alcohol use disorders, higher levels of attachment anxiety was significantly correlated with alcohol use ($r = .19$, $p < .01$; Thorberg et al., 2011). Further, alcohol dependent individuals demonstrate higher levels of attachment anxiety ($F(1,184) = 48.24$, $p < .001$) and avoidance ($F(1,184) = 16.88$, $p < .001$) than the individuals without a substance use disorder (Wyrykowska, Glogowska, & Mickiewicz, 2014).
**Alcohol use and attachment in college students and young adults.** Similar patterns of relations emerge in the body of work investigating alcohol use and attachment style in college students. Andres, Castanier, & Le Scanff (2014) found attachment insecurity was correlated with alcohol use \((r = .14, p < .01)\) in college students. Futher, Labrie & Sessoms (2012) found students’ attachment security before starting college correlated with their alcohol use \((r = -.20, p < .05)\) and negative consequences associated with alcohol use \((r = -.32, p < .001)\) six months after starting college. Specifically, in a sample of US college females, Golder, Gillmore, Spieker, & Morrison (2005) reported that attachment anxiety \((B = -.05, p > .05)\) and avoidance \((B = .26, p < .01)\) accounted for a significant amount of variance in reported frequency of drinking \((R^2 = .26, p < .01)\). Findings from another sample of college students (Kassel, Wardle, & Roberts, 2007) indicated that attachment insecurity was correlated with the frequency students reported using alcohol to deal with their stress \((r = .22, p < .005)\). Across studies, results indicate a significant relation between attachment style and alcohol use, with noted patterns of using alcohol to deal with stress and increased negative outcomes associated with alcohol use.

**Alcohol Use as an External Regulator**

Hunter and Maunder (2016) suggest that alcohol use serves as an external regulator for those with difficulty regulating emotions internally. Survey and experimental data across numerous populations demonstrate a consistent link between affect regulation and alcohol use. For example, in a sample of those successfully completing inpatient alcohol dependence treatment, Berking et al. (2011) found clients' abilities to internally regulate their emotions at discharge was predictive of alcohol use at three months after discharge \((B = -0.63, SE = 0.38, p < 0.05)\).
Several hyperactivating and down regulating emotional regulation strategies have been found to associated with alcohol use in the empirical research. Specifically, a meta-analysis of studies examining the impact of common affect regulation strategies on alcohol use found moderate correlations between alcohol use and both ruminating \( r = .21, p < .001 \) and avoidant strategies \( r = .26, p < .001; \) Aldao, Nolen-Hoeksema, & Schweizer, 2010). In greater detail, alcohol use in a sample of substance abuse inpatients three months after discharge was correlated with a number of affect regulation strategies such as; failing to understand their emotions \( r = -.24, p < .01 \), inability to tolerate their emotions \( r = -.24, p < .01 \), difficulty clarifying their emotions \( r = -.20, p < .05 \), trouble modifying their emotions \( r = -.20, p < .05 \); readiness to confront distressing situations \( r = -.19, p < .05 \) and self-compassion \( r = -.16, p < .05; \) Berking et al, 2011). Similarly, Paulus et al. (2017) found their alcohol use was correlated with limited affect regulation strategies \( r = .27, p < .01 \), poor impulse control \( r = .27, p < .01 \), poor emotional clarity \( r = .27, p < .01 \), non-acceptance of emotions \( r = .17, p < .01 \), and lower emotional awareness \( r = .13, p < .01 \). Furthering the connection between alcohol use and emotional regulation, when these participants were asked to rate their motives for drinking, alcohol use was moderately associated with drinking to cope with stress \( r = .58, p < .01 \). Across studies, difficulty regulating emotions across hyperactivating and down regulating strategies are associated with higher levels of alcohol use.

**Emotional regulation and alcohol use in college students.** Similar patterns of emotional regulation and alcohol use are observed in the college student population. Fischer, Forthun, Pidcock, & Dowd (2007) college students’ ability to regulate emotion predicted alcohol use after accounting for psycho-social maturity, parental drinking problems, and family discord \( \text{Women: } B = -.09, p < .05; \text{ Men: } B = -.20, p < .001; \). Furthering the association, students
difficulty with emotional regulation, as measured by the DERS, was correlated with alcohol use generally \((r = .26, p < .001)\), and more specifically with students’ reports of drinking to cope \((r = .49, p < .001)\), and drinking to enhance mood \((r = .24, p < .01);\) Aurora & Klancek, 2016).

Similar to Paulus et al. (2017), Dvorak et al. (2014) found several specific poor affect regulation strategies in a college sample that were correlated with alcohol use, including: poor impulse control \((r = .25, p < .05)\), limited regulation strategies \((r = .23, p < .05)\), difficulty engaging in goal directed behavior \((r = .21, p < .05)\), non-acceptance of emotions \((r = .21, p < .05)\), poor emotional clarity \((r = .21, p < .05)\), and low emotional awareness \((r = .09, p < .05)\).

Beyond correlational studies, an experimental investigation also demonstrated the association between emotional regulation and alcohol use. In lab research with college students, Kidorf and Lang (1999) induced emotional dysregulation in an experimental group by telling them that they would give a recorded speech in a large auditorium addressing their personal faults. Those in the control condition were told they were to complete psychological surveys. Students were then allowed to drink alcohol freely for 30 minutes. Students in the experimental condition rated higher levels of state anxiety \((F(1,82) = 63.26, p < .001)\), state depression \((F(1,82) = 8.19 p < .001)\), and state hostility \((F(1,82) = 4.13, p < .05)\). Further, those in the experimental condition drank significantly more than those in the control condition \((F(1,82) = 4.4, p < .05)\), again supporting the hypothesis that affect dysregulation is linked to alcohol use.

**Present Study**

In the present study, I tested the model proposed by Hunter and Maunder (2016) by examining the pathways from anxious and avoidant attachment styles, to emotional regulation, to the use of alcohol in a sample of college students. Specifically, I tested this model in predicting the frequency of alcohol use, the quantity of alcohol used, the frequency of heavy episodic
drinking, and overall alcohol use. I also examined, for the first time, whether emotional regulation mediates the relation between attachment styles and alcohol use for each model. Much of the aforementioned research has demonstrated the effect of insecure attachment on tendencies toward alcohol use, connecting this relation to affect regulation. According to Hunter and Maunder (2016), deficits in affect regulation will lead individuals to utilize external regulators (like alcohol) to cope with distressing emotions they cannot sufficiently internally regulate so as to bring themselves relief. The primary purpose of my study is to test this model, specifically to examine the mediating role of emotion regulation on the relation between attachment and alcohol use. This led me to the following specific research questions and hypotheses.

**Research Questions and Hypotheses**

**Research Question One**

Do adult attachment styles and emotional dysregulation significantly relate to alcohol use reported by college students?

**Hypothesis One**

I hypothesize that both attachment avoidance and anxiety as well as emotional dysregulation, will be moderately positively correlated with alcohol use frequency, quantity, and frequency of heavy episodic drinking.

**Research Question Two**

Do relations among attachment styles, emotional dysregulation, and the frequency of alcohol use support the proposed structure of the mediated model proposed by Hunter and Maunder (2016)?
Hypothesis Two

I hypothesize that the observed relations among attachment anxiety, attachment avoidance, emotional dysregulation, and the frequency of alcohol use will support the model proposed by Hunter and Maunder (2016). Specifically, I hypothesize that there will be moderately positive relations between both attachment anxiety and avoidance and emotional dysregulation. Further, I hypothesize, a moderately positive relation between emotional dysregulation and the frequency of alcohol use. Finally, I hypothesize that emotional dysregulation will mediate the relation between both attachment anxiety and avoidance and the frequency of alcohol use, as evidenced by significant weak to moderate positive indirect effects.

Research Question Three

Do relations among attachment styles, emotional dysregulation, and the quantity of alcohol use support the proposed structure of the mediated model proposed by Hunter and Maunder (2016)?

Hypothesis Three

I hypothesize that the observed relations among attachment anxiety, attachment avoidance, emotional dysregulation, and the quantity of alcohol use will support the model proposed by Hunter and Maunder (2016). Specifically, I hypothesize that there will be moderately positive relations between both attachment anxiety and avoidance and emotional dysregulation. I also hypothesize, a moderately positive relation between emotional dysregulation and the quantity of alcohol use. Further, I hypothesize that emotional dysregulation will mediate the relation between both attachment anxiety and avoidance and the quantity of alcohol use, as evidenced by significant weak to moderate positive indirect effects.
**Research Question Four**

Do relations among attachment styles, emotional dysregulation, and the frequency of heavy episodic drinking support the proposed structure of the mediated model proposed by Hunter and Maunder (2016)?

**Hypothesis Four**

I hypothesize that the observed relations among attachment anxiety, attachment avoidance, emotional dysregulation, and the frequency of heavy episodic drinking will support the model proposed by Hunter and Maunder (2016). Specifically, I hypothesize that there will be moderately positive relations between both attachment anxiety and avoidance and emotional dysregulation. I also hypothesize, a moderately positive relation between emotional dysregulation and the frequency of heavy episodic drinking. Finally, I hypothesize that emotional dysregulation will mediate the relation between both attachment anxiety and avoidance and the frequency of heavy episodic drinking as evidenced by significant weak to moderate positive indirect effects.

**Research Question Five**

Do relations among attachment styles, emotional dysregulation, and overall alcohol use support the proposed structure of the mediated model proposed by Hunter and Maunder (2016)?

**Hypothesis Five**

I hypothesize that the observed relations among attachment anxiety, attachment avoidance, emotional dysregulation, and overall alcohol use; as defined by an estimate of a latent alcohol use variable constructed from measures of the frequency of alcohol use, the quantity of alcohol used, and the frequency of heavy episodic drinking, will support the model proposed by Hunter and Maunder (2016). Specifically, I hypothesize that there will be moderately positive
relations between both attachment anxiety and avoidance and emotional dysregulation. Further, I hypothesize, a moderately positive relation between emotional dysregulation and an estimate of a latent alcohol use variable. Finally, I hypothesize that emotional dysregulation will mediate the relation between both attachment anxiety and avoidance and an estimate of a latent alcohol use variable, as evidenced by significant weak to moderate positive indirect effects.
CHAPTER 3. METHOD

Participants

Approval for this study of obtained from the Iowa State University Institutional Review Board (Appendix E). A total of 500 participants were recruited, in the Spring, Summer, and Fall semesters of 2018, through the Iowa State University Department of Psychology SONA platform to participate in the study. All affirmatively endorsed the informed consent. Participants who endorsed suicidal ideation ($n = 41$) on the PHQ9 were exited from the survey, redirected to a page listing local mental health resources, and their collected data was removed from the sample. Participants who completed less than 80% of the items ($n = 6$) were also removed from the sample. A total of 453 participants were retained in the final sample. This number exceeds the sample size ($N = 318$) indicated by a power analysis conducted in G*Power® necessary to detect a small to medium effect size (.10) in a mediation model (Faul, Erdfelder, Lang, & Buchner, 2007). Participants were recruited in the Spring, Summer, and Fall semesters of 2018.

The sample included individuals who self-identified as female ($n = 265, 58.5\%$), male ($n = 187, 41.3\%$), and transgender ($n = 1, 0.2\%$), ranging in age from 18 to 33 years old ($M = 19.6, SD = 1.6$). Participants primarily identified as European American ($n = 381, 84.1\%$), with 3.5% identifying as Asian American ($n = 16$), 3.1% identifying as International Students ($n = 14$), 3.1% identifying as Hispanic/Latino American ($n = 14$), 2.9% identifying as Bi/Multi-racial ($n = 13$), 2.0% identifying as African American ($n = 9$), and less than one percent identifying as; Middle Eastern American ($n = 3$), American Indian or Alaskan Native ($n = 1$), Hawaiian or Other Pacific Islander ($n = 1$), or Other ($n = 1$). Participants included 217 Freshman (47.9%), 105 Sophomores (23.2%), 68 Juniors (15.0%), 61 Seniors (13.5%), one non-degree student (0.2%), and one graduate student (.2%). Participants reported a variety of living arrangements, including;
167 living in a co-ed residence hall (36.9%), 111 living with a roommate in an off campus apartment (24.5%), 54 living in an university apartment (11.9%), 43 living in a non-co-ed residence hall (9.5%), 33 living in Greek housing (7.3%), 15 living off campus with family (3.3%), 15 living alone in an off campus apartment (3.3%), and 15 in other housing arrangements (3.3%). The sample included 106 first generation college students (23.4%) and 347 students whose parents earned a 4-year college degree (76.6%). Ninety-eight participants reported being involved in Greek life on campus (21.6%) and 355 were not involved in Greek life (78.4). Eighty participants reported having a parent or sibling with a history of alcohol abuse or dependence (17.7%), and 373 denied having a parent or sibling with a history of alcohol abuse or dependence (82.3%).

**Procedure**

I obtained approval for this study from the Iowa State University Institutional Review Board. After registering on SONA, participants were directed to an online survey housed on Qualtrics™, a firewalled, protected online data collection system. No personally identifying information was obtained from participants. The completion of research materials was estimated at 30 minutes and participants were awarded one research participation credit in the SONA system. Actual completion time ranged from 3.22 minutes to 2,693.52 minutes ($M = 30.28$, $SD = 150.65$, $Mdn = 13.77$).

Participants provided informed consent before completing research materials. Participants first reported basic demographic information and completed a brief depression screening instrument (PHQ9), which was not used in this investigation. Participants who endorsed suicidal ideation ($n = 41$) on the PHQ9 were exited from the survey and redirected to a page containing contact information for local mental health resources. The remaining
participants went on to complete measures of adult attachment, emotional regulation, alcohol use, and other measures not used in this study. Participants were then routed to a debriefing page offering mental health resources in the case they felt emotional discomfort or distress after answering the studies questions. Participants were automatically granted SONA credit within one week after registering for the study.

**Measures**

**Demographics**

Items soliciting basic demographic information, included; sex, age, year in school, race/ethnicity, type of residence at college, fraternity or sorority membership, first generation college student status, declared major, and family history of alcohol abuse or dependence.

**Experience in Close Relationships - Revised (ECR-R)**

The Experience in Close Relationships-Revised (ECR-R; Fraley, Waller, & Brennan, 2000), is a widely used self-reported, dimensional measure of attachment avoidance and anxiety. The ECR-R is a 36-item revised form of the Experience in Close Relationships (Brennan et al, 1998). Each item is rated on a 7-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*) with higher scores representing greater attachment insecurity (Fraley, Waller, & Brennan, 2000).

