Drunkorexia and Gender Role Conformity

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UNIVERSITY OF NORTHERN COLORADO

Greeley, Colorado

The Graduate School

DRUNKOREXIA AND GENDER ROLE CONFORMITY

A Dissertation Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Philosophy

Sarah Zwetzig

College of Education and Behavioral Sciences
Department of Applied Psychology and Counselor Education

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This Dissertation by: Sarah Zwetzig

Entitled: *Drunkorexia and Gender Role Conformity*.

has been approved as meeting the requirements for the Degree of Doctor of Philosophy in College of Education and Behavioral Sciences in Department of Applied Psychology and Counselor Education.

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ABSTRACT


Drunkorexia, a behavior involving binge drinking and compensatory eating or dieting behaviors, has been found in approximately 15-39% of college-aged individuals (Burke, Cremeens, & Vail-Smith, 2010; Giles, Champion, Sutfin, McCoy, & Wagoner, 2009; Roosen & Mills, 2015). Its prevalence, along with increased risk of negative consequences, make drunkorexia a particularly risky behavior (Giles et al., 2009). The current study examined the relationship and predictive power of gender role conformity, both feminine (as measured by the Conformity to Feminine Norms Inventory-45 [Parent & Moradi, 2010]) and masculine (as measured by the Conformity to Masculine Norms Inventory-46 [Parent & Moradi, 2009]), alcohol use (as measured by the Alcohol Use Disorder Identification Test [Saunders, Aasland, Babor, de la Fuente, & Grant, 1993]), and disordered eating (as measured by the Eating Attitudes Test-26 [Garner & Garfinkel, 1979]) on the level of drunkorexia (as measured by the Compensatory Eating and Behaviors in Response to Alcohol Consumption Scale [Rahal, Bryant, Darkes, Menzel, & Thompson, 2012]). This study also examined the differences in gender role conformity amongst those who engage in drunkorexia and those who do not. All significance was compared to a standard α=.05 level. Survey results from a total of 307 undergraduate students, 103 of which engaged in drunkorexia, showed no significant
correlation between drunkorexia and masculine gender role conformity for males ($r = -0.047, p = 0.845$) or females ($r = -0.050, p = 0.657$). Results also showed no significant correlation between drunkorexia and feminine gender role conformity for males ($r = -0.246, p = 0.296$) or females ($r = 0.180, p = 0.107$). Feminine gender role conformity was significantly related to the Diet and Exercise subscale of the drunkorexia measure ($r(80) = 0.289, p < 0.01$), although the correlation was small. After controlling for gender, a hierarchical regression analysis showed that alcohol use, disordered eating, and both feminine and masculine gender role conformity (entered at Step 2 of the analysis) significantly predicted total level of drunkorexia ($R^2 = 0.295, p < 0.001$). Alcohol use was the only significant variable in this model after a Bonferroni correction, accounting for the most unique variance in level of drunkorexia ($\Delta R^2 = 0.227, p < 0.001$). A post hoc hierarchical regression analysis showed that feminine gender role conformity, disordered eating, and alcohol use (entered at Step 1 in the analysis) significantly predicted scores on the Diet and Exercise subscale of the drunkorexia measure ($R^2 = 0.196, p < 0.001$), with alcohol use again accounting for the most unique variance ($\Delta R^2 = 0.066, p = 0.012$). After the Bonferroni correction, disordered eating did not remain a significant variable in the post hoc analyses. Analyses of covariance showed there was not a statistically significant difference in either masculine ($p = 0.065$) or feminine ($p = 0.086$) gender role conformity between those who engage in drunkorexia and those who do not. Results indicate alcohol use is an important factor to consider when treating drunkorexia, and feminine gender role conformity may be an important factor for some females who engage in drunkorexia. This study highlighted the need for screening of disordered eating and alcohol use, particularly with emerging adults, and findings suggest there may be a connection
between engaging in dieting and exercise and engagement in drunkorexia. Continued research on drunkorexia, particularly around measurement and theory of the behavior, are important future directions to consider.
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CHAPTER I
INTRODUCTION

Introduction

Drunkorexia, defined by many as “intentional calorie restriction prior to binge drinking”, has been found in approximately 15-39% of college-aged individuals (Burke, Cremeens, & Vail-Smith, 2010; Giles, Champion, Sutfin, McCoy, & Wagoner, 2009; Roosen & Mills, 2015). Its prevalence, along with increased risk of negative consequences, make drunkorexia a particularly risky behavior. Individuals who engage in drunkorexia are faced with increased emotional and physical complications over their nonparticipating peers, such as increased risk of unprotected sex, injury, or being sexually assaulted (Giles et al., 2009). Additionally, binge drinking and restriction of calories present their own separate health concerns and consequences, such as unintentional injuries, sexually transmitted diseases, unintended pregnancy, chronic diseases, cancer, memory and learning problems, and cardiac problems (Center for Disease Control [CDC], 2017). Rates of binge drinking and disordered eating in emerging adults have been increasing, show no signs of slowing (Hingson, Heeren, Winter, & Wechsler, 2005; Wechsler et al., 2002), and demonstrate a need to better understand the factors involved in the development of drunkorexia. The landmark study examining the factors and motivations for engaging in drunkorexia found weight
management, cost, and efficiency of intoxication to be the most commonly endorsed reasons for engaging in the behavior (Burke et al., 2010). These motivations intertwine, and involve aspects of both disordered eating and alcohol use. To date, several studies have examined motivations of drunkorexia in attempts to untangle “what” the behavior is – either a alcohol use problem or a disordered eating problem – with no clear answers (Burke et al., 2010; Giles et al., 2009; Hunt & Forbush, 2016; Peralta & Barr, 2017; Roosen & Mills, 2015; Ward, Galante, Trivedi, & Kahrs, 2015). Conclusions of these studies indicate that both disordered eating and alcohol use seem to be involved in drunkorexia for most individuals (e.g., Burke et al., 2010; Hunt & Forbush, 2016), and other situational and social contexts may play their own unique role in explaining the behavior (Baer, 2002; Krech, Crutchfield, & Ballachey, 1962; Louis, Davies, Smith, & Terry, 2007). Gender role conformity has been suggested to be an underlying factor that informs the development of drunkorexia (Peralta & Barr, 2017). There is a need for counseling psychologists to further explore different factors, such as gender role conformity, that may help inform a further understanding of this behavior. In having a better understanding of what contributes to the development of drunkorexia, counseling psychologists were able to better diagnose and treat those who present with this behavior.

**Background**

Throughout the years, many new potential psychological diagnoses have been proposed to be added to the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2013) and the International Statistical Classification of Diseases and Related Health Problems (World Health Organization [WHO], 1992) (Vandereycken, 2011). Many times, these newly proposed disorders are suggested and
supported by those in the field; however, some of them are first noticed by the general public and popular media. The term “drunkorexia” was first coined in 2008 by news reporters and other news sources, and defined the behavior as “using disordered eating practices as compensation for calories consumed through alcohol” (Marcus, 2016; Smith, 2009). These reports highlight the behavior as being done by females, particularly young undergraduate females attending college, and understood the motivation for the behavior to be solely that of weight management or weight loss.

Since the coining of the term, research on this behavior has increased. Many of the studies on the behavior of drunkorexia, especially earlier studies, maintained a focus on undergraduate female students. The focus on undergraduate females in a university setting stems from several sources. Firstly, given the behavior has a component of disordered eating, females are more likely than men to have an eating disorder or engage in subclinical disordered eating behaviors (CDC, 2013; National Eating Disorder Association [NEDA], 2006; Striegel-Moore et al., 2009). Although much of the research on drunkorexia and disordered eating has focused on females, many studies have found that males also engage in these behaviors, if at lower rates. More recent research on disordered eating and drunkorexia has shifted focus to include males; yet, much less research on prevention and treatment has been focused on males until recently (Raevuoni, Keski-Rahkonen, & Hoek, 2014). In fact, NEDA (2018a) found that one-third of all eating disorder sufferers are male, and Diemer, Grant, Munn-Chernoff, Patterson, and Duncan (2015) discovered that transgender students were the most likely population to be diagnosed with an eating disorder in the last year. Research on eating disorders in males and other populations is growing. The initial studies conducted on drunkorexia focused
so heavily on females who engage in the behavior due to the continued prevalence of females who suffer from eating disorders and engage in subclinical disordered eating.

It is important to note the use of “disordered eating” throughout this paper is used intentionally, rather than terms such as “atypical dietary behaviors” or other potentially less intense words. Neumark-Sztainer, Wall, Larson, Eisenberg, and Loth (2011) published a study in the Journal of the American Dietetic Association with over 2,000 participants, and used the term disordered eating to include many of the behaviors of drunkorexia being used in this study. Behaviors such as skipping meals, calorie restriction, vomiting/laxative use, all used in this study’s broad definition of drunkorexia, were defined as disordered eating behaviors. In addition, in an article by the National Eating Disorder Association, it was suggested that the level of functionality and impact on daily life is an important factor to consider when using terms such as eating disorder or disordered eating (Zucker, 2017). The author suggests that while many people may engage in eating behaviors that are disordered, defined in this case as “manipulating food intake,” the impact on their life is what distinguishes disordered eating from an eating disorder. It was also noted that societal rules and expectations heavily influence what is considered problematic in terms of eating, which makes it challenging to define. This author continues to use the term disordered eating in this paper to describe the wide range of compensatory behaviors that individuals may engage in. Other recent publications on the topic of drunkorexia (e.g., Peralta & Barr, 2017) have used a variety of terms to describe the compensatory behaviors involved in drunkorexia, including disordered eating, weight control behaviors, and eating disorder.
In addition to eating disorder statistics that drove initial research on drunkorexia to focus on females, much of the research has also focused on emerging adults, which has been conceptualized to be those aged between ages 18 and 25 (Arnett, 2000). This age range matches up with traditionally aged undergraduate students, on whom much of the research on this topic has also been conducted. The focus on undergraduate students has been explained by looking at social psychological factors and aspects of identity development that come with being an emerging adult. Larimer and Cronce (2002) found that of university students who engage in drunkorexia, freshmen are the most likely group to engage in the behavior. Several sources have found that being in college, especially a freshman in college, is a time for growth and identity development, as well as the first time that the population has been away from supervision of their parents (Baer, 2002; Baer, Kivlahan, & Marlatt, 1995; Schulenburg & Maggs, 2002; Schulenburg et al., 2001). These studies also noted that the increased academic rigor of college, and increased stress over academics and financial stability, lends itself to increased alcohol use as a coping mechanism (Baer, 2002; Cooper, 1994; Schulenburg & Maggs, 2002).