Of the 36 items, 18 (items 1-18) are scored for attachment anxiety, and 18 items (items 19-36) are scored for attachment avoidance. Several items are reversed scored for each of these attachment styles (items 9, 11, 20, 22, 26, 27, 28, 29, 30, 31, 33, 34, 35, & 36). Items within each attachment style are summed ranging from 18-126 (Fraley, Waller, & Brennan, 2000). In this study, results were transformed by subtracting 18 points from each scale to range from 0-108 for ease of interpretation.
The ECR-R was created as part of an Item Response Theory (IRT) analysis of adult attachment scales. This investigation aimed to improve precision of the ECR by addressing common limitations in classical test theory, including questions about the degree of continuity of attachment security, differential stability between attachment dimensions, and varying levels of precision across the continuum of attachment security. The ECR-R was developed from the same item pool as the ECR. The authors argue that utilizing and IRT analysis in items selection improves the measures precision (Fraley, Waller, & Brennan, 2000).

The ECR-R has strong psychometric properties. The two-factor structure suggested by attachment theory, measuring attachment anxiety and avoidance was supported in the ECR-R by both exploratory (EFA) and confirmatory (CFA) factor analyses. Across several principal components exploratory factor analyses, the eigenvalues for the two factors were: Factor 1 (avoidance) = 9.80 - 13.15 and Factor 2 (anxiety) = 4.97 - 8.56. The two attachment factors accounted for 48 - 51% of the variance across studies (Sibley & Liu, 2004; Sibley, Fisher, & Liu, 2005). In a CFA, fit indices supported a two-factor structure as the best fit with GFI = .92, NNFI = .96, CFI = .97, RMR = .083, and RMSEA = .068. A chi-squared difference test supported a two-factor solution as a better fit than a single factor ($\chi^2(1) = 1381.73, p < .001$) and a three-factor ($\chi^2(1) = 47.78, p < .001$) model (Sibley & Liu, 2004) These findings have been replicated in several other samples through CFA investigations (Sibley, Fisher, & Liu, 2005; Fairchild & Finney, 2006).

The ECR-R has demonstrated good internal reliability. Attachment anxiety has demonstrated strong internal consistency with Cronbach’s alpha ranging from $\alpha = .92$ to $\alpha = .95$. In this study, observed internal consistency of attachment anxiety was strong with a Cronbach’s alpha of .92. Attachment avoidance has also demonstrated strong internal consistency with
Cronbach’s alpha ranging from $\alpha = .91$ to $\alpha = .94$. In my current sample, observed internal consistency of attachment avoidance demonstrated a Cronbach’s alpha of .95. Correlations between the attachment avoidance and anxiety scales range from $r = .42$ to $r = .51$ (Sibley & Liu, 2004; Sibley, Fisher, & Liu, 2005, Fairchild & Finney, 2006). In this study, the two subscales were moderately correlated at $r = .49 (p < .001)$, indicating that the subscales are related, but essentially measuring different constructs.

The ECR-R has good test-retest reliability. Several assessments of temporal stability through path analyses indicated good stability after three and six weeks. These studies found 84% - 86% of the variance of attachment avoidance was shared across the two time points, and 85% - 86.5% of the variance of attachment anxiety was shared across the two time points (Sibley & Liu, 2004; Sibley, Fisher, & Liu, 2005). These findings are supported by a data simulation based on the initial IRT analyses (Fraley, Waller, & Brennan, 2000).

The ECR-R demonstrated good convergent validity. The ECR-R demonstrated moderate relations with the widely used Relationship Questionnaire (Bartholomew & Horowitz, 1991) with moderately positive correlations between attachment anxiety scales ($r = .60 - .69$) and between attachment avoidance scales ($r = .45 - .62$; Sibley, Fisher, & Liu, 2005). The ECR-R also demonstrated moderate relations with the ECR-RS (Experience in Close Relationships-Relationship Structure Form; Fraley et al., 2011), a 9-item measure of attachment anxiety and avoidance repeated across several important relationships (romantic, parental, etc.). Anxious attachment ($r = .46 - .66$) and avoidant attachment ($r = .31 - .56$) scores were moderately to strongly correlated with their ECR-RS counter parts assessing general attachment and attachment within romantic relationships specifically (Fraley et al., 2011).
The ECR-R has demonstrated good predictive validity. ECR-R was correlated as hypothesized with loneliness (UCLA Loneliness Scale-Version 3; Russel 1996) across both attachment anxiety ($r = .53$) and avoidance ($r = .37$). In the same sample, both attachment anxiety ($r = -.43$) and avoidance ($r = -.45$) were moderately negatively correlated as predicted with perceived social support (Social Provisions Scale; Cutrona & Russell, 1987). Further, attachment avoidance was correlated as predicted with avoiding and being uncomfortable with physical touch ($r = .41 - .51$). Attachment anxiety was correlated as predicted with worry ($r = .39$; Fairchild & Finney, 2006).

**Difficulties in Emotion Regulation Scale (DERS)**

The Difficulties in Emotion Regulation Scales (DERS) is a self-report measure that taps the frequency of respondents' emotional regulation experiences. The measure is comprised of 36 items, each rated on a five-point Likert scale, using the following anchors; 1 = almost never (0-10%), 2 = sometimes (11-35%); 3 = about half the time (36-65%); 4 = most of the time (66-90%); and, 5 = almost always (91-100%). Participants were be asked to make ratings based on the past 30 days. The DERS has 6 subscales, including; non-acceptance of emotional reactions (6 items); difficulty engaging in goal-directed behavior (5 items); impulse control difficulties (6 items); lack of emotional awareness (6 items); limited access to emotion regulation strategies (8 items); and, lack of emotional clarity (5 items). The DERS yields a full-scale score, with higher scores representing greater difficulties in regulating emotion (Gratz & Roemer, 2004).

The DERS has strong psychometric properties. An exploratory factor analysis of the 36 items indicated that the 6 factors accounted for 56% of the total item variance, with the following eigenvalues; nonacceptance of emotional reactions = 11.12 (30.85%), difficulties engaging in goal directed behavior = 3.85 (10.70%), impulse control difficulties = 2.94 (8.17%), lack of
emotional awareness = 1.95 (5.42%), limited access to emotion regulation strategies = 1.56 (4.34%), and lack of emotional clarity = 1.13 (3.14%). All items had factor loadings of .40 - .91 on their respective factors (Gratz & Roemer, 2004).

The DERS total score ($\alpha = .93$) and subscales show good internal consistency: non-acceptance of emotional responses ($\alpha = .85$), difficulty engaging in goal-directed behavior ($\alpha = .89$), impulse control difficulties ($\alpha = .86$), lack of emotional awareness ($\alpha = .80$), limited access to emotion regulation strategies ($\alpha = .88$), and, lack of emotional clarity ($\alpha = .84$). The DERS total score ($r = .88, p < .01$) and subscale scores also have good test-retest reliability over a four to eight-week time period: non-acceptance of emotional responses ($r = .69, p < .01$), difficulty engaging in goal-directed behavior ($r = .69, p < .01$), impulse control difficulties ($r = .57, p < .01$), lack of emotional awareness ($r = .68, p < .01$), limited access to emotion regulation strategies ($r = .89, p < .01$), and, lack of emotional clarity ($r = .80, p < .01$; Gratz & Roemer, 2004).

The DERS total score has a moderate correlation with the Negative Mood Regulation Scale ($r = -.69, p < .01$; NMRS; Catanzaro & Mearns, 1990). This relation is negative as higher scores on the DERS indicate more difficulty regulating emotions and higher scores on the NMRS indicate a better ability to regulate emotions. The DERS total score also correlated with indicators of emotion regulation including experiential avoidance (i.e., attempts to avoid thoughts, feelings, and other internal experiences even when doing so causes harm) as measured by the Acceptance and Action Questionnaire ($r = .60, p < .01$; AAQ; Hayes et al., 2004), and emotional expressivity (frequency and intensity of displaying emotional reactions) as measured by the Emotional Expressivity Scale ($r = -.23, p < .01$; EES; Kring, Smith, Neale; 1994). The DERS was correlated with common behavioral indicators of difficulty in emotion regulation,
including self-harm as measured by the Deliberate Self-Harm Inventory (women: $r = .20, p < .01$; men: $r = .26, p < .05$; Gratz, 2001) and intimate partner abuse as measured by the Abuse-Perpetration Inventory in men (women: $r = .08, p = n.s.;$ men: $r = .34, p < .01$; Lisak et al., 2000; Gratz & Roemer, 2004). The DERS has also been used in alcohol research. DERS scores of patients in inpatient alcohol rehabilitation programs had significantly higher scores during the first week of treatment compared to social drinkers ($F(1,111) = 5.0, p < .05$; Fox, Hong, & Sinha, 2008).

**QF Approach to Alcohol Use Measurement**

The QF approach to alcohol use measurement is a commonly used three-item assessment of alcohol use behaviors over the past 30 days, including: the frequency of alcohol use (QF Frequency), the typical quantity of alcohol used (QF Quantity), and the frequency of heavy episodic drinking (QF HED). Item responses take the form of counts in the units of days or drinks per day. Higher scores for each item indicate higher levels of alcohol use.

First, participants are asked to think back over the past 30 days, and report how many days they consumed any beverage containing alcohol. Next, participants are provided information about the size of a standard drink across different alcohol types (i.e. beer, wine, liquor). Participants are then again asked to think back over the past 30 days, and report how many standard drinks they usually had on days when they consumed alcohol. Finally, participants are asked on how many of the past 30 days they had five or more drinks if male or four or more drinks if female. The items can be combined to create a 30 day estimate of total drinks consumed, or the items can also be interpreted as single items for more specificity (Dawson, 2003). In my study, I used the single item approach.
The QF approach is considered a valid measure of alcohol use. It has demonstrated good criterion-related concurrent validity. QF estimates have a strong correlation ($r = .84-.94$) with the commonly used Graduate Frequency approach to alcohol use measurement (Poikolainen, Podkletnova, & Alho, 2002; Gmel, Graham, Keundig, & Kuntsche, 2006). A 10-nation sample with 21,852 participants found no significant difference between the QF and GF approaches (Gmel, Graham, Kuendig, & Kuntsche, 2006). The QF approach has also demonstrated a strong correlation ($r = .95$) with a daily diary method of alcohol use. A study of common blood serum laboratory test of biomarkers of heavy drinking indicated significant correlations between QF self-reported alcohol use and serum aspartate aminotransferase (ASAT; $r = .61$), alanine aminotransferase (ALAT; $r = .53$), $\gamma$-glutamyltransferase (GGT; $r = .67$), and carbohydrate-deficient transferrin (CDT; $r = .12$; Poikolainen, Podkletnova, & Alho, 2002).

The QF approach is considered a reliable measure of alcohol consumption. The approach has good test-retest reliability with a 30-day test-retest correlation of $r = .93$ (Poikolainen, Podkletnova, & Alho, 2002). It has demonstrated good test-retest reliability over longer periods (3-17 month) with test-retest correlations ranging from $r = .83$ to $r = .91$ (Webb, Redman, Gibberd, & Sanson-Fisher, 1991).
CHAPTER 4. RESULTS

Software

Analyses were conducted using the IBM © Statistical Package for the Social Sciences (SPSS©) 25th edition (64bit) for Windows© and Stata/IC© 15.1 (64bit) for Windows©.

Data Cleaning

Data were reviewed for any out of range responses or other unusual entries and deleted or corrected when possible. Data entered by participants who were excluded due to their endorsement of suicidality were deleted from the dataset. Text responses were converted to numeric variables where appropriate. When number of drinks or days drinking were reported by participants as ranges (e.g. 2-5 drinks), the average of the range was computed and rounded to the nearest integer and entered in place of the range value. Responses on the ECR-R and DERS were transposed to have a minimum possible score of zero for ease of interpretation.

Missing Data

Participants who completed less than 80% of the items (n = 6) were removed from the sample. Participants who completed less than 80% of the items on an individual measure, did not have a full-scale score calculated for that measure, and empty responses were entered as 'missing' and excluded using pairwise deletion (n = 10). Participants who completed more than 80% of each measure had missing data points imputed based on the mean of the answered items on that measure. After these data cleaning procedures, a total of 453 cases were retained for analyses.

Outliers

Data points on all measures were restricted in range by minimum and maximum scale values, with one exception, number of 'drinks per day' on the quantity item of the Q/F measure. Outliers were defined as responses outside of one and a half times the interquartile range (i.e.
values greater than 10 drinks per day; Tukey, 1977). Data points outside of this range (n = 6) were Winsorized (Tukey, 1962) to recode the outliers to the nearest response in the acceptable range (i.e. recoded to 10). This transformation shifted the mean number of drinks from 2.81 to 2.78 and shifted the standard deviation from 2.72 to 2.60. This procedure also reduced the skewness of the distribution from 1.13 to 0.81 and the kurtosis from 1.75 to < 0.001.

**Descriptive Data**

Descriptive statistics including sample mean, median, mode, standard deviation, variance, skewness, kurtosis, and observed range of all study measures are presented in Table 1.

After reviewing the descriptive statistics for each variable, the distribution of the alcohol use outcome variables were positively skewed (0.81-1.89), and the distributions of the QF Frequency and QF Heavy Episodic Drinking Frequency (HED) variables were leptokurtic (3.06-3.63). As these variables did not appear to conform to a normal distribution, further investigation of those distributions was warranted. All other variables had a normal distribution with adequate dispersion.