Another important factor that leads researchers to focus on undergraduate students with the behavior of drunkorexia is the social norm at many universities that encourages heavy consumption of alcohol (Baer, 2002; Baer et al., 1995; Schulenburg & Maggs, 2002; Schulenburg et al., 2001). In a large national survey study, O’Malley and Johnston (2002) found that 70% of undergraduate university students had drank in the last month, and that 40% had engaged in binge drinking in the last month. With drinking rates this high across universities, combined with the prevalence of disordered eating in females, it
is clear why much of the research on the behavior of drunkorexia has focused on undergraduate female students.

**Theoretical Framework**

A prominent theory that has been used to explain both disordered eating and substance use is social learning theory (Baer, 2002; Harrison & Cantor, 1997). Given drunkorexia includes both disordered eating and alcohol use, social learning theory was used to explain drunkorexia in this study. Rotter’s (1954) social learning theory posits that behavior represents an interaction of an individual with his or her environment. Behavior, therefore, cannot be seen only as a product of internal motivations, but as a combination of both individual internal motives and environmental influences. Rotter’s (1954) theory of social learning consists of four main components: behavior potential, expectancy, reinforcement value, and psychological situation. Rotter’s theory proposes that behavior comes in part from some form of socialization and social learning. As suggested by recent research, drunkorexia involves a combination of individual and environmental factors that contribute to the development of the behavior (Baer, 2002; Giles et al., 2009; Hunt & Forbush, 2016; Louis et al., 2007); therefore, Rotter’s social learning theory does well to explain the factors that underlie the behavior of drunkorexia, including disordered eating and alcohol use.

Rotter’s social learning theory’s first main component is behavior potential. Behavior potential is the likelihood of engaging in a behavior in a given situation. For purposes of the current study, this concept would equate to the potential or chance that an individual will engage in the behavior of drunkorexia in a given situation. The second component of Rotter’s (1954) theory of social learning is expectancy. Expectancy is the
probability that the behavior will lead to an expected, generally positive outcome. The concept of expectancy is subjective, and takes into account personal differences and variations of what is considered an expected positive outcome. In consideration of expectancy with drunkorexia, this part of the theory indicates that those who engage in the behavior would have some sort of positive expectancy that would result from the behavior. Prior research on drunkorexia has demonstrated many who engage in the behavior have positive expectancies or consequences of engaging in the behavior, such as enhancement of social abilities and weight management (Burke et al., 2010).

Reinforcement value, the third main concept in Rotter’s (1954) social learning theory, is the value of the outcome or consequence of a behavior. If expectancy is the expected consequence of a behavior, reinforcement value is the actual consequence. If in actuality a behavior does not lead to positive, reinforcing outcomes, or has low reinforcement value, the behavior likely will not continue. Oppositely, if a behavior leads to an outcome that has high reinforcement value and has positive outcomes, such as social connection or weight management in drunkorexia, it is more likely the behavior will happen again. Reinforcement value, like expectancy, is subjective, and each individual’s past and life experiences will dictate what is considered to be reinforcing.

The final component of Rotter’s (1954) social learning theory is psychological situation. Psychological situation refers to the past experiences and current psychological situation that can impact behavior. For example, different people will have different expectancies and reinforcement values, even if they are in the same situation, given past and present experiences. This component brings in more evidence for the potential impact of environmental and social settings for any given behavior. With the behavior of
drunkorexia, Rotter’s (1954) psychological situation suggests that one’s social experiences, which could include the pressure to conform to gender roles and other social pressures hypothesized in drunkorexia, may help explain and determine one’s reinforcement values and expectancies. The socially and environmentally informed expectancies and reinforcement values then determine the behavior expectancy, or whether someone will engage in drunkorexia or not. Social learning theory includes social, environmental, and individual factors that are implicated in the behavior of drunkorexia.

Rationale and Need of Study

Physical and Psychological Consequences

An important consideration in studying any topic is its relevance and importance in the modern world. The behavior of drunkorexia has extensive real-world consequences, and presents a serious health-risk for those that engage in it (Giles et al., 2009). Individuals who engage in this behavior are more likely to face emotional and physical complications, such as injury or being sexually assaulted, and engage in high-risk behavior, such as unprotected sex (Giles et al., 2009). Women are more prone to negative consequences involving injury, being sexually assaulted, or “regretting” something, whereas males are more likely to get into physical fights. Specifically, males who engage in drunkorexia are 82% more likely than their non-participating peers to get into physical fights (Giles et al., 2009). Giles et al. (2009) also found that restricting food, fat, or calories on drinking days was significantly associated with getting drunk in a typical week, a relationship that was present among males and females. Anderson, Martens, and Cimini (2005) found that women with comorbid alcohol use and purging
were more likely to experience negative consequences. The dangers of binge drinking have long been established, with many studies focusing on the health implications for undergraduate students who engage in binge drinking (Baer et al., 1995). The CDC identifies binge drinking as “the most common, costly, and deadly pattern of excessive alcohol use in the United States” (CDC, 2017). The CDC also identifies a multitude of health risks that come with binge drinking: unintentional injuries, violence, sexually transmitted diseases, unintended pregnancy, chronic diseases, cancer, memory and learning problems, and alcohol dependence (CDC, 2017). Others have noted the extensive medical and psychological consequences that come from binge drinking (Esser et al., 2014; Sacks, Gonzales, Bouchery, Tomedi, & Brewer, 2015; Stahre, Roeber, Kanny, Brewer, & Zhang, 2014).

In addition to the risks of binge drinking, there are also many health risks associated with eating disorders and subclinical disordered eating behavior. NEDA (2018b) recognizes that there are different health risks associated with various eating disorders and disordered eating behaviors. In consideration of the behavior of drunkorexia, which is typically a restriction of caloric intake, the health risks can be compared to that of anorexia nervosa. These health risks include: abnormal heart rate and blood pressure, reduction of bone density, muscle loss and weakness, dehydration, fatigue and fainting, and potential organ failure. While these side effects of calorie restriction may not be as present or severe for those who engage in drunkorexia, but do not have anorexia nervosa, the potential health consequences, especially from extended periods of calorie restriction, cannot be ignored.
Taken together, the effects of calorie restriction and binge drinking have the potential for even more severe consequences than the separate disorders or behaviors. The premise of the behavior of drunkorexia is restriction of calories prior to consuming alcohol, a combination which allows the active drug in alcohol, ethanol, to reach the blood system more quickly (Osborne, Sher, & Winograd, 2011). This increased efficiency causes the effects of alcohol to be felt more strongly and more quickly – often at a dangerous speed. This speed puts the consumer at risk for more alcohol related brain damage (Osborne et al., 2011). For females, the effect of alcohol is already much faster and longer-lasting than for males. Frezza, di Padova, Pozzato, Maddalena, and Baraona (1990) found that males have 70-80% more alcohol metabolizing enzymes than do females, so the way in which alcohol effects the sexes is different, with most females experiencing more severe effects than do most males. In addition, the National Institute on Alcohol Abuse and Alcoholism (1993) stated that women are more likely than men to experience physical problems from alcohol misuse, including binge drinking.

One surprising finding from a 2010 study by Burke et al. was that some students who engaged in the behavior of drunkorexia did so to prevent becoming sick from the combination of food and alcohol (Burke et al., 2010). This counterintuitive myth believed by those students in the Burke et al. (2010) study has been empirically proven to be false. Watkins and Adler (1993) found that food helps to slow alcohol absorption, and that eating more food before drinking is negatively associated with alcohol related problems, psychological distress, and disordered eating. The behavior of drunkorexia presents unique and increased dangers to those who engage in the behavior, and some motivations
that are founded in myths and false information do nothing but increase the risk of engaging in this behavior and suffering negative consequences.

**Classification and Diagnosis**

One of the most important components to understanding and treating a harmful psychological phenomenon, especially one such as drunkorexia that has so many negative health and psychological related consequences to it, is that of proper diagnosis. Although drunkorexia is not yet recognized as formal diagnosis, its components of disordered eating and alcohol use make it practically and clinically significant. Researchers in the field of disordered eating and substance abuse, and their comorbidities, have suggested that even subclinical behaviors that have a clear psychological component should be considered for study, and that there is a strong relationship between alcohol use and disordered eating at the subclinical level (Barry & Piazza-Gardner, 2012; Bulik et al., 2004; Goldbloom, 1993; Krahn, Kurth, Demitrack, & Drewnowski, 1992). Currently, there have been no studies that have been able to solidify whether drunkorexia is on the alcohol use disorder spectrum or the eating disorder spectrum. There has been a long-standing theory on eating disorders that relates eating disorders to addiction, with the common theme throughout both diagnosis spectrums being that of control (Gearhardt et al., 2011; von Ranson & Cassin, 2007). Although some of the treatment methods for alcohol use and eating disorders are the same, such as using motivational interviewing (Smedslund et al., 2011; Treasure & Ward, 1997), there is a reason why separate treatments exist for substance abuse and eating disorders.