**Comparing Distributions and Zero-Inflation of Outcome Variables**

First, frequency tables of each outcome variable were examined. All three outcome variables had a notably large number of participants reporting 'zeros', with 129 (28.5%) participants reporting zero days drinking in the last month (QF Frequency), 127 (28.0%) participants reporting 0 drinks per day in the last month (QF Quantity), and 223 (49.2%) participants reporting zero days of heavy episodic drinking in the past month (QF HED). Due to the positively skewed and leptokurtic distributions and high percentage of zeros, there was enough evidence provided to assume non-normal distributions in the outcome data for proceeding analyses.
Table 1

*Central Tendency and Dispersion of Measures*

<table>
<thead>
<tr>
<th>Measures</th>
<th>$M$</th>
<th>Median</th>
<th>Mode</th>
<th>$SD$</th>
<th>Variance</th>
<th>Sample Range</th>
<th>Scale Range</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ECR-R Anxious</td>
<td>40.17</td>
<td>41.00</td>
<td>54.0</td>
<td>20.42</td>
<td>416.97</td>
<td>0-102</td>
<td>0-108</td>
<td>0.09</td>
<td>-0.64*</td>
</tr>
<tr>
<td>2. ECR-R Avoidance</td>
<td>34.99</td>
<td>35.0</td>
<td>36.0</td>
<td>20.47</td>
<td>418.81</td>
<td>0-97</td>
<td>0-108</td>
<td>0.22</td>
<td>-0.57*</td>
</tr>
<tr>
<td>3. DERS</td>
<td>45.46</td>
<td>43.0</td>
<td>41.0</td>
<td>21.67</td>
<td>469.57</td>
<td>0-117</td>
<td>0-144</td>
<td>0.47*</td>
<td>-0.14</td>
</tr>
<tr>
<td>4. QF Frequency</td>
<td>4.85</td>
<td>3.0</td>
<td>0.0</td>
<td>5.40</td>
<td>29.19</td>
<td>0-30</td>
<td>0-30</td>
<td>1.56***</td>
<td>3.06***</td>
</tr>
<tr>
<td>5. QF Quantity</td>
<td>2.78</td>
<td>2.0</td>
<td>0.0</td>
<td>2.60</td>
<td>6.75</td>
<td>0-10</td>
<td>0-10</td>
<td>0.81**</td>
<td>0.00</td>
</tr>
<tr>
<td>6. QF HED</td>
<td>2.22</td>
<td>1.0</td>
<td>0.0</td>
<td>3.36</td>
<td>11.31</td>
<td>0-18</td>
<td>0-30</td>
<td>1.89***</td>
<td>3.63***</td>
</tr>
</tbody>
</table>

Note. * indicates the value is more than 2x the standard error; ** indicates the values is more than 4x the standard error; *** indicates the value is more than 8x the standard error; Standard Error of Skewness = .12; Standard Error of Kurtosis = .23; ECR-R Anxious = Experience in Close Relationships-Revised Anxious Attachment Subscale; ECR-R Avoidance = Experience in Close Relationships-Revised Avoidant Attachment Subscale; DERS = Difficulties in Emotion Regulation Scale Total Scale; QF Frequency = Quantity Frequency Alcohol Measure-Frequency of Alcohol Use; QF Quantity = Quantity Frequency Alcohol Measure-Average Quantity of Alcohol Used; QF HED = Quantity Frequency Alcohol Measure-Frequency of Heavy Episodic Drinking.
To further assess the distributions of the outcome data, several models assuming different
distribution types were compared by evaluating the direct relation of attachment avoidance and
attachment anxiety with each of the outcome variables. As the variables of interest were in the
form of a count data with a high frequency of zeros, I compared a Poisson distribution; a
negative binomial distribution; a zero-inflated Poisson distribution; a zero-inflated negative
binomial distribution; and a standard normal distribution (linear regression).

The Poisson distribution is a discrete probability distribution that expresses the
probability of an independent and discrete count variable occurring during an interval of time.
When the expected rate of the occurrence is low, the Poisson distribution curve takes a positively
skewed leptokurtic shape. The negative binomial distribution is also a discrete probability
distribution that expresses the probability of specified number of occurrences taking place in a
series of dichotomous outcome events. When the rate of the occurrence is low, the negative
binomial distribution curve takes a positively skewed leptokurtic shape. The negative binomial
distribution does not assume independence of occurrences like the Poisson distribution, and is
more accurate in predicting “contagious” events where events are positively correlated. The
zero-inflated distributions express probabilities when there is a frequent observation of zero in
count data. The distribution assumes that the occurrence of zero is inflated beyond what is
expected by chance. Zero-inflated distributions are used when the observation of a zero may be
influenced by an extraneous variable creating true zeros and false zeros. These distributions
allow for exposure variables to capture this variance. Zero-inflated distributions curves are more
positively skewed and leptokurtic than their underlying distribution and assume that the modal
observation is zero. Finally, the standard normal distribution is a continuous probability
distribution with the total area under the curve representing 100% of the probability. The
The standard normal distribution rests on the central limit theorem, stating that in naturally occurring distributions, as the number of observations increases, the distribution will converge at the mean. The standard normal distribution curve takes the shape of a bell curve, with 5% of the data points residing in each tail and 90% of the data points falling in between (Krishnamoorthy, 2006; Lovric, 2011).

The direct effect of the attachment variables on each outcome variable was assessed through a series of regressions assuming each of the above identified distributions. Fit indicators including the Akaike information criterion (AIC), Bayesian information criteria (BIC), and Log Likelihood were compared. Fit indicator values closer to zero indicate a better model fit. Results are presented in Table 2. Across all three outcome variables, each fit indicator suggested that the data best fit a zero-inflated negative binomial distribution, followed by the negative binomial distribution. Proceeding analyses were chosen based in part on the distribution and in part on the availability of accepted procedures. Due to the lack of available procedures for modeling zero-inflated data in Structural Equation Modeling (StataCorp, 2017; Muthen, 2019), a negative binomial distribution was selected. The following procedures, described below, utilized non-parametric or generalized analyses when QF items were entered as outcome variables to account for this distribution.

**Correlations**

Correlations among all variables and Cronbach’s alpha coefficients for measures were computed. Correlations involving a QF variable were computed using Spearman’s rho non-parametric correlation which does not assume a normal distribution. All other correlations were computed using as Pearson Product Moments. See results of these analyses in Table 3.
Table 2

Model Fit Indexes Assessing Distribution Types of Outcome Variables

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Distribution</th>
<th>AIC</th>
<th>BIC</th>
<th>Log Likelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td>QF Quantity</td>
<td>Normal (Linear)</td>
<td>2803.13</td>
<td>2815.47</td>
<td>-1398.57</td>
</tr>
<tr>
<td></td>
<td>Poisson</td>
<td>3754.13</td>
<td>3766.46</td>
<td>-1874.06</td>
</tr>
<tr>
<td></td>
<td>Zero-inflated Poisson</td>
<td>2847.98</td>
<td>2872.64</td>
<td>-1417.99</td>
</tr>
<tr>
<td></td>
<td>Negative Binomial</td>
<td>2404.92</td>
<td>2421.36</td>
<td>-1198.46</td>
</tr>
<tr>
<td></td>
<td>Zero-inflated Negative Binomial</td>
<td>2371.24</td>
<td>2400.02</td>
<td>-1178.62</td>
</tr>
<tr>
<td>QF Frequency</td>
<td>Normal (Linear)</td>
<td>2145.73</td>
<td>2158.07</td>
<td>-1069.87</td>
</tr>
<tr>
<td></td>
<td>Poisson</td>
<td>2246.10</td>
<td>2258.43</td>
<td>-1120.02</td>
</tr>
<tr>
<td></td>
<td>Zero-inflated Poisson</td>
<td>1951.13</td>
<td>1975.79</td>
<td>-969.56</td>
</tr>
<tr>
<td></td>
<td>Zero-inflated Negative Binomial</td>
<td>1924.60</td>
<td>1953.38</td>
<td>-955.30</td>
</tr>
<tr>
<td>QF HED</td>
<td>Normal (Linear)</td>
<td>2366.32</td>
<td>2378.65</td>
<td>-1180.16</td>
</tr>
<tr>
<td></td>
<td>Poisson</td>
<td>2646.73</td>
<td>2659.05</td>
<td>-1320.36</td>
</tr>
<tr>
<td></td>
<td>Zero-inflated Poisson</td>
<td>1919.40</td>
<td>1944.04</td>
<td>-953.70</td>
</tr>
<tr>
<td></td>
<td>Negative Binomial</td>
<td>1711.23</td>
<td>1727.66</td>
<td>-851.62</td>
</tr>
<tr>
<td></td>
<td>Zero-inflated Negative Binomial</td>
<td>1707.71</td>
<td>1736.46</td>
<td>-846.86</td>
</tr>
</tbody>
</table>

Note. QF Frequency = Quantity Frequency Alcohol Measure-Frequency of Alcohol Use; QF Quantity = Quantity Frequency Alcohol Measure-Average Quantity of Alcohol Used; QF HED = Quantity Frequency Alcohol Measure-Frequency of Heavy Episodic Drinking.

Moderate magnitude statistically significant positive correlations were observed among attachment avoidance, attachment anxiety, and difficulties in emotion regulation. Higher magnitude statistically significant positive correlations were observed among alcohol use variables (QF Frequency, QF Quantity, and QF HED). Notably, there were no significant correlations between the predictor (attachment avoidance, attachment anxiety, and difficulties in emotion regulation) and outcome variables (QF Frequency, QF Quantity, and QF HED). Significant moderately positive correlations were expected between all variables. Moderately positive correlations were observed between both attachment avoidance and anxiety and emotional regulation, but no significant correlations were observed between any alcohol outcome
variables (frequency of alcohol use, quantity of alcohol use, and frequency of heavy episodic drinking) and attachment avoidance, attachment anxiety, or emotional regulation. Therefore, the data does not support hypothesis one.

Table 3

Inter-correlations and Alpha Coefficients of Measures

<table>
<thead>
<tr>
<th>Measures</th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ECR-R Anxious</td>
<td>.92</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. ECR-R Avoidance</td>
<td></td>
<td>.49**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. DERS</td>
<td></td>
<td></td>
<td>.95</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. QF Frequency</td>
<td>-.05</td>
<td>-.08</td>
<td>.01</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. QF Quantity</td>
<td>-.01</td>
<td>-.01</td>
<td>-.03</td>
<td>.74**</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>6. QF HED</td>
<td>-.03</td>
<td>-.05</td>
<td>.02</td>
<td>.80**</td>
<td>.81**</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Note. *Italics* = Cronbach’s Alpha; **Bold** = Spearman’s rho Nonparametric Correlations; plain text = Pearson’s r correlation; ** = p < .01; N/A = Not applicable to single item measures; ECR-R Anxious = Experience in Close Relationships-Revised Anxious Attachment Subscale; ECR-R Avoidance = Experience in Close Relationships-Revised Avoidant Attachment Subscale; DERS = Difficulties in Emotion Regulation Scale Total Scale; QF Frequency = Quantity Frequency Alcohol Measure-Frequency of Alcohol Use; QF Quantity = Quantity Frequency Alcohol Measure-Average Quantity of Alcohol Used; QF HED = Quantity Frequency Alcohol Measure-Frequency of Heavy Episodic Drinking.

Association of Various Risk Factors with Outcome Variables

Categorical Variables

To examine whether categorical demographic data and group risk factors (sex, race/ethnicity, college major, housing, Greek life participation, generational college status, and family history of substance use disorders) had a significant impact on the outcome variables, a series of one-way Kruskal-Wallis H Tests were conducted. Results are presented in Tables 4-9.

**Sex.** No significant differences by sex were observed on measures of alcohol use.

**Race/Ethnicity.** Comparisons were made between participants identifying as European American and students identifying as a member groups traditionally considered as racially and ethnically diverse in the US. Significant differences between European American and
participants of color were observed on all measures of alcohol use, with European American students reporting higher levels of use.

Table 4

**Sex Differences: Kruskal-Wallis H Test**

<table>
<thead>
<tr>
<th>Measures</th>
<th>$H$</th>
<th>$df$</th>
<th>$p$</th>
<th>Mean Rank Male (n =187)</th>
<th>Mean Rank Female (n = 265)</th>
</tr>
</thead>
<tbody>
<tr>
<td>QF Frequency</td>
<td>0.17</td>
<td>1</td>
<td>.897</td>
<td>227.44</td>
<td>225.84</td>
</tr>
<tr>
<td>QF Quantity</td>
<td>1.37</td>
<td>1</td>
<td>.242</td>
<td>234.93</td>
<td>220.55</td>
</tr>
<tr>
<td>QF HED</td>
<td>1.19</td>
<td>1</td>
<td>.275</td>
<td>233.00</td>
<td>220.26</td>
</tr>
</tbody>
</table>

Note. QF Frequency = Quantity Frequency Alcohol Measure - Frequency of Alcohol Use; QF Quantity = Quantity Frequency Alcohol Measure - Average Quantity of Alcohol Used; QF HED = Quantity Frequency Alcohol Measure - Frequency of Heavy Episodic Drinking.

Table 5

**Racial Differences: Kruskal-Wallis H Test**

<table>
<thead>
<tr>
<th>Measures</th>
<th>$H$</th>
<th>$df$</th>
<th>$p$</th>
<th>Mean Rank People of Color (n =71)</th>
<th>Mean Rank Euro (n = 381)</th>
</tr>
</thead>
<tbody>
<tr>
<td>QF Frequency</td>
<td>26.20</td>
<td>1</td>
<td>&lt; .001</td>
<td>154.58</td>
<td>239.90</td>
</tr>
<tr>
<td>QF Quantity</td>
<td>9.73</td>
<td>1</td>
<td>.002</td>
<td>182.77</td>
<td>234.77</td>
</tr>
<tr>
<td>QF HED</td>
<td>15.95</td>
<td>1</td>
<td>&lt; .001</td>
<td>172.09</td>
<td>235.34</td>
</tr>
</tbody>
</table>

Note. Of color = Participants identifying as a member of a diverse racial group; Euro = Participants identifying as European American; QF Frequency = Quantity Frequency Alcohol Measure - Frequency of Alcohol Use; QF Quantity = Quantity Frequency Alcohol Measure - Average Quantity of Alcohol Used; QF HED = Quantity Frequency Alcohol Measure - Frequency of Heavy Episodic Drinking.

**Housing.** Categories of housing were collapsed into high and low risk housing groups based on prior research (e.g., Willoughby & Carroll, 2009; Weitzman, Nelson, & Wechsler, 2003; Harford, Wechsler, & Muthen, 2002; Larimer, Anderson, Baer, & Marlatt, 2000; Wechsler, Kuo, & Dowdall, 2000; Baer, 1994). Living in a single sex residence hall, living in university apartments, and living off campus with family were coded as low-risk housing categories. Living in a co-ed residence hall, living alone off campus, living with a roommate off campus, and living in a Greek life residence were coded as high-risk housing categories.
Significant differences between these two categories were observed on all alcohol variables with high risk housing residence reporting higher levels of alcohol use.

Table 6

**Housing Differences: Kruskal-Wallis H Test**

<table>
<thead>
<tr>
<th>Measures</th>
<th>$H$</th>
<th>$df$</th>
<th>$p$</th>
<th>Mean Rank Low-Risk (n =113)</th>
<th>Mean Rank High-Risk (n = 329)</th>
</tr>
</thead>
<tbody>
<tr>
<td>QF Frequency</td>
<td>18.75</td>
<td>1</td>
<td>&lt; .001</td>
<td>181.02</td>
<td>241.66</td>
</tr>
<tr>
<td>QF Quantity</td>
<td>17.16</td>
<td>1</td>
<td>&lt; .001</td>
<td>183.10</td>
<td>240.97</td>
</tr>
<tr>
<td>QF HED</td>
<td>18.16</td>
<td>1</td>
<td>&lt; .001</td>
<td>183.05</td>
<td>239.57</td>
</tr>
</tbody>
</table>

Note. QF Frequency = Quantity Frequency Alcohol Measure-Frequency of Alcohol Use; QF Quantity = Quantity Frequency Alcohol Measure-Average Quantity of Alcohol Used; QF HED = Quantity Frequency Alcohol Measure-Frequency of Heavy Episodic Drinking.

**First generation college students.** Significant differences in alcohol use between first generation college students and students with parents holding a four-year degree were observed on all measures of alcohol use. Participants with a parent holding a four-year degree reported higher levels of alcohol use.

Table 7

**Generational College Student Differences: Kruskal-Wallis H Test**

<table>
<thead>
<tr>
<th>Measures</th>
<th>$H$</th>
<th>$df$</th>
<th>$p$</th>
<th>Mean Rank FGCS (n =106)</th>
<th>Mean Rank Non-FGCS (n = 347)</th>
</tr>
</thead>
<tbody>
<tr>
<td>QF Frequency</td>
<td>10.27</td>
<td>1</td>
<td>.001</td>
<td>191.81</td>
<td>237.75</td>
</tr>
<tr>
<td>QF Quantity</td>
<td>11.56</td>
<td>1</td>
<td>.001</td>
<td>189.75</td>
<td>238.38</td>
</tr>
<tr>
<td>QF HED</td>
<td>7.29</td>
<td>1</td>
<td>.007</td>
<td>197.68</td>
<td>234.49</td>
</tr>
</tbody>
</table>

Note. FGCS = First Generation College Student; Non-FGCS = Student with a parenting holding a four-year degree; QF Frequency = Quantity Frequency Alcohol Measure-Frequency of Alcohol Use; QF Quantity = Quantity Frequency Alcohol Measure-Average Quantity of Alcohol Used; QF HED = Quantity Frequency Alcohol Measure-Frequency of Heavy Episodic Drinking.

**Greek life participation.** Significant differences in alcohol use between participants who were affiliated with Greek Life organizations and participants who were not affiliate with Greek Life organizations were observed on all measures of alcohol use, with Greek Life affiliates reporting higher levels of alcohol use.
Family history of substance use disorders. No significant differences between participants with a family history of substance use disorders and participants without such a family history were observed on measures of alcohol use.

Table 8

Greek Life Participant Differences: Kruskal-Wallis H Test

<table>
<thead>
<tr>
<th>Measures</th>
<th>$H$</th>
<th>$df$</th>
<th>$p$</th>
<th>Mean Rank</th>
<th>Mean Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>QF Frequency</td>
<td>37.33</td>
<td>1</td>
<td>&lt; .001</td>
<td>297.59</td>
<td>207.51</td>
</tr>
<tr>
<td>QF Quantity</td>
<td>43.85</td>
<td>1</td>
<td>&lt; .001</td>
<td>303.34</td>
<td>205.93</td>
</tr>
<tr>
<td>QF HED</td>
<td>36.09</td>
<td>1</td>
<td>&lt; .001</td>
<td>291.91</td>
<td>207.94</td>
</tr>
</tbody>
</table>

Note. Greek = Participants affiliated with Greek Life Organizations; Non-Greek = Participants not affiliated with Greek Life Organizations; QF Frequency = Quantity Frequency Alcohol Measure-Frequency of Alcohol Use; QF Quantity = Quantity Frequency Alcohol Measure-Average Quantity of Alcohol Used; QF HED = Quantity Frequency Alcohol Measure-Frequency of Heavy Episodic Drinking.

Table 9

Family History of Substance Use Disorders Differences: Kruskal-Wallis H Test

<table>
<thead>
<tr>
<th>Measures</th>
<th>$H$</th>
<th>$df$</th>
<th>$p$</th>
<th>Mean Rank</th>
<th>Mean Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>QF Frequency</td>
<td>0.09</td>
<td>1</td>
<td>.766</td>
<td>230.90</td>
<td>226.16</td>
</tr>
<tr>
<td>QF Quantity</td>
<td>1.34</td>
<td>1</td>
<td>.247</td>
<td>242.14</td>
<td>223.75</td>
</tr>
<tr>
<td>QF HED</td>
<td>1.05</td>
<td>1</td>
<td>.304</td>
<td>238.70</td>
<td>223.26</td>
</tr>
</tbody>
</table>

Note. Fam Hx = Participants reporting a family history of substance use disorders; No Fam Hx = Participants denying a family history of substance use disorders; QF Frequency = Quantity Frequency Alcohol Measure-Frequency of Alcohol Use; QF Quantity = Quantity Frequency Alcohol Measure-Average Quantity of Alcohol Used; QF HED = Quantity Frequency Alcohol Measure-Frequency of Heavy Episodic Drinking.

Continuous Variables

To assess if continuous demographic and group risk factors had an effect on outcome variables, nonparametric correlations using Spearman’s rho were computed.

Age. Participant age had a weak but statistically significant positive correlation on the frequency of alcohol use (QF Frequency; $rho = .13, p < .01$), but was not significantly correlated
with the quantity of alcohol used (QF Quantity; \( \rho = .01, p = .83 \)) or the frequency of heavy episodic drinking (QF HED; \( \rho = .06, p = .20 \)).

**Summary and Determination of Model Covariates**

After assessing group differences and correlates of risk factors for alcohol use, those demographic or risk factor variables statistically significantly related with greater alcohol use were selected to be entered into the overall analytic model as covariates. A summary of these selected covariates is available in Table 10.

Table 10.

<table>
<thead>
<tr>
<th>Summary of Model Covariates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Covariates</td>
</tr>
<tr>
<td>Sex</td>
</tr>
<tr>
<td>Race/Ethnicity</td>
</tr>
<tr>
<td>Major</td>
</tr>
<tr>
<td>Housing</td>
</tr>
<tr>
<td>FGCS</td>
</tr>
<tr>
<td>Greek</td>
</tr>
<tr>
<td>Family History of SUD</td>
</tr>
<tr>
<td>Age</td>
</tr>
</tbody>
</table>

Note. SIG = Significant (p < .01) difference between groups on outcome variable or significant (p < .01) correlation between variables; -- = no significant differences between groups on outcome variable or no significant correlation between variables; QF Frequency = Quantity Frequency Alcohol Measure—Frequency of Alcohol Use; QF Quantity = Quantity Frequency Alcohol Measure—Average Quantity of Alcohol Used; QF HED = Quantity Frequency Alcohol Measure—Frequency of Heavy Episodic Drinking; Major = Reported College Major; Housing = Reported Housing Type; FGCS = First Generation College Student Status; Greek = Greek Life Participation; Family History of SUD = Family History of Substance Use Disorders.

**Testing Mediation: Path Analyses**

**Summary of Statistical Procedures**

To test for mediation, I conducted two path analyses for each alcohol use outcome variable, using the generalized structural equation modeling (gSEM) package available in Stata®. As recommended by Holmbeck (1997), a fully mediated and partially mediated model were
tested and compared for fit. The Stata© gSEM package, in conducting structural equation modeling (SEM) and path analyses, allows for generalized outcome variables that violate the assumptions for traditional SEM (binary, ordinal, or count).

In each model, the outcome variable was entered as a negative binomial variable based on the variable mean using a log link function. Although the results of the distribution comparison indicate that a zero-inflated negative binomial distribution is the best fit, the current version of the gSEM package on Stata© does not support zero-inflated distributions. Additionally, the use of zero-inflated distributions within the framework of SEM are understudied. These distributions have not been approved for use until further research has been conducted to determine whether using zero-inflated approaches can be used without bias within the SEM framework (StataCorp, 2017; Muthen, 2019). However, the differences in model fit between the zero-inflated and non-zero-inflated negative binomial models were negligible (see Table 2). The fully mediated and partially mediated models were compared using a likelihood ratio test and comparing AIC, BIC, and Log Likelihood, as traditional SEM fit test statistics equivalents ($\chi^2$, CFI, RMSEA, SRMR) are not currently available for generalized structural equation modeling. Mediation was assessed by examining the size and significance of indirect effects as recommended by Rucker, Preacher, Tormala, and Petty (2011). This analytic process was repeated three times, once for each outcome variable (QF Frequency, QF Quantity, & QF HED). Finally, to assess overall alcohol use, a fourth model was examined utilizing a latent alcohol use factor in place of the observed generalized outcome variable in the previous models. This model was assessed using procedures for SEM with observed variables in Stata©. Partially mediated and fully mediated models were again compared, and mediation was assessed through the examination of indirect effects. See Figure 2 and Figure 3.
To assess hypothesis two, two path models were tested comparing the partially mediated model and the fully mediated model. First, the partially mediated model was tested, where attachment anxiety and attachment avoidance predicted emotion dysregulation; and attachment anxiety, attachment avoidance, and emotion dysregulation predicted the frequency of alcohol
use. Race/ethnicity, housing, first-generation college student status, Greek life participation, and age were added as control variables and regressed on the frequency of alcohol use. Next, the fully mediated model was tested by removing the direct paths from attachment anxiety and attachment avoidance to frequency of alcohol use.

Models were compared using AIC, BIC, and Log Likelihood. See results in Table 11. Comparison of fit indices indicated an equivalent fit between the fully mediated and partially mediated model. Results of a likelihood ratio test indicated no significant difference between the fit of the two models (LRχ2 = 3.27, p = .195). Therefore, the partially mediated model was retained to examine both direct and indirect effects of attachment avoidance and attachment anxiety on the frequency of alcohol use.

### Table 11

**QF Frequency: Fully Mediated Versus Partially Mediated Models Fit Indexes**

<table>
<thead>
<tr>
<th>Model</th>
<th>AIC</th>
<th>BIC</th>
<th>Log Likelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partial Mediation</td>
<td>6156.88</td>
<td>6214.44</td>
<td>-3064.44</td>
</tr>
<tr>
<td>Fully Mediated</td>
<td>6158.37</td>
<td>6207.74</td>
<td>-3067.19</td>
</tr>
</tbody>
</table>

Note. QF Frequency = Quantity Frequency Alcohol Measure-Frequency of Alcohol Use.

Path coefficients for the partially mediated model are presented in Figure 4. Path coefficients with standard error, z statistics, and 95% confidence intervals are presented in Table 12. Significant path coefficients were observed between emotion dysregulation and both attachment anxiety and attachment avoidance. Further, significant path coefficients were observed between the control variables of age, Greek life participation, housing status, and race and ethnicity and the outcome variable, alcohol use frequency. Notably, the direct paths from the predictor variables, attachment anxiety and attachment avoidance, and the outcome variable, alcohol use frequency, were not significant, nor was the path between the mediator, emotion dysregulation, and alcohol use frequency.
To assess mediation, as recommended by Rucker, Preacher, Tormala, and Petty (2011), indirect effects of the predictors, attachment anxiety and attachment avoidance, on the outcome, quantity of alcohol used, via the mediator, emotion dysregulation, were examined. Indirect effects of attachment anxiety and attachment avoidance on frequency of alcohol use were computed using the delta method of parameter estimation. Results are presented in Table 13. No significant indirect effects were observed. Therefore, the data does not support emotion dysregulation mediating the relation between either attachment anxiety or attachment avoidance with alcohol use frequency.
### Table 12

**QF Frequency Path Analysis Unstandardized Coefficients**

<table>
<thead>
<tr>
<th>Path</th>
<th>Coef</th>
<th>SE</th>
<th>z</th>
<th>p</th>
<th>LL</th>
<th>UL</th>
</tr>
</thead>
<tbody>
<tr>
<td>QF Frequency</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;=ECR-R Anxious</td>
<td>-0.004</td>
<td>0.003</td>
<td>-1.20</td>
<td>.229</td>
<td>-0.010</td>
<td>0.003</td>
</tr>
<tr>
<td>&lt;=ECR-R Avoidance</td>
<td>-0.003</td>
<td>0.003</td>
<td>-0.94</td>
<td>.349</td>
<td>-0.009</td>
<td>0.003</td>
</tr>
<tr>
<td>&lt;=DERS</td>
<td>0.005</td>
<td>0.003</td>
<td>1.52</td>
<td>.130</td>
<td>-0.001</td>
<td>0.011</td>
</tr>
<tr>
<td>&lt;=Race</td>
<td>0.809</td>
<td>0.169</td>
<td>4.78</td>
<td>.000</td>
<td>0.478</td>
<td>1.141</td>
</tr>
<tr>
<td>&lt;=Housing</td>
<td>0.545</td>
<td>0.137</td>
<td>3.99</td>
<td>.000</td>
<td>0.277</td>
<td>0.814</td>
</tr>
<tr>
<td>&lt;=FGCS</td>
<td>-0.213</td>
<td>0.138</td>
<td>-1.54</td>
<td>.123</td>
<td>-0.483</td>
<td>0.058</td>
</tr>
<tr>
<td>&lt;=Greek Life</td>
<td>-0.614</td>
<td>0.137</td>
<td>-4.50</td>
<td>.000</td>
<td>-0.882</td>
<td>-0.347</td>
</tr>
<tr>
<td>&lt;=Age</td>
<td>0.124</td>
<td>0.038</td>
<td>3.32</td>
<td>.001</td>
<td>0.051</td>
<td>0.197</td>
</tr>
<tr>
<td><strong>DERS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;=ECR-R Anxious</td>
<td>0.450</td>
<td>0.047</td>
<td>9.62</td>
<td>.000</td>
<td>0.359</td>
<td>0.542</td>
</tr>
<tr>
<td>&lt;=ECR-R Avoidance</td>
<td>0.242</td>
<td>0.047</td>
<td>5.17</td>
<td>.000</td>
<td>0.150</td>
<td>0.333</td>
</tr>
<tr>
<td><strong>Error</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>=&gt;DERS</td>
<td>311.502</td>
<td>20.978</td>
<td></td>
<td></td>
<td>272.985</td>
<td>355.454</td>
</tr>
</tbody>
</table>

Note. LL = Lower Limit; UL Upper Limit; ECR-R Anxious = Experience in Close Relationships-Revised Anxious Attachment Subscale; ECR-R Avoidance = Experience in Close Relationships-Revised Avoidant Attachment Subscale; DERS = Difficulties in Emotion Regulation Scale Total Scale; Housing = Reported Housing Type; FGCS = First Generation College Student Status; Greek = Greek Life Participation.