The amount of literature on the behavior of drunkorexia has increased since the term was first coined in 2008. There is still limited research and knowledge on how the
behavior should be classified. Research on the various factors involved in the behavior, both from quantitative and mixed methods studies, have yielded that many (mostly undergraduate students) who engage in the behavior do so to either manage or lose weight, or to enhance the effects of the alcohol being consumed. In fact, a study conducted by Zwetzig and Martinez (2016), found that the most endorsed perceptions for engaging in drunkorexia are weight concerns and enhancement of alcohol effects. The two main components of the behavior – alcohol use and disordered eating – have been a source of recent studies to determine “what” drunkorexia is. Thus far, despite attempts, no clear separation between disordered eating and alcohol use has been found (Hunt & Forbush, 2016; Roosen & Mills, 2015).

Counseling psychologists can benefit from better understanding the various factors that contribute to the development of health risk behaviors such as drunkorexia. College counseling centers’ main focus tends to be on serving students that attend that school. As such, counseling psychologists who work in these centers are very likely to see clients who present with the behavior of drunkorexia, given the estimated prevalence of the behavior ranges from 15-30% among undergraduate student populations (e.g., Burke et al., 2010; Giles et al., 2009). Understanding this behavior and factors that contribute to its development is highly beneficial for counselors in university counseling centers. After an extensive search of literature, this author found no research that has been conducted on the prevalence of drunkorexia in college counseling centers. This may be due to drunkorexia being a sub-diagnostic behavior with widely varying definitions across the literature. Although no prevalence rates have not been established for drunkorexia in college counseling center settings, they have been established for eating
disorders and alcohol use. Cranford, Eisenberg, and Serras (2009) found 67% of clients at a college counseling center with a co-occurring binge drinking and other mental disorder perceived the need for mental health services. Hoyt and Ross (2003) found that both alcohol use and disordered eating are common conditions that college counseling centers treat.

A growing field of work for counseling psychologists is that of integrated primary care, where clinicians work alongside medical professionals to treat a variety of mental health and health risk behaviors. Given the health problems that occur from disordered eating and alcohol use, and the combined consequences of engaging in drunkorexia (Giles et al., 2009), it is important for counseling psychologists working in primary care settings to understand this behavior. Similar to college counseling centers, after an extensive search of the literature, no research was found on the prevalence rates of drunkorexia within primary care. Again, this is likely due to the lack of a formal diagnosis and varying definitions. Researchers have found evidence of both substance abuse and disordered eating being treated in this setting. Gatchel and Oordt’s (2003) guidelines on clinical practice for those in primary care, published by the American Psychological Association, noted that disordered eating is a common problem treated by clinicians in primary care. Buchholz, King, and Wray (2018) found high rates of eating disorders in women veterans being treated in primary care centers. In terms of alcohol use, Ansseau et al. (2004) found that approximately 10% of patients being treated at a Belgian primary care center had some concerns of substance abuse. It is clear that in multiple settings in which counseling psychologists may work, by having a better
understanding of the factors related to engaging in drunkorexia, counseling psychologists were able to better diagnose, treat, and prevent this risky behavior.

**Conformity**

A factor that may be involved in the behavior of drunkorexia, and has limited research, is conformity. In a recent study that attempted to make a singular measure for drunkorexia behaviors and motive, Ward and Galante (2015) found through exploratory factor analysis that drunkorexia motives are derived from conformity drinking motives, using Cooper’s (1994) model of motives for alcohol use, as well as several other relevant measures. Cooper’s (1994) model of drinking motives used a confirmatory factor analysis to determine four motivations for drinking alcohol: social, coping, enhancement, and conformity. Eisenberg and Fitz (2014) results revealed that weight control is more predictive of the behavior of drunkorexia for females than it is for males, and that conformity to societal body image is likely related to engaging in the behavior of drunkorexia. The impact of conformity on disordered eating and alcohol use is well-established (Ambrosino, 2012; Lewis & Lewis, 1984; Neighbors, Lee, Lewis, Fossos, & Larimer, 2007; Regan & Morrison, 2011); yet, it has not been directly applied to the behavior of drunkorexia as a major contributing factor involved in the behavior.

In addition to viewing drunkorexia as motivated by conformity drinking motives, extensive research has been conducted that ties gender role conformity to both eating and drinking behaviors. The concept of gender role conformity is a wide area of study, and research suggests that gender roles are multifaceted and dynamic, with varying components (Connell, 1995; Mahalik et al., 2005; Meyer, Blissett, & Oldfield, 2001). Several measures have been validated to survey gender role conformity, and generally
include subscales to measure the multitude of components that make up both feminine and masculine norms (Bem, 1974; Mahalik et al., 2003; Mahalik et al., 2005; Parent & Moradi, 2009; Parent & Moradi, 2010). Through use of these measures, several studies have found a connection between conformity to certain aspects of gender roles and disordered eating/eating disorders and alcohol abuse (Blashill, 2011; Griffiths, Murray, & Touyz, 2015; Iwamoto, Corbin, Brady, et al., 2018; Iwamoto, Corbin, Takamatsu, & Castellanos, 2018; Murray, Rieger, Karlov, & Touyz, 2013).

As it stands, the lack of understanding of clear motivations for drunkorexia limits our ability to make a diagnosis or fit the behavior into a diagnostic category to help inform treatment. For example, if a student comes into a college counseling center and presents with the behavior of drunkorexia, a decision has to be made of how to approach treatment with the student. If the student is more influenced by disordered eating rather than substance abuse, the treatment should look different than if the student is more influenced by substance abuse. Additionally, if there is evidence and research to support that gender role conformity and social expectancies play a role in this behavior, an entirely separate treatment approach may be taken with the student. Currently, there are no clear guidelines in working with this behavior or how to determine the most relevant factors involved for an individual. Research has suggested that each case of this behavior needs to be treated individually, with both disordered eating and alcohol use taken into consideration for each individual (Roosen & Mills, 2015; Ward et al., 2015).

The gap in the literature that currently exists in regard to drunkorexia is that of one, clear motivation for drunkorexia (Hunt & Forbush, 2016; Roosen & Mills, 2015; Ward & Galante, 2015). Although several studies have examined the motivations for
engaging in the behavior, none have been able to separate the different components of disordered eating and alcohol use in determining how the factors are involved in this behavior. Very little research has been conducted on gender role conformity and its role in drunkorexia. After an exhaustive review of the literature, this author found only one study that demonstrated a connection between gender role conformity and drunkorexia (Peralta & Barr, 2017). Many of the researchers on this behavior have suggested that there is not enough information to determine whether the disorder is more of a problem with alcohol use, disordered eating, social expectations and conformity, or a combination of these concepts (Barry, Whiteman, Piazza-Gardner, & Jensen, 2013; Hansen, 2016; Hunt & Forbush, 2016; Roosen & Mills, 2015).

Peralta and Barr (2017) were the first to investigate the role of gender role conformity on drunkorexia, and found sex was not a robust predictor of engagement in the behavior or compensatory behaviors, such as exercising or purging after alcohol consumption. In the same study, they found a higher conformity to masculine gender role norms, measured by the Conformity to Masculine Norms Inventory-46 (CMNI-46; Parent & Moradi, 2009) was positively correlated with drunkorexia. The Peralta and Barr (2017) study used a unidimensional scale measuring masculine and feminine gender orientation, the Bem Sex Role Inventory (BSRI; Bem, 1974). The BSRI works by measuring femininity and masculinity on a sliding scale, where if you are high on one, you are low on the other, and essentially measures androgyny of gender orientation. While the BSRI has been used in many studies in the past, modern understandings of gender orientation go beyond one unidimensional scale. It is possible for one to have both traits, feminine and masculine, and using a unidimensional scale does not fully capture the complexities
of gender orientation and identity. To that end, Peralta and Barr (2017) also used the CMNI-46, which measures level of masculine gender role conformity on its own. This step in their research was valuable, and led to significant results. However, the feminine scale component was missing from their research, and is an important direction for study. As suggested by Peralta and Barr (2017) future research should include both gender orientation scales (feminine and masculine) in order to investigate and further understand the impact of gender role conformity on the behavior of drunkorexia. By using a unidimensional scale of gender orientation, and by using two separate scales, where one may score high or low on both feminine and masculine gender conformity, this research better captures the complexities of gender role conformity and gender orientation. By further understanding how gender role conformity plays a role in the development of drunkorexia, the better counseling psychologists can develop appropriate treatment plans and serve the populations that present with this behavior. The current study is designed to address the gap in literature suggested by Peralta and Barr (2017), and use separate feminine and masculine gender role conformity measures to research and better understand drunkorexia. In addition, the current study examined if there is a significant difference in gender role conformity between those who engage in the behavior and those who do not.

**Purpose of Study**

The purpose of this study was to gain a better understanding of the factors that inform and contribute to drunkorexia, such as gender role conformity, as there are notable health risks associated with this behavior when untreated (Giles et al., 2009). Better understanding drunkorexia necessitates conceptualizing factors that contribute to the
development of the behavior. The definition of drunkorexia includes both disordered eating behavior and alcohol use indicators, but the extent to which each factor contributes to the development of drunkorexia was unclear (Hunt & Forbush, 2016; Roosen & Mills, 2015). More research is needed to address this gap. Additionally, a factor that may be involved in the behavior of drunkorexia, and has limited research, is conformity, particularly gender role conformity. Further understanding of which factors contribute to the development of drunkorexia, such as gender role conformity, may yield important information for implications about treatment, diagnosis, and prevention for counseling psychologists in a variety of settings. By isolating factors that contribute to drunkorexia, research may inform treatment interventions and precipitate program development to educate individuals about this behavior.

**Research Questions**

Q1 After controlling for gender, what relationship exists between gender role conformity, both masculine and feminine, and level of drunkorexia?

Q2 After controlling for gender, how do alcohol use, disordered eating, and gender role conformity (feminine and masculine) explain the level of drunkorexia?

Q3 After controlling for gender, which variable (alcohol use, disordered eating, feminine gender role conformity, masculine gender role conformity) accounts for most variability in the level of drunkorexia?

Q4 After controlling for gender, is there a difference in level of gender role conformity (feminine and masculine) between those who engage in drunkorexia and those who do not?

**Definition of Terms**

*Alcohol use.* Consuming alcoholic beverages (beer, wine, and spirits). Alcohol use is being measured by the Alcohol Use Disorder Identification Test (AUDIT; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993).
**Binge drinking.** Drinking 4 (females)/5 (males) alcoholic beverages in one sitting, typically within an approximately two-hour long period (National Institute of Alcohol Abuse and Alcoholism, 2015). For participants, binge drinking were defined as “drinking enough alcohol, in one sitting, to become intoxicated” to account for individual differences in alcohol tolerance and effects. Participants were given the formal definition as a guideline.

**Disordered Eating.** A wide range of abnormal eating behaviors, many of which are shared with diagnosed eating disorders (Eating Disorders Victoria, 2017). In this study disordered eating were measured by the Eating Attitudes Test-26 (Garner & Garfinkel, 1979).

**Drinking alteration.** Intentionally altering the type or amount of alcohol one is consuming during a binge-drinking event (i.e., drinking alcohol with less calories, drinking less alcohol) (Rahal, Bryant, Darkes, Menzel, & Thompson, 2012).

**Drunkorexia.** Intentional restriction of calories prior to binge drinking (i.e., not eating dinner before a planned episode of binge drinking) OR restriction of calories, purging, exercise, meal alteration and drinking alteration as compensation for alcohol consumption (Barry & Piazza-Gardner, 2012; Peralta, 2002; Rahal et al., 2012). In this study, drunkorexia was measured by the Compensatory Eating and Behaviors in Response to Alcohol Consumption Scale (CEBRACS; Rahal et al., 2012). This measure consists of four subscales: Alcohol Effects, Bulimia, Diet and Exercise, and Restriction.

**Exercise.** Intentional physical activity with the goal of maintaining or losing weight, or building muscle (i.e., aerobic workout, weight lifting, running, etc.).
Emerging Adult. Individuals between the ages of 18 and 25 (Arnett, 2000).

Gender. The condition of being male, female, or neuter (American Psychological Association, 2015). In this study, participants were asked to identify themselves as “male, female, or other”, and can provide a text description of their gender if desired.

Gender role conformity. Adhering to societal rules and standards about how to be feminine/masculine and is demonstrated in an individuals’ behaviors, feelings, and thoughts (Mahalik et al., 2003; Mahalik et al., 2005). In this study, gender role conformity were measured by the Conformity to Feminine Norms Inventory-45 (CFNI-45; Parent & Moradi, 2010) and the Conformity to Masculine Norms Inventory-46 (CMNI-46; Parent & Moradi, 2009).

Intentional restriction of calories. Intentionally restricting/avoiding calories that would normally be consumed on a day when binge drinking is not planned (e.g., not eating lunch or dinner before planned binge drinking) (Rahal et al., 2012).

Meal alteration. Intentionally altering the type or amount of food you are eating (i.e., eating food with less fat or carbs, eating a smaller meal than on a non-drinking day) (Rahal et al., 2012).

Purging. Self-induced vomiting or the misuse of laxatives, diuretics, or enemas (American Psychiatric Association, 2013).

Limitations

As with many studies on a variety of psychological factors that contribute to behavior, researchers are limited in our means to study human behavior accurately with self-report measures. The use of self-report measures, while nearly unavoidable, is a
limitation of this study. All measures use a self-report survey or inventory, which limits the accuracy of the results of the study. In addition, the sensitivity of the topic, especially when using measures with high face validity, may increase social desirability among participants, which may lead to inaccurate results. Every possible step was taken to ensure anonymity with participants, which should negate some of the inevitable social desirability that occurs with self-report measures around sensitive topics. Finally, this study is a non-experimental correlational research design (Remler & Van Ryzin, 2010). Due to the convenience sampling being used in this study, results were limited in their generalizability. Participants are being recruited from only one Rocky Mountain region university, and may not be representative of the population of emerging adults.

**Summary**

Drunkorexia is a risky behavior that can lead to many physical and emotional health related problems, including death (CDC, 2017; Giles et al., 2009; NEDA, 2018b). Research around the behavior of drunkorexia has been growing since the term was first coined in 2008. Many studies have contributed to the literature a greater understanding of how and why individuals engage in this behavior (e.g., Burke et al., 2010; Giles et al., 2009; Ward et al., 2015). Motivations for the behavior have been found to focus on weight management and alcohol use, such as becoming intoxicated more quickly and maintaining weight due to the calories in alcohol (Burke et al., 2010). Several scales have been developed to assess the motives and behaviors of those that engage in the behavior before, during, and after a drinking episode (Rahal et al., 2012; Ward & Galante, 2015). Recently, other research has attempted to find other factors that may contribute to the development of the behavior, such as gender role conformity (Peralta & Barr, 2017).
Social learning theory (Rotter, 1954) proposes a connection between role of gender role conformity, alcohol use, and disordered eating to help explain the behavior of drunkorexia.

In order to better understand this behavior, and help inform diagnosis, treatment and prevention by counseling psychologists, it is necessary to continue research on this behavior and factors that may be involved. Gender role conformity is an important factor to research to help better understand this behavior and its development. Given the impact that gender role conformity has been found to have in alcohol use and disordered eating separately (Iwamoto, Corbin, Brady, et al., 2018; Kaya, Iwamoto, Grivel, Clinton, & Brady, 2016; Meyer et al., 2001), understanding how gender role conformity may explain drunkorexia is a logical step. The purpose of this study is to reduce the gap in the literature by understanding how gender role conformity, alcohol use, and disordered eating explain drunkorexia. By further understanding the factors that contribute to the development and continuance of this behavior, counseling psychologists can better help those who may engage in it.
CHAPTER II
LITERATURE REVIEW

Introduction

This chapter reviews the theory guiding this study and the literature of the factors being examined: disordered eating, alcohol use, conformity, and drunkorexia. A review of each of these factors and their relationship with gender role conformity is also discussed.

Theory

Social learning theory has been suggested to guide understanding of disordered eating and alcohol use (Baer, 2002; Harrison & Cantor, 1997). The various drunkorexia definitions across the literature include some component of alcohol use and some component of disordered eating or weight control behaviors. The variety of definitions used for drunkorexia in the literature creates a challenge in identifying one theory that explains the behavior. Social learning theory, broadly, includes components of individual variation in behavior, as well as social and environmental influences. In consideration of this study and its focus on the social and environmental influence of gender role conformity, social learning theory were used to guide this research.

Various theories of social learning have been proposed over the years. Perhaps most well-known is Bandura’s (1977) theory of social learning, which emphasizes
modeling as the main method of learning. Famous experiments, such as the “Bobo doll” experiment, are still discussed and used today in psychology textbooks and courses. Many years before Bandura’s popular take on social learning, Rotter (1954) proposed a social learning theory that consisted of four main components: behavior potential, reinforcement value, expectancy, and psychological situation. Rotter’s research focused on both social learning and locus of control, and many researchers have since used his theories to explain various phenomena. Recently, Rotter’s (1954) theory of social learning and locus of control have been used by various disciplines including nursing, education, and psychology, to help explain phenomena such as childhood psychological outcomes, risky sexual behavior, violence, HIV risk, and training of medical professionals (Buhbe, 2001; Gwandure & Mayekiso, 2012; Harris, 2018; Nowicki, Iles-Caven, Gregory, Ellis, & Golding, 2017). Rotter’s components of social learning still stand strong among learning theories, and were used to explain the behavior of drunkorexia, and its connection to gender role conformity, in this study.

Rotter’s (1954) social learning theory posits that personality and behavior represent an interaction of an individual with their environment. Individual factors, such as past experiences, current situation, genetics, and others interact with the environment one is in. Behavior, therefore, cannot be seen only as a product of internal factors, but as a combination of internal factors and environmental influences. Rotter’s (1954) theory of social learning consists of four main components: behavior potential, expectancy, reinforcement value, and psychological situation. Rotter’s theory proposes that behavior comes in part from some form of socialization and social learning. As suggested by recent research, drunkorexia involves a combination of individual, environmental, and
social factors that contribute to the development of the behavior (Baer, 2002; Krech et al., 1962; Louis et al., 2007; Ward et al., 2015). Social situation, such as having roommates and being involved in Greek life (Ward et al., 2015), and individual factors, such as past experiences (Baer, 2002; Roosen & Mills, 2015), have been implicated in drunkorexia. Rotter’s (1954) theory includes both the individual factors (expectancy and reinforcement value) and social and environmental factors (psychological situation) that underlie the behavior of drunkorexia.

The first main component of Rotter’s social learning theory is behavior potential. Behavior potential is the likelihood of engaging in a behavior in a given situation. For purposes of the current study, this concept would equate to the potential or chance that an individual will engage in the behavior of drunkorexia in a given situation. The situation can vary widely; in the case of drunkorexia, it may be getting ready to go to a party or bar, talking with friends about drinking, or any number of situations that may lead to a greater potential of engaging in drunkorexia. If one is in a social situation that involves drinking or planning on drinking, the behavioral potential for engaging in drunkorexia is increased. The connection between social context, such as being at a bar or getting ready with friends, and increased behavioral expectancy is further evidenced by research that has found a strong connection between various social situations (e.g., Greek life, roommates) and engaging in drunkorexia (Ward et al., 2015).