### Table 13

**Effect of Predictors on Alcohol Frequency**

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Coef</th>
<th>SE</th>
<th>z</th>
<th>p</th>
<th>LL</th>
<th>UL</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECR-R Anxious</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct Effect</td>
<td>-0.004</td>
<td>0.003</td>
<td>-1.20</td>
<td>.229</td>
<td>-0.011</td>
<td>0.003</td>
</tr>
<tr>
<td>Indirect Effect</td>
<td>&lt; -0.001</td>
<td>&lt; 0.001</td>
<td>-0.80</td>
<td>.421</td>
<td>&lt; -0.001</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Total Effect</td>
<td>-0.004</td>
<td>0.003</td>
<td>-1.20</td>
<td>.229</td>
<td>-0.011</td>
<td>0.003</td>
</tr>
<tr>
<td>ECR-R Avoidance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct Effect</td>
<td>-0.003</td>
<td>0.003</td>
<td>-0.94</td>
<td>.349</td>
<td>-0.009</td>
<td>0.003</td>
</tr>
<tr>
<td>Indirect Effect</td>
<td>&lt; -0.001</td>
<td>&lt; 0.001</td>
<td>-0.71</td>
<td>.478</td>
<td>&lt; -0.001</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Total Effect</td>
<td>-0.003</td>
<td>0.003</td>
<td>-0.94</td>
<td>.350</td>
<td>-0.009</td>
<td>0.003</td>
</tr>
</tbody>
</table>

Note. LL = Lower Limit; UL Upper Limit; ECR-R Anxious = Experience in Close Relationships-Revised Anxious Attachment Subscale; ECR-R Avoidance = Experience in Close Relationships-Revised Avoidant Attachment Subscale.
Model 2: QF Drinks

To assess hypothesis three, the quantity of alcohol use variable was used as the dependent variable. A partially mediated model was examined to test for an indirect effect of the mediator (emotion dysregulation) on the direct effect between the predictor variables (attachment anxiety and attachment avoidance) and the quantity of alcohol use (QF Quantity). Race/ethnicity, housing, first-generation college student status, and Greek life participation were added as control variables and were regressed on the quantity of alcohol use. Second, the fully mediated model was tested by removing the direct paths from attachment anxiety and attachment avoidance to quantity of alcohol use.

Models were compared using AIC, BIC, and Log Likelihood. See results in Table 14. Results indicated an equivalent fit between the fully mediated and partially mediated model. Results of a likelihood ratio test indicated no significant difference between the fit of the two models (LRχ² = .72, p = .698). Therefore, the partially mediated model was retained to examine both direct and indirect effects of attachment avoidance and attachment anxiety on the quantity of alcohol use.

Table 14

<table>
<thead>
<tr>
<th>Model</th>
<th>AIC</th>
<th>BIC</th>
<th>Log Likelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partial Mediation</td>
<td>5791.48</td>
<td>5844.93</td>
<td>-2882.74</td>
</tr>
<tr>
<td>Fully Mediated</td>
<td>5791.00</td>
<td>5836.26</td>
<td>-2884.50</td>
</tr>
</tbody>
</table>

Note. QF Quantity = Quantity Frequency Alcohol Measure-Average Quantity of Alcohol Used.

Path coefficients for the partially mediated model are presented in Figure 5. Path coefficients with standard error, z statistics, and 95% confidence intervals are presented in Table 15. Significant path coefficients were observed between both attachment anxiety and attachment avoidance and emotion dysregulation. Additionally, significant path coefficients were observed
between the control variables and quantity of alcohol use of Greek life participation, housing status, and first-generation college student. Again, neither were the direct paths from attachment anxiety and attachment avoidance to quantity of alcohol use significant, nor was the direct path between emotion dysregulation and the quantity of alcohol use significant.

![Path Model 2: QF Quantity Diagram](image)

*Figure 5. Path Model 2: QF Quantity*

Note. * = p < .05; ** = p < .01; *** = p < .001; ----- = p > .05; ------- = p < .05.

To assess mediation, effects of attachment anxiety and attachment avoidance on quantity of alcohol use were computed using the delta method of parameter estimation. Results are presented in Table 16. No significant indirect or total effects were observed between neither attachment anxiety nor attachment avoidance and alcohol use quantity. Therefore, the data does not support emotion dysregulation mediating the relation between either attachment anxiety or attachment avoidance with alcohol use quantity.
Table 15

**QF Quantity Unstandardized Coefficients**

<table>
<thead>
<tr>
<th>Path</th>
<th>Coef</th>
<th>SE</th>
<th>z</th>
<th>p</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>QF Quantity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;=ECR-R Anxious Direct</td>
<td>-0.001</td>
<td>0.003</td>
<td>-0.40</td>
<td>.693</td>
<td>-0.006</td>
</tr>
<tr>
<td>&lt;=ECR-R Anxious Indirect</td>
<td>&lt; 0.001</td>
<td>&lt; 0.001</td>
<td>0.43</td>
<td>.664</td>
<td>&lt; -0.001</td>
</tr>
<tr>
<td>Total Effect</td>
<td>-0.001</td>
<td>0.003</td>
<td>-0.40</td>
<td>.693</td>
<td>-0.007</td>
</tr>
<tr>
<td>&lt;=ECR-R Avoidance Direct</td>
<td>0.002</td>
<td>0.003</td>
<td>0.83</td>
<td>.405</td>
<td>-0.003</td>
</tr>
<tr>
<td>&lt;=ECR-R Avoidance Indirect</td>
<td>&lt; 0.001</td>
<td>&lt; 0.001</td>
<td>-0.57</td>
<td>.566</td>
<td>&lt; -0.001</td>
</tr>
<tr>
<td>Total Effect</td>
<td>0.002</td>
<td>0.003</td>
<td>0.83</td>
<td>.405</td>
<td>-0.003</td>
</tr>
<tr>
<td>&lt;=DERS</td>
<td>-0.003</td>
<td>0.003</td>
<td>-1.00</td>
<td>.317</td>
<td>-0.008</td>
</tr>
<tr>
<td>&lt;=Race</td>
<td>0.258</td>
<td>0.136</td>
<td>1.89</td>
<td>.058</td>
<td>-0.009</td>
</tr>
<tr>
<td>&lt;=Housing</td>
<td>0.366</td>
<td>0.113</td>
<td>3.23</td>
<td>.001</td>
<td>0.144</td>
</tr>
<tr>
<td>&lt;=1st Gen College</td>
<td>-0.257</td>
<td>0.114</td>
<td>-2.26</td>
<td>.024</td>
<td>-0.480</td>
</tr>
<tr>
<td>&lt;=Greek Life</td>
<td>-0.545</td>
<td>0.107</td>
<td>-5.09</td>
<td>.000</td>
<td>-0.755</td>
</tr>
<tr>
<td>DERS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;=ECR-R Anxious Direct</td>
<td>0.450</td>
<td>0.047</td>
<td>9.62</td>
<td>.000</td>
<td>0.359</td>
</tr>
<tr>
<td>&lt;=ECR-R Avoidance Direct</td>
<td>0.242</td>
<td>0.047</td>
<td>5.17</td>
<td>.000</td>
<td>0.150</td>
</tr>
<tr>
<td>Error</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>=&gt;DERS</td>
<td>308.841</td>
<td>20.612</td>
<td>--</td>
<td>--</td>
<td>270.972</td>
</tr>
</tbody>
</table>

Note. LL = Lower Limit; UL Upper Limit; ECR-R Anxious = Experience in Close Relationships-Revised Anxious Attachment Subscale; ECR-R Avoidance = Experience in Close Relationships-Revised Avoidant Attachment Subscale; DERS = Difficulties in Emotion Regulation Scale Total Scale; Housing = Reported Housing Type; FGCS = First Generation College Student Status; Greek = Greek Life Participation.

Table 16

**Effect of Predictors on Alcohol Quantity**

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Coef</th>
<th>SE</th>
<th>z</th>
<th>p</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECR-R Anxious</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct Effect</td>
<td>-0.001</td>
<td>0.003</td>
<td>-0.40</td>
<td>.693</td>
<td>-0.007</td>
</tr>
<tr>
<td>Indirect Effect</td>
<td>&lt; 0.001</td>
<td>&lt; 0.001</td>
<td>0.43</td>
<td>.664</td>
<td>&lt; -0.001</td>
</tr>
<tr>
<td>Total Effect</td>
<td>-0.001</td>
<td>0.003</td>
<td>-0.40</td>
<td>.693</td>
<td>-0.007</td>
</tr>
<tr>
<td>ECR-R Avoidance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct Effect</td>
<td>0.002</td>
<td>0.003</td>
<td>0.83</td>
<td>.405</td>
<td>-0.003</td>
</tr>
<tr>
<td>Indirect Effect</td>
<td>&lt; 0.001</td>
<td>&lt; 0.001</td>
<td>-0.57</td>
<td>.566</td>
<td>&lt; -0.001</td>
</tr>
<tr>
<td>Total Effect</td>
<td>0.002</td>
<td>0.003</td>
<td>0.83</td>
<td>.405</td>
<td>-0.003</td>
</tr>
</tbody>
</table>

Note. LL = Lower Limit; UL Upper Limit; ECR-R Anxious = Experience in Close Relationships-Revised Anxious Attachment Subscale; ECR-R Avoidance = Experience in Close Relationships-Revised Avoidant Attachment Subscale.

**Model 3: QF Heavy Episodic Drinking.** To assess hypothesis four, two path models were tested comparing the partially mediated model and the fully mediated model. First, the partially mediated model was tested where attachment anxiety and attachment avoidance
predicted emotion dysregulation; and attachment anxiety, attachment avoidance, and emotion dysregulation predicted the frequency of heavy episodic drinking. Race/ethnicity, housing, first-generation college student status, and Greek life participation were added as control variables and regressed on the frequency of heavy episodic drinking. Second, the fully mediated model was tested by removing the direct paths from attachment anxiety and attachment avoidance to frequency of heavy episodic drinking.

Models were again compared using AIC, BIC, and Log Likelihood. See results in Table 17. Results indicated an equivalent fit between the fully mediated and partially mediated model. Results of a likelihood ratio test indicated no significant difference between the fit of the two models ($\text{LR}_\chi^2 = 1.47, p = .480$). Therefore, the partially mediated model was retained to examine both direct and indirect effects of attachment avoidance and attachment anxiety on the frequency of heavy episodic drinking.

Table 17

<table>
<thead>
<tr>
<th>Model</th>
<th>AIC</th>
<th>BIC</th>
<th>Log Likelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partial Mediation</td>
<td>5544.26</td>
<td>5597.71</td>
<td>-2759.13</td>
</tr>
<tr>
<td>Fully Mediated</td>
<td>5542.89</td>
<td>5588.14</td>
<td>-2760.44</td>
</tr>
</tbody>
</table>

Note. QF HED = Quantity Frequency Alcohol Measure-Frequency of Heavy Episodic Drinking.

Path coefficients for the partially mediated model are presented in figure 6. Path coefficients with standard error, z statistics, and 95% confidence intervals are presented in Table 18. Significant path coefficients were observed between emotion dysregulation and both attachment anxiety and attachment avoidance. Significant path coefficients were also observed between the control variables of Greek life participation, housing status, and race and ethnicity and the frequency of heavy episodic drinking. Neither the direct paths from both attachment anxiety and attachment avoidance and the frequency of heavy episodic drinking were not
significant, nor was the path between the emotion dysregulation and the frequency of heavy episodic drinking.

Figure 6. Path Model 3: QF Heavy Episodic Drinking
Note. * = p < .05; ** = p < .01; *** = p < .001; ----- = p > .05; —— = p < .05.

To assess for mediation, the indirect effects of attachment anxiety and attachment avoidance on frequency of heavy episodic drinking were computed using the delta method of parameter estimation. Results are presented in Table 19. No significant indirect effects were observed between either predictor variable and the frequency of heavy episodic drinking. Therefore, the data does not support emotion dysregulation mediating the relation between either attachment anxiety or attachment avoidance with the frequency of heavy episodic drinking.
### Table 18

**QF HED Frequency Unstandardized Coefficients**

<table>
<thead>
<tr>
<th>Path</th>
<th>Coef</th>
<th>SE</th>
<th>z</th>
<th>p</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>QF HED</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;=ECR-R Anxious</td>
<td>-0.004</td>
<td>0.004</td>
<td>-0.82</td>
<td>.412</td>
<td>-0.012</td>
</tr>
<tr>
<td>&lt;=ECR-R Avoidance</td>
<td>-0.003</td>
<td>0.004</td>
<td>-0.62</td>
<td>.536</td>
<td>-0.011</td>
</tr>
<tr>
<td>&lt;=DERS</td>
<td>0.003</td>
<td>0.004</td>
<td>0.61</td>
<td>.542</td>
<td>-0.006</td>
</tr>
<tr>
<td>&lt;=Race</td>
<td>0.833</td>
<td>0.243</td>
<td>3.43</td>
<td>.001</td>
<td>0.357</td>
</tr>
<tr>
<td>&lt;=Housing</td>
<td>0.726</td>
<td>0.195</td>
<td>3.73</td>
<td>.000</td>
<td>0.344</td>
</tr>
<tr>
<td>&lt;=1st Gen College</td>
<td>-0.251</td>
<td>0.195</td>
<td>-1.29</td>
<td>.198</td>
<td>-0.633</td>
</tr>
<tr>
<td>&lt;=Greek Life</td>
<td>-0.764</td>
<td>0.185</td>
<td>-4.13</td>
<td>.000</td>
<td>-1.126</td>
</tr>
<tr>
<td>DERS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;=ECR-R Anxious</td>
<td>0.450</td>
<td>0.047</td>
<td>9.62</td>
<td>.000</td>
<td>0.359</td>
</tr>
<tr>
<td>&lt;=ECR-R Avoidance</td>
<td>0.242</td>
<td>0.047</td>
<td>5.17</td>
<td>.000</td>
<td>0.150</td>
</tr>
<tr>
<td>Error</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>=&gt;DERS</td>
<td>307.434</td>
<td>20.564</td>
<td>--</td>
<td>--</td>
<td>269.659</td>
</tr>
</tbody>
</table>

Note. Coef = Unstandardized Coefficients; LL = Lower Limit; UL = Upper Limit; ECR-R Anxious = Experience in Close Relationships-Revised Anxious Attachment Subscale; ECR-R Avoidance = Experience in Close Relationships-Revised Avoidant Attachment Subscale; DERS = Difficulties in Emotion Regulation Scale Total Scale; QF Frequency = Quantity Frequency Alcohol Measure-Frequency of Alcohol Use; QF Quantity = Quantity Frequency Alcohol Measure-Average Quantity of Alcohol Used; QF HED = Quantity Frequency Alcohol Measure-Frequency of Heavy Episodic Drinking; Housing = Reported Housing Type; FGCS = First Generation College Student Status; Greek = Greek Life Participation.