The second component of Rotter’s (1954) theory of social learning is expectancy. Expectancy is the probability that the behavior will lead to an expected, generally positive outcome. The concept of expectancy is subjective, and takes into account personal differences and variations of what is considered expected and reinforcing
behavior. In order to have expectancy, one must believe that they a) have the ability to engage in the behavior successfully, and b) the behavior were reinforcing. Rotter notes that expectancies are based on past experiences, meaning the more a certain behavior leads to a reinforcing outcome, the more likely the behavior will occur again. In consideration of expectancy with drunkorexia, this part of the theory indicates that those who engage in the behavior have some sort of positive expectancy that would result from the behavior. For example, by engaging in drunkorexia, one might have an expectancy of maintaining their weight (e.g., Peralta, 2002), becoming intoxicated more quickly (Burke et al., 2010), or fitting in with others who may also be engaging in the behavior (Cooper, 1994; Eisenberg & Fitz, 2014; Ward et al., 2015). Prior research on drunkorexia has demonstrated many who engage in the behavior have positive expectancies of consequences of engaging in the behavior (Burke et al., 2010; Ward et al., 2015).

Reinforcement value, the third main concept in Rotter’s (1954) social learning theory, is the value of the outcome or consequence of a behavior. If expectancy is the expected consequence of a behavior, reinforcement value is the actual consequence. If in actuality a behavior does not lead to positive, reinforcing outcomes, or has low reinforcement value, the behavior likely will not continue. Oppositely, if a behavior leads to an outcome that has high reinforcement value and has positive outcomes, such as social connection or weight management in drunkorexia, it is more likely the behavior will happen again. Reinforcement value, like expectancy, is subjective, and each individual’s past and life experiences will dictate what is considered to be reinforcing. In each moment, what is considered a positive outcome or consequence may change for
each individual. This component of the theory provides further evidence for the individual factors that come into play in the behavior of drunkorexia.

The concepts of behavioral potential, expectancy, and reinforcement value in Rotter’s (1954) theory of social learning were put into a formula, in which behavior potential (BP) is determined as a function of the expectancy (E) and reinforcement value (RV) of the behavior (see Equation 1). If the expected outcome and the actual outcome of engaging in a behavior are both positive, and outweigh any associated negative risks, the behavioral potential is likely to be high enough to continue engaging in the behavior.

\[ BP = f(E \& RV) \] (1)

The final main component of Rotter’s social learning theory is psychological situation. Although not included in the formula for predicting behavior, Rotter (1954) suggested that each person behaves differently given his or her past experiences and current psychological situation. For example, different people will have different expectancies and reinforcement values even if they are in the same situation given past and present experiences. This component brings in more evidence for the potential impact of environmental and social settings for any given behavior. With the behavior of drunkorexia, Rotter’s (1954) psychological situation suggests that one’s social experiences, including the pressure to conform to gender roles and other social pressures, may help explain and determine one’s reinforcement values and expectancies. The socially and environmentally informed expectancies and reinforcement values then determine the behavior expectancy, or whether someone will engage in drunkorexia or not. For example, if one is surrounded by others who are engaging in drunkorexia, such as roommates, and sees positive outcomes for those people, the expectancy of positive
outcomes were higher; therefore, one would have a higher behavioral potential to engage in the behavior.

Rotter’s (1954) theory of social learning involves various components that are related to what has been discovered about drunkorexia. The individual factors of each person, combined with social pressures, environment, and psychological situation, are well explained with this theory. The important component of psychological situation, which includes the social environment one is in, has limited research. Exploring gender role conformity, which is part of the social environment and individual factors of an individual, is important to better understanding this behavior.

**Disordered Eating**

According to National Institute of Mental Health (2001), approximately 1 in 5 females were affected by an eating disorder or disordered eating throughout their lifetime. Eating disorders, and subclinical disordered eating behaviors, have been well established as harmful, clinically significant behaviors worthy of intervention and research (American Psychiatric Association, 2013; National Eating Disorder Association [NEDA], 2018b). In the Diagnostic and Statistical Manual of Mental Disorders-5 (DSM-5), there are a variety of eating patterns and behaviors that constitute an eating disorder, and include behaviors ranging from restriction of calories, purging, to binging and other compensatory behaviors (American Psychiatric Association, 2013). One of the most commonly known eating disorders, likely due to its prominence in popular media and the significance of its harmful health impacts, is anorexia nervosa (AN; Smink, van Hoeken, & Hoek, 2012). To meet criteria for AN, one must demonstrate restriction of energy intake and body weight relative to relevant norms, have an intense fear of gaining weight
or becoming fat, and have a disturbance in the way in which one experiences their body weight or shape. In addition, specifiers for the type of AN are included, consisting of restricting or binge-eating/purging types. Bulimia nervosa (BN) is another eating disorder that has overlap with drunkorexic behaviors, and includes components of binge eating and purging that occur outside of an episode of AN (American Psychiatric Association, 2013). Given the definition of drunkorexia, with most definitions encompassing restriction of calories or some other compensatory behavior, AN and BN are highly relevant disorders to understand.

**Anorexia Nervosa**

AN, on the surface, is not a very prevalent disorder. Bulik et al. (2010) found that in a study of over 31,000 people in Sweden, 1.2% of the women had AN when using a strict definition of the disorder, and 2.4% had AN when using a broader definition. Though these seem to be small percentages on the surface, the health risks presented by AN make it of higher interest to counseling psychologists. In a large scale review of almost fifty years of research, researchers found that that anorexia nervosa has the highest mortality rate of any psychiatric disorder (Arcelus, Mitchell, Wales, & Nielsen, 2011). Physical side effects include fatigue, syncope, dehydration, cardiovascular problems, stomach pains, hair loss, and death, among others (NEDA, 2018b). People with eating disorders are also at a higher risk for other mental health problems, such as depression, anxiety disorders, borderline personality disorder, obsessive-compulsive disorder, and substance abuse (National Alliance on Mental Illness, 2018). According to the American Psychiatric Association (2013), there are often comorbidities between eating disorders and other mental health problems. Although the physical risks of AN are alone startling,
the comorbidities and increased risk for developing other mental disorders make it of special importance to counseling psychologists.

**Bulimia Nervosa**

Bulimia nervosa consists of similar compensatory behaviors that are commonly seen in drunkorexia. In order to meet criteria for BN, one must experience recurrent episodes of binge eating, recurrent inappropriate compensatory behaviors, and their self-evaluation is influenced by body shape and weight (American Psychiatric Association, 2013). Physical complications of BN include electrolyte imbalances, gastric rupture, esophageal rupture, chronic bowel problems, peptic ulcers, and tooth decay (NEDA, 2018b). The American Psychiatric Association (2013) suggests that other mental health problems are common with BN, such as depressive disorders, anxiety disorders, personality disorders, and substance abuse problems. Again, the complications and consequences of BN are worrisome, and warrant training and understanding of the disorder by counseling psychologists. Similarly to AN, BN involves compensatory behaviors that are typically used in definitions of drunkorexia in previous research.

The prevalence of BN in females ranges from 1-1.5% in a 12-month period, according to Hoek (2006) and Smink et al. (2012). It is important to note that these prevalence studies also found that prevalence was highest among young adults, with the disorder peaking in adolescence to adulthood. Estimates of prevalence for males, like other eating disorders including AN, is much lower than for females, with estimates of a 10:1 ratio for diagnosis of the disorder. Consideration of stigma, help-seeking, and reporting inequities should be considered with males in any disorder (Hackler, Vogel, & Wade, 2010).
While AN and BN are among the most commonly known and diagnosed eating disorders, considerations for new eating disorders have emerged in recent years. Volpe et al. (2015) suggested that the definition of “non-threshold” eating disorders is not clear, and there are many behaviors and symptoms of eating disorders that individuals experience that are clinically relevant, if not formally diagnostically sound. Part of the difficulty of defining these sub-diagnostic syndromes, Volpe and colleagues (2015) posit, is that there is a great amount of symptom overlap and quick transitions in presentation of behavior. Along similar lines, Mintz and Betz (1988) found that approximately 60% of undergraduate university females engaged in sub-diagnostic (DSM-III-R criteria) disordered eating behavior, and suggested that this sub-diagnostic behavior is still clinically relevant. In a somewhat more recent study, Croll, Neumark-Sztainer, Story, and Ireland (2002) found that 56% of girls and 30% of adolescent boys reported unhealthy weight control behaviors, and similarly suggested that sub-diagnostic eating behaviors remain an important focus of research and clinical work.

**Demographic Variables and Disordered Eating**

In addition to considering eating disorders as a whole across large populations, most commonly with adolescents and college populations, some research has emerged that highlights the differences in sex, gender, and ethnicity as an important factor in the presentation and diagnosis of eating disorders. Diemer et al. (2015) conducted a large-scale study on demographics and eating disorders, in which over 289,000 responses from the National College Health Assessment II were analyzed. The researchers were interested in looking at the intersection of gender identity and sexual orientation on eating related symptoms and diagnosis. Their analyses indicated that transgender identifying
students had the highest prevalence of being diagnosed with an eating disorder in the past year. In addition, transgender identifying students reported the highest past month use of diet pills, laxatives, and vomiting. The difference between transgender identifying students and cisgender heterosexual students was stark, with cisgender heterosexual males reporting the lowest prevalence of eating disorder diagnosis and use of inappropriate compensatory strategies. Sexual minority young adults reported the second highest rates of eating disorder diagnoses in the last year, as well as past month use of inappropriate compensatory strategies (Diemer et al., 2015).

Gender differences have also been a focus of study in the field of eating disorders, with several researchers looking at how males and females approach disordered eating. Striegel-Moore et al. (2009) conducted a study to examine gender differences in prevalence of eating disorder symptoms rather than a diagnosis of eating disorders. The researchers found that males were more likely to endorse behaviors of over-eating, and females were more likely to endorse feeling a sense of “losing control” while eating. Additionally, the study found that a substantial number of males endorse symptoms of eating disorders, even if they do not meet the full diagnostic criteria for an eating disorder. In a large study of adolescents of high school age, Forman-Hoffman (2004) found that abnormal eating behaviors were present for 26% of females and 10% of males. These rates were varied by the geographic location and ethnicity of participants (Forman-Hoffman, 2004).

In consideration of the impact of ethnicity of eating disorders, Croll et al. (2002) conducted further research into the prevalence of eating disorders and disordered eating behavior among high school students. Over 81,000 students took a survey, and Croll et al.
Grogan (1999) found through a survey that 40% of undergraduate college males reported engaging in dieting behaviors. Although much of the research is focused on women, there is strong evidence that disordered eating behavior and weight management concerns are present for males. Croll et al. (2002) also found that Hispanic and Indian youth had the highest prevalence of disordered eating behaviors. Similar to other studies, these results provide further evidence for the importance of considering sub-diagnostic eating behaviors, as well as considerations for the impact of ethnicity and culture on what is traditionally defined as an “eating disorder” or disordered eating behavior.

Some of the previously mentioned studies have included college aged populations and adults. It is important to consider how disordered eating behaviors and eating disorders show up in college and emerging adult populations. NEDA (2006) found that 20% of college students, both male and female, self-reported having an eating disorder at some point in their lives. Anderson, Shapiro, and Lundgren (2003) suggest that the freshman year of college is a high-stakes time for eating disorders due to the phenomenon of the “freshman 15”, where students on average gain weight during their freshman year of college. They suggest that this weight gain, whether based in reality or fear, can lead to more students engaging in unhealthy and potentially risky weight management behaviors and eating disorders. Lester and Petrie (1998) found that the most prevalent time for a female to be diagnosed with an eating disorder or engage in dangerous weight management strategies is during high school and college.
Although the concept of “freshman 15” may sound like a pop-culture myth on the surface, research has been conducted that has found that gaining weight during the freshman year of college is a real phenomenon. Anderson et al. (2003) found that “overwhelmingly” college students gained weight during their freshman year of college. de Vos et al. (2015) also found that mean weight increased for college students after their first year of college, and that more weight was gained by those who were part of a student-corp, rather than living with their parents. Additionally, those who had the most irregular eating habits and lifestyle were the least willing to make a change in their behavior or lose weight afterward.

Cooley and Toray (1996) studied females in college, and administered measures of bulimia and restraint. They found that eating pathology, not necessarily diagnosable eating disorders, was associated with figure dissatisfaction of body shape and figure, self-consciousness, and ineffectiveness in weight management strategies. For those that scored higher on the measures of bulimia and restraint they found that, over a period of seven months, alcohol use predicted worsening eating disorder symptoms for the college females. The prevalence of disordered eating and eating disorders is concerning enough, especially as adolescents move toward their high school and college years. The health consequences of engaging in potentially dangerous disordered eating symptoms are all the more concerning.

NEDA provides resources for eating disorder education, resources, and training for those suffering from, and helping with, eating disorders. For each disorder, they have provided an overview of the symptoms, causes, dangers, and treatments. Although there are separate symptoms and dangers presented with each eating disorder, all are
highlighted as having significant health consequences (NEDA, 2018b). AN and BN are reported to have the worst negative health consequences: cardiac problems, muscle loss, dry skin and hair, reduction in bone density, dehydration, gastric ruptures, tooth decay, electrolyte imbalances, ulcers, and even death. These health consequences may not occur with every individual, or with those who engage in sub-diagnostic disordered eating behavior. Regardless, the impact that these behaviors can have on the health of individuals who engage in these behaviors is harrowing.

**Measuring Disordered Eating**

Several measures of disordered eating have been proposed since the mid 1900’s. The Eating Attitudes Test-26 (EAT-26; Garner, Olmstead, Bohr, & Garfinkel, 1982) and the Eating Disorder Inventory-III (EDI-III; Garner, 2004) are two of the most commonly used eating disorder measures used in many settings today. The EDI-III is a self-report measure that has been commonly used in both research and clinical settings. The EDI-III is the second of revised versions of the first Eating Disorder Inventory (EDI; Garner, Olmstead, & Polivy, 1983). The most recent validation and installment of the EDI, the EDI-III, consists of 91 questions, with an overall Cronbach’s alpha reliability of .90 to .97 (Garner, 2004). In an independent study of the factor structure and validity on clinical and non-clinical female samples, researchers were able to confirm the original factor structure and satisfactory internal consistency and validity (Clausen, Rosenvinge, Friborg, & Rokkedal, 2011).

The EAT-26 was developed after revalidation and factor analysis of the Eating Attitudes Test-40 (EAT-40; Garner & Garfinkel, 1979). The EAT-26 was found to be highly correlated with the EAT-40 ($r=.98$), and have a high internal consistency ($\alpha=.90$).
It has been found to be appropriate to use in college populations, for both clinical and non-clinical samples from a variety of cultural backgrounds (Garfinkel & Newman, 2001; Mintz & O’Halloran, 2000). The EAT-26 consists of 26 questions that fall into three factors: dieting, bulimia and food preoccupation, and oral control. Since its creation, the EAT-26 has been more recently updated to determine its validity and reliability, and results from these studies indicate correlations of EAT-26 scores according to group membership to be \( r = .79 \) (Mintz & O’Halloran, 2000). The criterion validity for overall accuracy of the tool was found to be .90, or 90% accurate (Mintz & O’Halloran, 2000). Pereira et al. (2008) found a translated version of the measure to be accurate and valid, and Ocker, Lam, Jensen, and Zhang (2007) again validated psychometric properties of the test. Mintz and O’Halloran concluded that the EAT-26, while not perfect, can be used to identify the likelihood of having any DSM-IV identified disorder. In addition, Mintz and O’Halloran (2000) discussed that most false positives in the EAT-26 would likely be symptomatic individuals who have symptoms, but do not meet criteria for an eating disorder. This strengthens the evidence for using the EAT-26 in non-clinical populations. For this study, due to its length and appropriateness to the sample, the EAT-26 were used to measure disordered eating.

**Alcohol Use**

There is a wide array of alcohol use problems that are defined in the DSM-5, ranging from full-blown alcohol use disorder to alcohol intoxication, and alcohol withdrawal (American Psychiatric Association, 2013). These disorders are defined in the DSM-5 as having to have an impact on occupational, social, academic, or other important areas of functioning in order to be considered a disorder. In consideration of this
definition of alcohol abuse, researchers in 2008 found that 20% of college students met criteria for alcohol use disorder using the DSM-IV criteria (Blanco et al., 2008). Negative health consequences of alcohol use disorder include liver failure, increased risk of cardiac problems, increased risk of negative consequences such as assault and car crashes, legal problems, and death (National Institute on Alcohol Abuse and Alcoholism [NIAAA], 2015). On its own, the statistic of 20% of college students meeting the criteria for this disorder is staggering. The prevalence of the sub-diagnostic behavior of binge drinking is even starker, and presents the same risks and consequences as a diagnosable alcohol use disorder (NIAAA, 2015).

**Binge Drinking**

Binge drinking has been defined not by the DSM-5, but by the NIAAA. This institute defines binge drinking as: drinking four alcohol drinks (five for men) at least one day in the last month (NIAAA, 2015). They also have defined and set the standard for what is considered “one drink”, as 1.5oz of liquor, 5oz of wine, and 12oz of beer, at standard alcohol by volume (ABV) percentages (NIAAA, 2015). Although binge drinking is not a diagnosis in the DSM-5, research has suggested that sub-diagnostic problematic drinking behaviors, such as binge drinking, are incredibly clinically important due to their negative consequences and risks (Kim, Kim, Pack, & Sung, 2016). Kim et al. (2016) found that although using binge drinking and heavy drinking in the showed no diagnostic power in the diagnosis of alcohol use disorder, the consequences of binge and heavy drinkers is still clinically relevant and an important area for research.

A wide array of research has been conducted on binge drinking, particularly with college students. Many of these studies have looked at the prevalence, risk factors,
consequences, and treatments for this behavior among college students. One of these studies, conducted by O’Malley and Johnston (2002) found that 40% of college students were classified a “heavy drinkers”, which is having more than 5 drinks during a drinking episode in the last two weeks. Kanny, Liu, Brewer, and Lu (2013) took data on drinking from those of all ages, and found that binge drinking was the most prevalent in those ages 18-24. These researchers also posited that reducing binge drinking behavior and the prevalence of binge drinking is the leading health indicator in the “Healthy People 2020” initiative, beating out other common negative health behaviors. According to a national survey, among college students aged 18-22, 60% reported drinking alcohol in the last month, and 2/3 of them engaged in binge drinking during the last month (Substance Abuse and Mental Health Services Administration, 2014).

**Demographic Variables and Alcohol Use**

Demographic considerations are also important when considering the prevalence rates of drinking problems in college students. O’Malley and Johnston (2002) discovered several important demographic differences in the prevalence of alcohol use among college students. In their study, which consisted of over 14,000 American college students, found differences in use based on gender, race and ethnicity, and other demographic factors. In consideration of gender, males were more likely to use, abuse, and experience non-physical risks (i.e., legal problems) than were females. White students, on the whole, were far more likely than other races and ethnicities to use alcohol and binge drink, followed by Hispanic identifying students in the middle, and African American Students were the least likely to use alcohol. The rate of alcohol use of students in college, versus those who are traditional college-aged and not in college, were
also found to be higher. Looking back into high school behavior, O’Malley and Johnston (2002) found that students who knew they were going to be attending college drank less in high school than did those who were not attending college, but then once they began college, they began drinking more than their non-college same-aged peers.