### Table 19

**Indirect and Total Effect of Predictors on the Frequency of Heavy Episodic Drinking**

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Coef</th>
<th>SE</th>
<th>z</th>
<th>p</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECR-R Anxious Direct</td>
<td>-0.004</td>
<td>0.005</td>
<td>-0.82</td>
<td>.412</td>
<td>-0.012</td>
</tr>
<tr>
<td>Indirect Effect</td>
<td>&lt; 0.001</td>
<td>&lt; 0.001</td>
<td>-0.42</td>
<td>.672</td>
<td>&lt; -0.001</td>
</tr>
<tr>
<td>Total Effect</td>
<td>-0.004</td>
<td>0.005</td>
<td>-0.82</td>
<td>.413</td>
<td>-0.012</td>
</tr>
<tr>
<td>ECR-R Avoidance Direct</td>
<td>-0.003</td>
<td>0.004</td>
<td>-0.62</td>
<td>.536</td>
<td>-0.011</td>
</tr>
<tr>
<td>Indirect Effect</td>
<td>&lt; 0.001</td>
<td>&lt; 0.001</td>
<td>-0.38</td>
<td>.700</td>
<td>&lt; -0.001</td>
</tr>
<tr>
<td>Total Effect</td>
<td>-0.003</td>
<td>0.004</td>
<td>-0.62</td>
<td>.536</td>
<td>-0.011</td>
</tr>
</tbody>
</table>

Note. Coef = Unstandardized Coefficients; LL = Lower Limit; UL = Upper Limit; ECR-R Anxious = Experience in Close Relationships-Revised Anxious Attachment Subscale; ECR-R Avoidance = Experience in Close Relationships-Revised Avoidant Attachment Subscale.
Model 4: Latent Alcohol Use. To assess hypothesis five, the dependent variable was replaced with a latent alcohol use variable, comprised of loadings from the frequency of alcohol use, the quantity of alcohol use, and the frequency of heavy episodic drinking using Stata procedures for SEM with observed variables. Loadings of each variable on the latent factor are available in Table 20.

Table 20

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Coef</th>
<th>SE</th>
<th>z</th>
<th>p</th>
<th>LL</th>
<th>UL</th>
</tr>
</thead>
<tbody>
<tr>
<td>QF Frequency</td>
<td>2.155</td>
<td>0.134</td>
<td>16.06</td>
<td>.000</td>
<td>1.892</td>
<td>2.418</td>
</tr>
<tr>
<td>=&gt;Error</td>
<td>11.596</td>
<td>0.960</td>
<td>--</td>
<td>--</td>
<td>9.858</td>
<td>13.640</td>
</tr>
<tr>
<td>QF Quantity</td>
<td>1 (Constrained)</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>=&gt;Error</td>
<td>3.094</td>
<td>0.240</td>
<td>--</td>
<td>--</td>
<td>2.658</td>
<td>3.603</td>
</tr>
<tr>
<td>QF HED</td>
<td>1.734</td>
<td>0.099</td>
<td>17.54</td>
<td>.000</td>
<td>1.540</td>
<td>1.927</td>
</tr>
<tr>
<td>=&gt;Error</td>
<td>0.821</td>
<td>0.388</td>
<td>--</td>
<td>--</td>
<td>0.325</td>
<td>2.073</td>
</tr>
</tbody>
</table>

Note. Coef = Unstandardized Coefficients; LL = Lower Limit; UL = Upper Limit; QF Frequency = Quantity Frequency Alcohol Measure-Frequency of Alcohol Use; QF Quantity = Quantity Frequency Alcohol Measure-Average Quantity of Alcohol Used; QF HED = Quantity Frequency Alcohol Measure-Frequency of Heavy Episodic Drinking.

The partially mediated model and the fully mediated model were compared. First, the partially mediated model was tested where attachment anxiety and attachment avoidance predicted emotion dysregulation; and attachment anxiety, attachment avoidance, and emotion dysregulation predicted the latent alcohol use factor. Race/ethnicity, housing, first-generation college student status, and Greek life participation were added as control variables and regressed on the latent alcohol use factor. Second, the fully mediated model was tested by removing the direct paths from attachment anxiety and attachment avoidance to the latent alcohol use factor.

Models were compared using AIC, BIC, RMSEA, CFI, TLI, and SRMR. See results in Table 21. Indices suggested an equivalent fit between the fully mediated and partially mediated model. Further, a Likelihood Ratio Test was conducted comparing the two models. Results of a
likelihood ratio test indicate no significant difference between the fit of the two models ($\text{LR} \chi^2 = 1.73, p = .422$). Therefore, the partially mediated model was retained to examine both direct and indirect effects of attachment avoidance and attachment anxiety on the latent alcohol use factor.

Table 21

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Partial Mediation</th>
<th>Full Mediation</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIC</td>
<td>20047.42</td>
<td>20045.15</td>
</tr>
<tr>
<td>BIC</td>
<td>20240.24</td>
<td>20229.76</td>
</tr>
<tr>
<td>RMSEA [90%CI]</td>
<td>.06 [.04, .08]</td>
<td>.06 [.04, .08]</td>
</tr>
<tr>
<td>CFI</td>
<td>.97</td>
<td>.97</td>
</tr>
<tr>
<td>TLI</td>
<td>.95</td>
<td>.95</td>
</tr>
<tr>
<td>SRMR</td>
<td>.03</td>
<td>.03</td>
</tr>
</tbody>
</table>

Note. AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; RMSEA = Root Mean Square Error of Approximation; CFI = Confirmatory Fit Index; TLI = Tucker Lewis Index; SRMR = Standardized Root Mean Squared Residual.

Path coefficients for the partially mediated model are presented in Figure 7. Path coefficients with standard error, z statistics, and 95% confidence intervals are presented in Table 22. Significant path coefficients were observed between emotion dysregulation and both attachment anxiety and attachment avoidance. Further, significant path coefficients were observed between the control variables of Greek life participation, housing status, and race and ethnicity and the latent alcohol use outcome variable. The direct paths from both attachment anxiety and attachment avoidance and the latent alcohol outcome factor were not significant, nor was the path between emotion dysregulation and the latent alcohol outcome.
To assess mediation, the indirect effects of attachment anxiety and attachment avoidance on the latent alcohol use factor were computed using the delta method of parameter estimation. Results are presented in Table 23. No significant indirect effects were observed between either predictor and the latent alcohol use factor. Therefore, the data does not support emotion dysregulation mediating the relation between either attachment anxiety or attachment avoidance with alcohol use.
Table 22

*Latent Factor Frequency Unstandardized Coefficients*

<table>
<thead>
<tr>
<th>Path</th>
<th>Coef</th>
<th>SE</th>
<th>z</th>
<th>p</th>
<th>LL</th>
<th>UL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latent Alcohol Use</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;=ECR-R Anxious</td>
<td>-0.003</td>
<td>0.005</td>
<td>-0.48</td>
<td>.632</td>
<td>-0.013</td>
<td>0.008</td>
</tr>
<tr>
<td>&lt;=ECR-R Avoidance</td>
<td>-0.005</td>
<td>0.005</td>
<td>-0.97</td>
<td>.330</td>
<td>-0.015</td>
<td>0.005</td>
</tr>
<tr>
<td>&lt;=DERS</td>
<td>0.002</td>
<td>0.005</td>
<td>0.39</td>
<td>.696</td>
<td>-0.008</td>
<td>0.012</td>
</tr>
<tr>
<td>&lt;=Race</td>
<td>0.666</td>
<td>0.246</td>
<td>2.71</td>
<td>.007</td>
<td>0.184</td>
<td>1.148</td>
</tr>
<tr>
<td>&lt;=Housing</td>
<td>0.726</td>
<td>0.206</td>
<td>3.53</td>
<td>.000</td>
<td>0.323</td>
<td>1.129</td>
</tr>
<tr>
<td>&lt;=1st Gen College</td>
<td>-0.277</td>
<td>0.207</td>
<td>-1.34</td>
<td>.180</td>
<td>-0.681</td>
<td>0.128</td>
</tr>
<tr>
<td>&lt;=Greek Life</td>
<td>-1.076</td>
<td>0.224</td>
<td>-4.80</td>
<td>.000</td>
<td>-1.516</td>
<td>-0.637</td>
</tr>
<tr>
<td>DERS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;=ECR-R Anxious</td>
<td>0.441</td>
<td>0.047</td>
<td>9.43</td>
<td>.000</td>
<td>0.349</td>
<td>0.532</td>
</tr>
<tr>
<td>&lt;=ECR-R Avoidance</td>
<td>0.237</td>
<td>0.047</td>
<td>5.08</td>
<td>.000</td>
<td>0.145</td>
<td>0.328</td>
</tr>
<tr>
<td>Error</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>=&gt;DERS</td>
<td>307.434</td>
<td>20.564</td>
<td>--</td>
<td>--</td>
<td>269.659</td>
<td>350.501</td>
</tr>
<tr>
<td>=&gt;Latent Alcohol Use</td>
<td>3.094</td>
<td>0.347</td>
<td>--</td>
<td>--</td>
<td>2.420</td>
<td>3.794</td>
</tr>
</tbody>
</table>

Note. Coef = Unstandardized Coefficients; LL = Lower Limit; UL = Upper Limit; ECR-R Anxious = Experience in Close Relationships-Revised Anxious Attachment Subscale; ECR-R Avoidance = Experience in Close Relationships-Revised Avoidant Attachment Subscale; DERS = Difficulties in Emotion Regulation Scale Total Scale; Housing = Reported Housing Type; FGCS = First Generation College Student Status; Greek = Greek Life Participation.

Table 23

*Effect of Predictors on Latent Alcohol Use*

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Coef</th>
<th>SE</th>
<th>z</th>
<th>p</th>
<th>LL</th>
<th>UL</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECR-R Anxious</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct Effect</td>
<td>-0.003</td>
<td>0.005</td>
<td>-0.48</td>
<td>.632</td>
<td>-0.008</td>
<td>0.012</td>
</tr>
<tr>
<td>Indirect Effect</td>
<td>0.001</td>
<td>0.002</td>
<td>0.39</td>
<td>.696</td>
<td>-0.003</td>
<td>0.005</td>
</tr>
<tr>
<td>Total Effect</td>
<td>-0.002</td>
<td>0.005</td>
<td>-0.35</td>
<td>.724</td>
<td>-0.011</td>
<td>0.008</td>
</tr>
<tr>
<td>ECR-R Avoidance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct Effect</td>
<td>-0.005</td>
<td>0.005</td>
<td>-0.97</td>
<td>.330</td>
<td>-0.015</td>
<td>0.005</td>
</tr>
<tr>
<td>Indirect Effect</td>
<td>0.001</td>
<td>0.001</td>
<td>0.39</td>
<td>.697</td>
<td>-0.002</td>
<td>0.003</td>
</tr>
<tr>
<td>Total Effect</td>
<td>-0.004</td>
<td>0.005</td>
<td>-0.91</td>
<td>.364</td>
<td>-0.014</td>
<td>0.005</td>
</tr>
</tbody>
</table>

Note. Coef = Unstandardized Coefficients; LL = Lower Limit; UL = Upper Limit; ECR-R Anxious = Experience in Close Relationships-Revised Anxious Attachment Subscale; ECR-R Avoidance = Experience in Close Relationships-Revised Avoidant Attachment Subscale.
CHAPTER 5: DISCUSSION

The primary aim of this study was to examine the model proposed by Hunter and Maunder (2016) explaining the mechanisms by which attachment style relates to physical health and disease risk. The model proposes that disease risk is influenced by attachment through influencing outcomes associated with patient-provider interaction and by shaping behaviors which increase the risk of contracting or developing a disease. In my study, specifically, I examined how attachment style relates to alcohol use, and if affect regulation mediated that relation.

Hunter and Maunder theorized a path from attachment style to affect regulation to alcohol use. The attachment literature demonstrates that insecure attachment style does predict variance in alcohol use. Attachment theory asserts that attachment styles are representations of the internal working model which shape patterns of interpersonal behaviors and regulate affect (Bowlby, 1969). Hunter and Maunder (2016), summarize the literature and assert that the relation between attachment style and alcohol use can be explained by affect regulation. In this model, higher levels of attachment anxiety and avoidance are associated with fewer affect regulation strategies and more emotional dysregulation. This difficulty in regulating emotions then leads to an individual utilizing external regulators of affect, like alcohol. Although the relation between attachment style and alcohol use is often explained by this mechanism, prior to my investigation, researchers have not empirically modeled the mediating effect of affect regulation on the relation of attachment style and alcohol use.

Findings Concerning Hypotheses

In hypothesis one, I predicted that alcohol use would be moderately positively correlated with attachment style and emotional dysregulation. Neither the frequency of alcohol use, the
quantity of alcohol used, nor the frequency of heavy episodic drinking were significantly correlated with attachment anxiety, attachment avoidance, or emotion dysregulation. Therefore, hypothesis one was not supported by the data. This result is inconsistent with previously published cross-sectional research (Wyrykowska, Glogowska, & Mickiewicz, 2014; Thorberg et al., 2011; Mickelson, Kessler, & Shaver, 1997), and notably inconsistent with previous cross-sectional research in college samples (Golder, Gillmore, Spieker, & Morrison, 2005; Kassel, Wardle, & Roberts, 2007; Andres, Castanier, & Le Scanff, 2014; Labrie & Sessoms, 2012). Significant positive moderate correlations were observed between anxious and avoidant attachment styles, and emotional dysregulation. Significant positive correlations were also observed among the outcome variables of frequency of alcohol use, quantity of alcohol use, and the frequency of heavy episodic drinking. However, attachment style variables and alcohol use variables were not significantly correlated with one another. This pattern of nonsignificant relations persisted throughout the results.

In hypotheses two through five, I predicted the relations among key variables would support the model proposed by Hunter and Maunder (2016), which indicated emotional dysregulation would mediate the relation between attachment style and alcohol use. I tested these hypotheses using four different outcome variables: 1) drinking the frequency of alcohol use (hypothesis two); 2) the quantity of alcohol used (hypothesis three); 3) the frequency of heavy episodic drinking (hypothesis four); and, 4) overall alcohol use (hypothesis five). A pattern of similar relations emerged across all four models.