A common question asked about the high prevalence rates of binge drinking in college students is “why?” Why are students of this age group and life stage more likely to engage in this behavior than their peers? To answer this question, research has been conducted to answer this question, and the results indicate it is a combination of personal and social factors. To begin answering the question of “why”, researchers have focused on the developmental differences and behavioral differences of individuals, beginning in childhood. Lewis and Lewis (1984) studied peer pressure in children, and how peer pressure related to risk-taking behaviors across an individual’s development. They found that peer-pressure is a strong force that begins in childhood, generally around middle school, and increases as they progress through childhood into adolescence. The authors posit that this peer pressure is likely to continue throughout adolescence and into emerging adulthood, and that a variety of protective factors can reduce the impact of peer pressure, such as family support, education, and personal factors. Robb (2011) reported on the “culture of intoxication” and alcohol use on U.S. college campuses, and Larimer and Cronce (2002) noted several factors (e.g., stress, decline in parental supervision, identity development) as possible contributors to the prevalence.
Physical and Psychological Consequences of Alcohol Abuse

The impact of drinking, specifically binge drinking, has been another important area of focus for researchers and health organizations alike. Hingson et al. (2005) used data collected over 8 years, from 1993-2001 to determine if there was a change in drinking behaviors of college students. They found that the frequency of drinking in general did not change from 1993 to 2001. Using the same data, Wechsler et al. (2002) found that the rates of binge drinking actually increased in this time, from 19.7% to 22.8%, and the rate of individuals becoming “drunk” more than three times in the last 30 days increased from 23.4% to 29.4%. The most recent national survey, the National Survey of Drug Use and Health, found 39.6% of those between the ages of 18-25 had engaged in binge drinking between 2016 and 2017 (Center for Behavioral Health Statistics and Quality, 2017). It is clear that this remains a health risk on college campuses, and that it is likely not slowing down. Given the prevalence of binge drinking, it is important to review the consequences of binge drinking.

The NIAAA (2015) reports negative health and other risks associated with binge drinking. These included a higher risk of assault, sexual assault, drunk driving accidents, arrests, bodily injury, organ failure and death. Robb (2011) reported several cases of students on college campuses who had died due to alcohol overdose, with some examples in recent years, and noted that those examples were just a handful of recent incidents of young lives being taken too soon by excessive alcohol use. Stahre et al. (2014) found that 1 in 10 deaths in the U.S. between 2006 and 2010 were caused by excessive drinking. Ramstedt and Hope (2005) noted the prominence and consequences of binge drinking.
compromises overall wellness. In addition to the individual health concerns that are faced by those who engage in binge drinking, national organizations and governmental agencies have found worrying financial and economic impacts of the behavior.

The Center for Disease Control (CDC, 2017) determined that in 2010, drinking resulted in a 249 billion dollar cost due to loss of workplace productivity, health care expenses, and criminal justice costs; 77% of this cost was found to be due to binge drinking. The CDC also noted that the 77% of the cost that comes from binge drinking comes from mostly the 18-34 age range, with 25% of that cost coming from those aged 18-24. In 2010, researchers found that alcohol consumption cost the U.S. 223.5 billion dollars and 88,000 deaths, with 75% of the cost and half of the deaths due to binge drinking (Sacks et al., 2015). In looking specifically at consequences for females who engage in the behavior, the CDC (2013) notes that binge drinking results in 23,000 deaths of women and girls each year, and that the behavior increases risk for breast cancer, heart disease, STD, and pregnancy. The CDC also reported that females take less alcohol to become intoxicated, and that females who begin drinking in high school report higher use as they get older; 1 in 5 high school females and 1 in 8 adult females engages in binge drinking (CDC, 2013). Hingson et al. (2005) conducted a review of public health from 1998 to 2001, and found that college student alcohol consumption was implicated in 599,000 injuries, 646,000 assaults, 97,000 sexual assaults, and 1,800 deaths of college students.

Research on alcohol consumption and binge drinking, going as far back as 40 years ago, suggests that drinking among college students is prevalent, socially motivated, and has far-reaching negative health and other consequences. There is no denying that the
consequences of engaging in this behavior should be a concern for health officials and counseling psychologists alike. The role of binge drinking in the behavior of drunkorexia in highly important; making up one-half of the commonly used definitions of drunkorexia.

**Comorbidity of Alcohol Abuse and Eating Disorders**

There is a long-established connection between alcohol abuse and eating disorders, with repeated studies demonstrating high prevalence of comorbidity between the two disorders (Dansky, Brewerton, & Kilpatrick, 2000). The National Center on Addiction and Substance Abuse (CASA) estimates that 30-50% of those with bulimia and 12-18% of those with anorexia either abuse or are dependent on alcohol (CASA, 2003). CASA also found that in general, there is a 35% comorbidity rate between substance dependency and eating disorders. An important note is that CASA (2003) included subclinical disordered eating in their research, which identifies a link between alcohol abuse and subclinical disordered eating. Other researchers have continued to find a relationship between alcohol use and subclinical disordered eating (Barry & Piazza-Gardner, 2012; Bulik et al., 2004; Goldbloom, 1993).

In a similar study that examined dieting severity and substance use, Krahn et al. (1992) found a positive relationship between dieting severity and frequency of alcohol consumption and binge drinking. They found that those with a history of dieting who engage in alcohol abuse have an increased health risk. In addition to a long-established connection between eating disorders and alcohol use, researchers have found that those who engage in both behaviors are more likely to experience negative consequences (e.g., Anderson et al., 2005; Giles et al., 2009). Grilo, Sinha, and O’Malley (2002) discuss at
length the strength of data that supports a connection between alcohol use and eating disorders, and highlights the importance of considering the comorbidity in research and treatment.

**Measuring Alcohol Use and Abuse**

Countless measures have been produced to measure alcohol use and abuse for a variety of populations. Measures or measurement systems such as the PROMIS® (Ader, 2007), Rutgers Alcohol Problem Index (White & Labouvie, 1989), Daily Drinking Questionnaire (Collins, Parks, & Marlatt, 1985), and Personal Drinking Questionnaire (Miller & Tonigan, 1996) are just few of many empirically validated measures of alcohol use and its consequences. Some measures measure consequences of drinking, where others measure the motivations or positive expectancies of drinking. One of the most commonly used measures of alcohol use and abuse, the Alcohol Use Disorder Identification Test (AUDIT; Saunders et al., 1993) is a 10-item screening tool used in a variety of settings, such as medical and clinical agencies. This measure has been validated on multiple populations, and is a popular tool of choice given its brief length. A study conducted by Fiellin, Reid, and O’Connor (2000) found that the AUDIT, compared to similar and less formal measures and inventories, provided the highest specificity and sensitivity for detecting alcohol use problems. Average specificity ranged up to 97%, and sensitivity was up to 96%. In a more recent review of psychometric properties, de Meneses-Gaya, Zuardi, Loureiro, and Crippa (2009) suggested the AUDIT is still a reliable and valid measure for alcohol use problems. The AUDIT, given its brief length and current common use, were used in this study.
**Drunkorexia**

Since the term drunkorexia first came about, research on the behavior of drunkorexia has expanded, with researchers in the field of psychology beginning to examine the prevalence, motivations, and factors associated with this behavior (Glassman et al., 2015). Most, if not all, of this research has continued to focus on undergraduate students, and has expanded to include undergraduate male students, due to the prevalence on college campuses as well accessibility of participants (Barry et al., 2013; Barry & Piazza-Gardner, 2012; Gorrell, 2015). With the new literature on this topic, an aspect of this behavior that has not yet been clearly defined is the definition of what drunkorexia is or should be (Eisenberg & Fitz, 2014). Each study that has been conducted on the behavior thus far has used a slightly different definitions, seemingly dependent upon the intent, context, and purpose of the study (Barry et al., 2013). Although there are many different definitions that have been used throughout the literature, each definition maintains the components of intentional altering of eating or compensatory behaviors, and consumption of alcohol (Burke et al., 2010; Eisenberg & Fitz, 2014; Rahal et al., 2012). Peralta’s (2002) qualitative study discovered themes of calorie restriction, purging, meal and drink alteration (lower fat/carbs drinks and food), and exercise to be ways in which individuals engage in the behavior. Some studies have narrowly limited their definition of the behavior to include only restriction of calories prior to drinking, while others have expanded the definition to include various alterations in eating behavior or compensatory behaviors (i.e., exercise, purging) prior to, during, and after a drinking episode.
The prevalence of the behavior of drunkorexia has been a major focus of many studies since 2008, and results on overall prevalence have been fairly consistent. In what many consider to be the first study on the prevalence of this behavior, Giles et al. (2009) found that 39% of past 30-day drinkers engaged in the behavior of drunkorexia, with 67% of those doing it due to weight concerns. Burke et al. (2010) found a prevalence rate of approximately 15% for college freshmen that engaged in the behavior of drunkorexia. Studies since the Burke et al. (2010) study have consistently found prevalence rates of this behavior in undergraduate students to fall between 15% and 20%. Osborne et al. (2011) found 14% of their sample population engaged in drunkorexia, and Roosen and Mills (2015) found that 18% of their sample engaged in the behavior consistently.

**Motivations for Drunkorexia**

Quantitative research on the behavior of drunkorexia began in 2009, with the landmark Giles et al. (2009) study on motivations and prevalence of the behavior. The researchers obtained a large sample of over 4,000 undergraduate students and had them complete 318 items about drinking, eating, and drunkorexia behavior. Motivation for engaging in drunkorexia was assessed by asking participants if they engaged in the behavior due to weight concerns or a desire to enhance the effects of alcohol. This landmark study revealed that of the 39% of past 30-day drinkers that engaged in the behavior, 67% did it due to weight concerns, and that drunkorexia was associated with a higher risk of getting drunk. One consideration with this particular study was that participants were given a list to choose their motivation, rather than using an open-ended question. This may have limited the accuracy of responses and capturing the true motivations of participants.
Taking Giles et al. (2009) study one step further, Burke et al. (2010) used both quantitative and qualitative data to further parse out different motivations for engaging in drunkorexia. Of those that engaged in the behavior of drunkorexia, on the quantitative measure, the majority of students reported being motivated by weight management and enhancement of alcohol effects to restrict their calories prior to drinking. Qualitatively, they found five main motives for why undergraduate freshman engage in the behavior: increased ability to drink, prevention of being sick, forgetting to eat, not being hungry, and lacking money. A difficulty in assessing the motives for this behavior is that these motives are not independent of one another. For example, one might not eat dinner before they drink in order to become intoxicated more quickly; yet, this motive also involves a cost efficiency. If you become intoxicated more quickly, you do not need to drink as much, which in turn saves money. The Burke et al. (2010) study created a methodology and way of measuring motivations of this behavior for several future studies of drunkorexia (Roosen & Mills, 2015; Ward et al., 2015).