The first link in the Hunter and Maunder (2016) is the relation between attachment style and emotion dysregulation. I hypothesized significant positive moderate relations between both attachment anxiety and avoidance and emotional dysregulation. The data supported this
hypothesis across models with moderate positive correlations ($r = .44-.54$, $p < .01$) and significant path coefficients ($B = .24-45$, $p < .001$). My results were consistent with previous research indicating that higher levels of attachment anxiety and avoidance are associated with greater difficulty in emotional regulation. This provides additional evidence that an internal working model of attachment serves to regulate emotions, where individuals with less secure attachment styles have a more limited repertoire of emotional regulation strategies and in turn experience greater levels of emotional dysregulation.

Next, Hunter and Maunder (2016) suggest that higher levels of emotional dysregulation are associated with higher levels of alcohol use (to serve as an 'external' emotional regulator). I hypothesized moderate positive relations between emotional dysregulation and alcohol use across all four models. My data did not support these hypotheses, as no significant relations emerged between emotional dysregulation and alcohol consumption as measured by any of the four independent alcohol outcome variables. This result runs contrary to the theory and previous research.

Hunter and Maunder (2016) summarized the existing literature in arguing that previously observed relations between attachment style and alcohol use were explained by the mechanism of emotional regulation. I hypothesized that emotional dysregulation would mediate the relationship between both attachment anxiety and avoidance and alcohol use across all four models. My data did not support these hypotheses. No significant indirect effects were observed between either attachment anxiety nor attachment avoidance and alcohol use across any of the four alcohol outcome variables tested. Further, no significant direct effects were observed between alcohol use and attachment anxiety or attachment avoidance. In all four models, there were no significant
relations among alcohol use and attachment anxiety, attachment avoidance, nor emotional
dysregulation.

**Summary**

The primary purpose of my study was to assess whether emotional dysregulation
mediated the previously observed relation between attachment style and alcohol use as proposed
by Hunter and Maunder (2016), in line with the prevailing understanding of attachment theorists.
Not only did my data not support emotional dysregulation as a mediator, but they did not support
a strong direct relationship between attachment style and alcohol use. In sum, attachment style
and emotional dysregulation were not significantly related to alcohol use.

In my sample of college students, alcohol use was not significantly related to attachment
and emotional dysregulation. This finding stands in contrast with previously published work. My
data does not support the claim that college students with insecure attachment styles and limited
abilities to regulate emotions are at an increased risk for greater use of alcohol. The literature
cites numerous risk factors for alcohol use in college. In this sample several of these risk factors,
selected as control variables, were significantly related to alcohol use, but adult attachment style
and emotional dysregulation were not among these significant relations.

**Understanding the Null Results**

The results found in this sample did not support the model as hypothesized. The lack of
significant results stands in contrast to the existing literature. This can be understood from
several perspectives.

**Stress Activation of the Attachment System**

Bowlby (1969; 1973; 1980) asserted that the attachment system is used to regulate
distressing emotions and navigate stressful challenges based on the support the individual
received from the attachment figure. Attachment theory predicts that attachment behaviors are therefore activated by stress. In this sample of college students, stress levels were unknown. Assuming they represent the general population of college students with typical levels of stress, the attachment system may not have been activated. Perhaps, without an activating stressor, individuals across attachment styles do not need to utilize external regulators like alcohol use, when they are able to regulate low levels of stress without them.

A Complex Variable

The lack of significant findings needs to be interpreted within the context of the complex relation of variables that influence alcohol use. In the hypothesized model, alcohol use was predicted by very few variables. The alcohol literature cites a multitude of risk factors that contribute to alcohol use. Although I did control for several of the most cited demographic risk factors for alcohol, in the larger context of the factors that predict this behavior, the hypothesized model was fairly isolated. To truly predict alcohol use, a much wider array of risk factors and variables would need to be examined.

Levels of Alcohol Use

This sample of college students reported relatively low levels of alcohol use, with the modal response being zero across outcome measures. The sample reported less alcohol use than expected when compared to epidemiological studies (Borders & Booth, 2007; Hingson, Zha, & Weitzman, 2009). Much of the literature citing attachment and emotional regulation as a predictor of alcohol use, especially cross sectional studies, tend to use samples with higher levels of drinking or samples experiencing problematic drinking like substance use disorder or adverse consequences related to drinking.(Berking et al., 2011; Vungkhanching, Sher, Jackson, & Parra, 2004; Thorberg et al., 2011; Labrie & Sessoms, 2012; Wyrykowska, Glogowska, & Mickiewicz,
My findings may suggest that significant relations among variables observed with higher levels of alcohol use, may not be present with lower levels of alcohol use.

**Context Matters**

The social context for alcohol use matters in understanding these relations. The hypothesized model assumes that alcohol use broadly acts as an external regulator. The larger Hunter and Maunder (2016) model also assert that this external regulator is linked with overall health risks and disease burden. These assumptions may not be true in a college sample with low levels of alcohol use based on the social milieu. My data may suggest that in samples with lower levels of alcohol use, alcohol use is not associated with the difficulties in emotion regulation and social behaviors within insecure attachment styles. For example, in a college setting where alcohol use and other social support behaviors associated with a secure attachment, the likelihood of engaging in low levels of alcohol use may be increased. While further evidence is needed to understand this relation, the current findings indicate that those in Greek life organization, which are often organizations focused on social connection, drink at higher rates. While some literature assessed motivations for drinking as support for the hypothesized relations (Kidorf and Lang, 1999; Kassel, Wardle, & Roberts, 2007; Aurora & Klanecky, 2016; Paulus et al., 2017), my study assessed alcohol use broadly. My results leave open the possibility that alcohol use can serve multiple functions in a college population and not just serve as an external regulator and health risk.

**Limitations and Future Directions**

**Sample and Data Limitations**

This sample has several noteworthy characteristics that may have contributed to finding no significant relation among alcohol use, attachment style or emotional dysregulation. The
sample contained primarily non-drinkers, with relatively few people reporting high levels of alcohol use. Despite utilizing a negative binomial distribution, the data may not have had sufficient variance to detect more subtle relations. Using a general sample of college students may have reflect relations among constructs that were different had the sample on average, reported higher and more evenly distributed levels of alcohol use.

There is limited evidence that this sample may not have been representative of the general population of college students. For example, several well documented alcohol risk factors were not significantly related to alcohol use in this sample; specifically, sex and family history of substance use disorders. Although my sample reported levels of alcohol use grossly similar to reported national and regional averages, this sample reported lower levels of alcohol use and more abstainers than most epidemiological estimates (Borders & Booth, 2007; Hingson, Zha, & Weitzman, 2009). These atypical collateral findings may suggest reporting bias. Some sources of potential sample bias include; self-selection for participation in my study; recruiting only from students enrolled in psychology courses (SONA system); and, recruiting students only from one midwestern state university location. Further, my atypical findings may suggest lower awareness on the part of participants of the variables assessed (e.g. not being aware of a family members' substance use disorder) or participants may not have accurately reported all variables as a function of social desirability or impression management.

The exclusion criteria for my study also present a notable potential source of sample bias. My study excluded individuals who reported experiencing suicidal thoughts as a research risk management strategy required by the IRB. This excluded subgroup represented a substantial proportion of the sample. In addition to potential participants who self-selected to comply with the posted exclusion criteria, 41 participants (8.2%) screened positive for suicidal thoughts and
were immediately exited from the survey and removed post-hoc. This exclusion criterion may have excluded participants who were experiencing more distress and dysregulation, or may have had unintended ceiling effects on reported distress, raised floor effects on reporting emotional dysregulation strategies, or excluded those more likely to endorse the use of external regulators like alcohol. These exclusions may have reduced the variance in alcohol consumption outcome variables, and therefore, influenced relations and significance among key variables.

**Implications for Future Research**

Longitudinal research is needed to best address the limitations of the cross-sectional design utilized in my study. Although the flow of the Hunter and Maunder (2016) model would appear to imply causation, cross-sectional sampling techniques are less able to support a true causal argument across time. Longitudinal research designs can better address the limited scope of information present in assessing alcohol only through a 30-day look back period which may or may not be representative of longer-term patterns of alcohol use.

My study investigated The Hunter and Maunder (2016) model which predicts alcohol use, but not motivations for use. Attachment theory and the Hunter and Maunder (2016) model suggested that alcohol would be used as an external regulator. My data did not support a relation between alcohol use and attachment and emotion regulation, but motivations for alcohol use were not assessed. It is possible that although participants with insecure attachment styles and more emotional dysregulation did not drink more than their counterparts, these consumers of alcohol may have drank for different reasons. Future research should expand the scope of the outcomes beyond simple alcohol use to include reasons for alcohol use, specifically assessing alcohol use across time to manage stress or regulate emotions.
Alcohol use has been documented as a risk factor for several short-term and long-term consequences related to health and wellbeing. My study examined alcohol use broadly, in the general population of college students, and did not examine those currently experiencing, or at risk of experiencing, negative outcomes from their drinking behavior (e.g. alcohol related injury, legal consequences related to alcohol use, or psychosocial functional impairments related to alcohol use). In the future, researchers may benefit from assessing not only alcohol use, but also these specific negative consequences of alcohol use or specific problematic alcohol use patterns of behavior. Research in this area may better determine how attachment and emotional regulation relate to alcohol use within this higher risk subgroup.

Attachment theory explains how individuals relate to others and regulate their affect when faced with stressors (Mikulincer & Shaver, 2007). My study examined a general population of college students and did not assess current stress or distress levels. It is possible that predicted relations were not observed in this sample because participants may not have been experiencing stress and their attachment systems were not activated. If individuals are not faced with stressors that overwhelm their resources, there is no need to utilize external regulating strategies. Future research should assess participants current level of stress or distress to account for this important factor as it relates to attachment and ensuing emotional dysregulation.

As well, my study examined only one external regulating behavior, alcohol use, out of a wide range of external regulating behaviors that influence physical health such as drug use, over eating, nicotine use, and excessive exercise (Hunter & Maunder, 2016). Although the data in my sample did not support the Hunter and Maunder (2016) theory specific to alcohol use, it is possible that relations in the model have had more empirical support if other external regulating behaviors were also considered. Further, those individuals with fewer internal emotional
regulation strategies may utilize several external regulating strategies to compensate. Researchers utilizing the Hunter and Maunder (2016) model may benefit from using additional behavioral outcome variables to capture the range of possible external regulating behaviors that increase the risk of disease and illness.

My study utilized self-report measurements of all variables. Although the scales and measurement techniques are widely used and have demonstrated good psychometric properties, self-report data has several general limitations. Self-report data is subject to the effects of social desirability, particularly salient given the sensitive nature of the content of this investigation (relational patterns, emotional regulation, and alcohol use). Further, accurate self-report data requires adequate insight into one’s behaviors, patterns, and characteristics. In future research, investigators may benefit from including observational data or controlling for social desirability.

My investigation explored the influence of attachment style on alcohol use in a relatively isolated context. Although several individual and demographic risk factors were accounted for as control variables, the number of risk factors influencing alcohol use in college students far exceeds the scope of my study. Further, the interaction effects among attachment and other risk factors were not accounted for in my study. Given the numerous factors influencing alcohol use in college students, future investigations may benefit from exploring these additional risk relations, with specific attention to potential interaction effects, to better understand more potentially complex relations present in the model.

Notable risk factors in need of exploration include accounting for the cultural and social expectations college students hold related to alcohol use. College students consistently report higher levels of alcohol use than the general population (CBHSQ, 2016). Further, the strongest predictor of alcohol use in the current study was the control variable of Greek Life participation,
with those participants affiliated with fraternities and sororities consuming more alcohol than their peers. In certain social situations where alcohol use may be viewed as a normative or typical social behavior, some level of alcohol use in specific social contexts may be related to attachment style. Further exploration of the relations between attachment and alcohol use within such social contexts may help to more thoroughly explain the drinking patterns of college students.

**Implications for Practice**

My findings have several implications for clinical practice. Adult attachment style is often thought of as a theory explaining strategies used to navigate personal social relationships, but the connection of attachment style to emotional regulation is often overlooked. Clinicians would benefit from considering how client attachment style is related to emotional regulation. Results of my study highlight the difficulty those with less secure attachment styles have in regulating their emotions. Although I did not find significant relations among alcohol use, attachment or emotional regulation in college students, previous research suggests that clinicians should continue to consider the many risk factors that have been established as contributors to alcohol consumption in college students, including attachment style and emotional regulation.

**Conclusion**

My study sought to examine the model proposed by Hunter and Maunder (2016), which suggests that the previously established relation between attachment style and alcohol use (or other external regulating behaviors associated with disease risk) is mediated by emotional dysregulation. My results provided limited support for this model, observing relations among attachment anxiety and avoidance, and emotional dysregulation, but did not observe significant relations among alcohol use and these constructs. Not only was no observed mediation effect
present as hypothesized, but the direct relationship between alcohol use and attachment style was quite low in contrast to previous research. My results contribute additional support to the literature documenting insecure attachment styles and their connection with emotional regulation functions, highlighting the importance of understanding the limited emotional regulation strategies accessible for individuals with less secure attachment styles. Further research is necessary in understanding the nuances and complexities of the relations among insecure attachment styles and alcohol use, or other external regulating behaviors.
REFERENCES


Milner, L. C., & Buck, K. J. (2010). Identifying quantitative trait loci (QTLs) and genes (QTGs) for alcohol-related phenotypes in mice. *International Review of Neurobiology, 91*, 173-204.


APPENDIX A. DEMOGRAPHIC QUESTIONS

Demographics

1) Sex:
   (1) Male
   (2) Female
   (3) Transgender
   (4) Other (please indicate)____________

2) Age:_____

3) Year in School:
   (1) Freshman
   (2) Sophomore
   (3) Junior
   (4) Senior
   (5) Graduate or Professional Student
   (6) Other (please indicate)____________

4) Race/Ethnicity:
   (1) American Indian or Alaskan Native
   (2) Asian American
   (3) African or African American (Black)
   (4) Hawaiian or Other Pacific Islander
   (5) Hispanic/Latino American
   (6) European American (White)
   (7) Middle Eastern American
   (8) International (nationality)
   (9) Bi/Multi-racial
   (10) Other (please indicate)____________

5) College Major:______________

6) Please describe your current living situation
   (1) Living in a non-co-ed residence hall
   (2) Living in a co-ed residence hall
   (3) Living in a university apartment
   (4) Living with family off campus
   (5) Living with roommates in apartment off campus
   (6) Living along in apartment off campus
   (7) Other (please indicate)______________
7) Have either of your parents received a 4-year college degree?
   (1) Yes
   (2) No

8) Do you participate in greek life on campus?
   (1) Yes
   (2) No

9) Have one or more of your parents or siblings experienced significant substance abuse or dependence?
   (1) Yes
   (2) No
APPENDIX B. EXPERIENCES IN CLOSE RELATIONSHIPS-REVISED

The statements below concern how you feel in emotionally intimate relationships. We are interested in how you generally experience relationships, not just in what is happening in a current relationship. Respond to each statement by selecting the number to indicate how much you agree or disagree with the statement.

**Researcher Note: Items below are to be randomized when presented to participants**

1) I'm afraid that I will lose my partner's love.
   strongly disagree 1 2 3 4 5 6 7 strongly agree

2) I often worry that my partner will not want to stay with me.
   strongly disagree 1 2 3 4 5 6 7 strongly agree

3) I often worry that my partner doesn't really love me.
   strongly disagree 1 2 3 4 5 6 7 strongly agree

4) I worry that romantic partners won’t care about me as much as I care about them.
   strongly disagree 1 2 3 4 5 6 7 strongly agree

5) I often wish that my partner's feelings for me were as strong as my feelings for him/her.
   strongly disagree 1 2 3 4 5 6 7 strongly agree

6) I worry a lot about my relationships.
   strongly disagree 1 2 3 4 5 6 7 strongly agree

7) When my partner is out of sight, I worry that he/she might become interested in someone else.
   strongly disagree 1 2 3 4 5 6 7 strongly agree

8) When I show my feelings for romantic partners, I'm afraid they will not feel the same about me.
   strongly disagree 1 2 3 4 5 6 7 strongly agree

9) I rarely worry about my partner leaving me.
   strongly disagree 1 2 3 4 5 6 7 strongly agree

10) My romantic partner makes me doubt myself.
    strongly disagree 1 2 3 4 5 6 7 strongly agree

11) I do not often worry about being abandoned.
    strongly disagree 1 2 3 4 5 6 7 strongly agree

12) I find that my partner(s) don't want to get as close as I would like.
    strongly disagree 1 2 3 4 5 6 7 strongly agree

13) Sometimes romantic partners change their feelings about me for no apparent reason.
    strongly disagree 1 2 3 4 5 6 7 strongly agree

14) My desire to be very close sometimes scares people away.
    strongly disagree 1 2 3 4 5 6 7 strongly agree

15) I'm afraid that once a romantic partner gets to know me, he/she won't like who I really am.
    strongly disagree 1 2 3 4 5 6 7 strongly agree

16) It makes me mad that I don't get the affection and support I need from my partner.
    strongly disagree 1 2 3 4 5 6 7 strongly agree

17) I worry that I won't measure up to other people.
    strongly disagree 1 2 3 4 5 6 7 strongly agree

18) My partner only seems to notice me when I’m angry.
    strongly disagree 1 2 3 4 5 6 7 strongly agree
19) I prefer not to show a partner how I feel deep down.
   strongly disagree 1 2 3 4 5 6 7 strongly agree
20) I feel comfortable sharing my private thoughts and feelings with my partner.
   strongly disagree 1 2 3 4 5 6 7 strongly agree
21) I find it difficult to allow myself to depend on romantic partners.
   strongly disagree 1 2 3 4 5 6 7 strongly agree
22) I am very comfortable being close to romantic partners.
   strongly disagree 1 2 3 4 5 6 7 strongly agree
23) I don't feel comfortable opening up to romantic partners.
   strongly disagree 1 2 3 4 5 6 7 strongly agree
24) I prefer not to be too close to romantic partners.
   strongly disagree 1 2 3 4 5 6 7 strongly agree
25) I get uncomfortable when a romantic partner wants to be very close.
   strongly disagree 1 2 3 4 5 6 7 strongly agree
26) I find it relatively easy to get close to my partner.
   strongly disagree 1 2 3 4 5 6 7 strongly agree
27) It's not difficult for me to get close to my partner.
   strongly disagree 1 2 3 4 5 6 7 strongly agree
28) I usually discuss my problems and concerns with my partner.
   strongly disagree 1 2 3 4 5 6 7 strongly agree
29) It helps to turn to my romantic partner in times of need.
   strongly disagree 1 2 3 4 5 6 7 strongly agree
30) I tell my partner just about everything.
   strongly disagree 1 2 3 4 5 6 7 strongly agree
31) I talk things over with my partner.
   strongly disagree 1 2 3 4 5 6 7 strongly agree
32) I am nervous when partners get too close to me.
   strongly disagree 1 2 3 4 5 6 7 strongly agree
33) I feel comfortable depending on romantic partners.
   strongly disagree 1 2 3 4 5 6 7 strongly agree
34) I find it easy to depend on romantic partners.
   strongly disagree 1 2 3 4 5 6 7 strongly agree
35) It's easy for me to be affectionate with my partner.
   strongly disagree 1 2 3 4 5 6 7 strongly agree
36) My partner really understands me and my needs.
   strongly disagree 1 2 3 4 5 6 7 strongly agree
APPENDIX C. DIFFICULTIES IN EMOTION REGULATION SCALE

Please indicate how often the following statement has applied to you over the past 30 days by writing the appropriate number from the scale below.

1-----------------------------------2-----------------------------3-----------------------------------4-----------------------------------5

almost never sometimes about half the time most of the time almost always
(0-10%) (11-35%) (36-65%) (66-90%) (91-100%)

1) I am clear about my feelings.
2) I pay attention to how I feel.
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.
7) I know exactly how I am feeling.
8) I care about what I am feeling.
9) I am confused about how I feel.
10) When I’m upset, I acknowledge my emotions.
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 will end up feeling very depressed.
17) When I’m upset, I believe that my feelings are valid and important.
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.
21) When I’m upset, I feel ashamed at myself for feeling that way.
22) When I’m upset, I know that I can find a way to eventually feel better.
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.
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 there is nothing I can do to make myself feel better.
29) When I’m upset, I become irritated at 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 behavior.
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.
35) When I’m upset, it takes me a long time to feel better.
36) When I’m upset, my emotions feel overwhelming.
APPENDIX D. ALCOHOL QUANTITY-FREQUENCY (Q/F)

1) DURING THE PAST 30 DAYS, on how many days did you have any beverage containing alcohol (including beer, wine, or liquor)?

_____ DAYS (out of the past 30 when I had any alcohol beverage)

For questions 2 & 3 remember, these count as ONE DRINK:

12 ounces of BEER ; 4 ounces of WINE ; 1 shot of LIQUOR

Also:

½ pint of liquor = 8 drinks ; 1 pint of liquor = 16 drinks ; 1 bottle of wine = 6 drinks

DURING THE PAST 30 DAYS, on days when you did drink alcohol, how many drinks did you usually have?

_____ DRINKS per sitting

DURING THE PAST 30 DAYS, on how many days did you have 5 or more drinks (if you are a male) or 4 or more drinks (if you are a female)?

_____ DAYS (out of the past 30) when I have five (male) / four (female) or more drinks.
APPENDIX E. IRB APPROVAL MEMO

Date: 1/16/2018
To: Dakota Kaiser
        W112 Lagomarcino
From: Office for Responsible Research
Title: The mediational role of affect regulation on the relation between attachment and alcohol use in college students
IRB ID: 17-620
Approval Date: 1/16/2018
Date for Continuing Review: 1/15/2020
Submission Type: New
Review Type: Expedited

The project referenced above has received approval from the Institutional Review Board (IRB) at Iowa State University according to the dates shown above. Please refer to the IRB ID number shown above in all correspondence regarding this study.

To ensure compliance with federal regulations (45 CFR 46 & 21 CFR 56), please be sure to:

- Use only the approved study materials in your research, including the recruitment materials and informed consent documents that have the IRB approval stamp.

- Retain signed informed consent documents for 3 years after the close of the study, when documented consent is required.

- Obtain IRB approval prior to implementing any changes to the study by submitting a Modification Form for Non-Exempt Research or Amendment for Personnel Changes form, as necessary.

- Immediately inform the IRB of (1) all serious and/or unexpected adverse experiences involving risks to subjects or others; and (2) any other unanticipated problems involving risks to subjects or others.

- Stop all research activity if IRB approval lapses, unless continuation is necessary to prevent harm to research participants. Research activity can resume once IRB approval is reestablished.

- Complete a new continuing review form at least three to four weeks prior to the date for continuing review as noted above to provide sufficient time for the IRB to review and approve continuation of the study. We will send a courtesy reminder as this date approaches.

Please be aware that IRB approval means that you have met the requirements of federal regulations and ISU policies governing human subjects research. Approval from other entities may also be needed. For example, access to data from private records (e.g., student, medical, or employment records, etc.) that are protected by FERPA, HIPAA, or other confidentiality policies requires permission from the holders of those records. Similarly, for research conducted in institutions other than ISU (e.g., schools, other colleges or universities, medical facilities, companies, etc.), investigators must obtain permission from the institution(s) as required by their policies. IRB approval in no way implies or guarantees that permission from these other entities will be granted.

Upon completion of the project, please submit a Project Closure Form to the Office for Responsible Research, 202 Kingland, to officially close the project.

Please don't hesitate to contact us if you have questions or concerns at 515-294-4566 or IRB@iastate.edu.
APPENDIX F. INFORMED CONSENT

Title of Study: The mediational role of affect regulation on the relation between attachment and alcohol use in college students

Investigator: Dakota J Kaiser, MS

Faculty Supervisor: Loreto Prieto, PhD

This is a research study. Please take your time in deciding if you would like to participate.

Introduction
The purpose of this study is to better understand the relation between relationship patterns, coping patterns, mental health, and alcohol use in college students. You must be at least 18 years old to participate in this study.

Description of Procedures
If you decide to participate in this study, you will be granted access to an online survey after completing this page. Your responses to the survey will be confidential, no identifying information will be linked to your data, and all data will be reported only in aggregate (group) form.

You will complete survey items that gather information on your demographics, relationship style, alcohol use, ways in which you manage your emotions, and levels of depression and anxiety.

Risks
Some slight discomfort may occur in recalling relationship patterns, coping style, mental health symptoms or alcohol use. If you feel any discomfort at any point during this study, you may choose to immediately end your participation at any time, with no penalty or negative consequences.

You will be asked directly about various mental health issues, including suicidal thoughts. If you currently have suicidal thought or feelings, or have had suicidal thoughts or feelings in the past two weeks, we strongly recommend that you do not participate in this research project, and strongly encourage you to contact one of the mental health services listed below to receive help with any difficulties you may be experiencing.

Mary Greeley Medical Center-Emergency Services: (515)-239-2011 or dial 911, 1111 Duff Ave, Ames, IA 50010.

ISU-Student Counseling Services: (515)-294-5056, 3rd floor of the Student Services Building.

Central Iowa Psychological Services: (515)-233-1122, 223 S Walnut Ave, Ames, IA 50010

Thielen Student Health Center: (515)-294-5801, 2647 Union Drive, Ames, IA 50011
National Suicide Prevention Hotline: 1-800-273-8255

**Benefits**
There are no direct benefits to you from participating in this study. You have other studies available to you that can yield your research credit in your courses, as well as other methods of obtaining your required course research credit. Consult your course syllabi and instructor for this information.

**Costs and Compensation**
You will be awarded one SONA research credit for your participation in this study. The estimated amount of time required to complete the survey is no more than 45 minutes. Please be aware that you will not be able to save your responses and return to the survey at another time. Therefore, be sure to complete *all* research materials in one sitting.

**Data Sharing**
De-identified information collected about you during this study may be shared with other researchers or used for future research studies. We will not obtain additional informed consent from you before sharing the de-identified data.

**Participant Rights**
Your participation in this study is completely voluntary. You may refuse to participate or end your participation at any time, without any penalty or negative consequences. If you choose to participate, you are expected to make a *good faith* effort to complete all research materials. In other words, simply paging through the survey without answering any items, or answering only a very few items and leaving the great majority of them blank, would not be considered a "good faith" effort to participate. However, you have the right not to answer any specific questions on the survey that you do not wish to answer (simply skip the question and go to the next question).

**Confidentiality**
Records identifying participants will be kept confidential to the extent permitted by applicable laws and regulations and will not be made publicly available. However, federal government regulatory agencies, auditing departments of Iowa State University, and the Institutional Review Board (a committee that reviews and approves human subject research studies) may inspect and/or copy your records for quality assurance and data analysis. These records may contain private information.

To ensure confidentiality to the extent permitted by law, we will take the following measures: 1) no joining or connection of your electronic consent form will be made to the record of data you enter online; 2) no physical copies of consent forms will be generated so as to protect the identities of all participants; 3) any materials generated (e.g., electronic copies of research data) will be stored in the supervising faculty member’s locked file cabinet, in a locked lab, in the psychology department, to which only the supervising faculty member has a key; and, 4) all electronic raw data will be kept on encrypted protected files or computers. If the results are published, participants’ identities will remain confidential and all data will be presented in aggregate (group) form.

**Questions or Problems**
You are encouraged to ask questions at any time during this study.

- For further information about the study contact Dakota Kaiser at dkaiser@iastate.edu (515.294.4217) or Dr. Loreto Prieto at lprieto@iastate.edu (515.294.2455).
- If you have any questions about the rights of research subjects or research-related injury, please contact the IRB Administrator, (515) 294-4566, IRB@iastate.edu, or Director, (515) 294-3115, Office for Responsible Research, Iowa State University, Ames, Iowa 50011.

*****************************************************************************************************************

PARTICIPANT SIGNATURE

By checking the “Yes, I agree to participate” box, I am confirming that: 1) I have read and understand the informed consent form; 2) I am at least 18 years of age; and, 3) I am neither currently experiencing suicidal thought or feelings, nor have I had suicidal thoughts or feelings in the past two weeks. I voluntarily agree to participate in this study. I have been given, and have taken, all the time I need to read the informed consent document and ask any questions I may have.

By checking the “No, I do not agree to participate” box, you will immediately end your participation in this study.

_____ Yes, I agree to participate.

_____ No, I do not agree to participate.

Debriefing (presented at conclusion of survey)

If you experienced any discomfort from responding to the items in this study, if you are or have been experiencing suicidal thoughts, or if you are concerned about your alcohol use, please consider consulting one of the following mental health services.

Mary Greeley Medical Center-Emergency Services: (515)-239-2011 or dial 911, 1111 Duff Ave, Ames, IA 50010.

ISU-Student Counseling Services: (515)-294-5056, 3rd floor of the Student Services Building.

Central Iowa Psychological Services: (515)-233-1122, 223 S Walnut Ave, Ames, IA 50010

Thielen Student Health Center: (515)-294-5801, 2647 Union Drive, Ames, IA 50011

National Suicide Prevention Hotline: 1-800-273-8255