**Measuring Drunkorexia**

The first attempt to close the gap of motivations of drunkorexia, and create a scale for drunkorexia, was conducted by Rahal et al. (2012). Rahal and colleagues used a common factor analysis of several relevant scales on disordered eating and alcohol use to make a scale to assess the motivations and behavior of drunkorexia. The Compensatory Eating and Behaviors in Response to Alcohol Consumption Scale (CEBRACS) was created using a factor analysis of the following measures: Eating Disorder Inventory-2 (EDI-2; Garner, 1991), Global Belief in a Just World Scale (Lipkus, 1991), and questions about alcohol use frequency and severity based off of commonly used guidelines (Carter,
Brandon, & Goldman, 2010; Del Boca & Darkes, 2003) and Peralta’s (2002) qualitative study on drunkorexia. The Lipkus (1991) scale was used to determine discriminant validity, which the final CEBRACS scale accomplished. The final scale consists of 21 items and four factors that came out of a factor analysis: alcohol effects (7 items), bulimia (6 items), Diet and Exercise (6 items), and restriction (2 items) (Rahal et al., 2012). Four factors came out of a factor analysis: alcohol effects, bulimia, diet and exercise, and restriction (Rahal et al., 2012). Cronbach’s alpha for the overall scale was .89, with factor alphas ranging from .75 to .95. Factor loadings for the four factors ranged from .60 to .96. It is important to note that Factor 4, Restriction, consists of only two items (Rahal et al., 2012). Permission is not needed to use the CEBRACS measure, but the author obtained permission via email from the measure’s authors.

Similarly, Ward and Galante (2015) conducted an exploratory factor analysis of several measures related to the main components of drunkorexia in an attempt to create one, singular scale for the behavior. Their final measure, called the Drunkorexia Motives and Behaviors Scale, consists of four total scales, with the first three having two subscales each: 1) Drunkorexia motives and behaviors (motives and behaviors), 2) Drunkorexia Fails scale (avoidance and approach), 3) Drunkorexia during an Alcohol Consumption Event scale (drinking behaviors and calories), and 4) Post-Drinking Compensation Scale (no subscales). The four scales consist of 52 total questions. The researchers used the following measures for their exploratory factor analysis: Drinking Motives Questionnaire-Revised (DMQ-R; Cooper, 1994; Kuntsche, Knibbe, Gmel, & Engels, 2006), Eating Attitudes Test (EAT-26; Garner & Garfinkel, 1979), Rutgers Alcohol Problem Index (RAPI; White & Labouvie, 1989), three drunkorexia items that
mimic those used in the Burke et al. (2010) study, and questions about the frequency of their alcohol use.

The researchers then used an exploratory factor analysis, with 349 participants completing all measures, to create the four total scales and relevant subscales. Various items from all measures loaded onto different scales. One novel finding was that all five of Cooper’s (1994) conformity drinking motives loaded onto the Drunkorexia Motives scale. Cronbach’s alphas that were less than .05 were not included in the final scale. For the Drunkorexia Motives and Behaviors Scale, the motives subscale informed 66.15% of the variance (Cronbach’s alphas ranging from .80 to .91), and the Drunkorexia Behaviors scale accounted for 14.04% (Cronbach’s alphas ranging from .72 to .88) of the variance. Internal consistency for the Drunkorexia Motives and Behaviors scales range from .87 to .98. The factor loadings from the Drunkorexia Fails scale ranged from .64 to .88. The factor loadings on the Drunkorexia during an Alcohol Consumption Event subscales ranged from .58 to .88.

Ward and Galante’s (2015) and Rahal et al.’s (2012) attempts to create a singular scale for the behavior of drunkorexia have been impressive and challenging steps to take to further understand this risky behavior. There are several limitations to their factor analyses that leave a gap in the literature and scales that can be used by clinicians to help identify the motives and behaviors of drunkorexia. Notably, both scales noted a limitation of the low number of male participants in their studies. Although women have been found to be more likely than men to engage drunkorexia (Barry et al., 2013; Burke et al., 2010; Giles et al., 2009), all studies that have included male participants and this behavior have found that males also engage in this behavior, but may use different
methods of compensation for alcohol use than do females (Barry et al., 2013; Gorrell, 2015). Barry et al. (2013) found that men who engage in drunkorexia are more likely to alter their exercise, and engage in excessive exercise, to compensate for calories consumed during a binge drinking episode than are women. As noted by other authors (e.g., Peralta & Barr, 2017), Ward and Galante’s (2015) scale separates drunkorexia from alcohol consumption and disordered eating, which is beyond the scope of this study.

For the purposes of this study, the CEBRACS measure (Rahal et al., 2012) were used to measure drunkorexia. Although not without limitations, it is the only formal measure of drunkorexia that captures the variety definitions of the behavior used throughout the literature, and has strong internal consistency from its initial development and more recent studies (e.g., Galante, 2015; Peralta & Barr, 2017). In consideration of length, it is less than half the length of the Drunkorexia Motives and Behaviors Scale. With the length of the other scales being used, CEBRACS was chosen to help limit fatigue from participants. CEBRACS was also used in the singular study examining gender role conformity on drunkorexia that is helping inform the need for this study (Peralta & Barr, 2017).

Conformity

The study of conformity is expansive and diverse, largely due to its definition. Asch (1952) conducted the first documented experimental research on conformity, by using confederates to pressure participants into giving an obviously incorrect answer. Since this seminal work, the use and definitions of conformity in research has continued to broaden. Shortly after Asch’s (1952) study, it was recognized that humans have a predisposition to conform (Krech et al., 1962). Conformity may immediately strike an
image in one’s mind of someone falling into line, obeying an authority figure, or fitting in with the crowd. Depending on the research field, topic, and purpose, the use of similar words has been used interchangeably with conformity. Terms such as peer pressure/influence, obedience, and social likeability appear frequently in research that involves conformity or changing behavior based on contextual influences.

A debate continues to exist in various fields that use conformity, including psychology and sociology, of what conformity is and how it should be defined. Typically, measures and studies that involve adolescents or K-12 aged participants use the term peer pressure (Lewis & Lewis, 1984), whereas studies that involve older populations use conformity (e.g., Tompkins, Martz, Rocheleau, & Bazzini, 2009). This is not a rule and there are exceptions, many of which were apparent in this review of literature. Researchers have found several factors that influence conformity, including social influences and individual differences. Where two people might be put under the same social pressure or influence to behave in a certain way, individual differences in how people respond to social pressure does not guarantee they have the same way under that pressure (Krech et al., 1962). Individual differences that have been shown to impact conformity, or resistance to it, have found significant relationships between gender, ethnicity, and social class (Steinberg & Monahan, 2007).

For the purposes of this review, the literature that were discussed considers the definition of peer pressure, conformity, gender role conformity, or similar terms to broadly mean changing or choosing behavior based on social or other contextual influences. Given the inconsistencies in terminology and definitions of conformity in research, other terms may be used interchangeably throughout this review based on terms
used in individual studies. As stated prior, the scope of conformity research is very broad; therefore, this review focuses mainly on literature that involves disordered eating and alcohol use.

**Gender Role Conformity and Disordered Eating**

As previously mentioned, the field of conformity research is vast, and consists of many definitions and types of conformity. Given the gender differences in behavior and motivations for engaging in drunkorexia, exploring the impact that gender role conformity has on the behavior is necessary. There are several theories that permeate research on gender role and gender role conformity and its impact on body image. One of the more prominent theories is the masculinity hypothesis, which posits that conformity to traditional masculine gender roles is a risk factor for musculature oriented body image pathology in males (Blashill, 2011). This theory is closely related to the theory of threatened masculinity (Mishkind, Rodin, Silberstein, & Striegel-Moore, 1986). The threatened masculinity hypothesis is outdated, and views masculinity through a binary lens that does not take into account the full experience of masculinity for all genders. Along a similar vein, the femininity hypothesis proposes that conformity to feminine norms is a risk factor for eating pathology and body image concerns among women (Lakkis, Ricciardelli, & Williams, 1999; Meyer et al., 2001).

Research that has used a broad, general definition of conformity has found that conformity can lead to disordered eating behaviors and internalization of societal standards of appearance. In a study examining social connectedness, conformity, and disordered eating behavior, Vartanian and Hopkinson (2009) found that social connectedness was negatively related to conformity. Those who endorsed higher levels of
social connection with others reported less pressure to conform. Participants who endorsed higher levels of conformity positively also endorsed higher levels of internalization of societal standards of attractiveness. Vartanian and Hopkinson (2009) were able to conclude that conformity can play an important role in disordered eating behavior, as conformity was related to internalization, when in turn predicts body image concerns and various disordered eating symptoms.

In empirical research looking at the impact of feminine and masculine gender role conformity on disordered eating, most recent studies have used either the Bem Sex Role Inventory (BSRI; Bem, 1974) or the Conformity to Feminine Norms Inventory (CFNI; Mahalik et al., 2005) and Conformity to Masculine Norms Inventory (CMNI; Mahalik et al., 2003). Meyer et al. (2001) used the BSRI on 100 undergraduate college students to determine the connection between gender role conformity and disordered eating. This study is also one of the few in the field that has a heterogeneous sample of sexual orientation – 40% of participants identified as homosexual. Results of the study, which included the BSRI and an eating disorder measure, found a connection between higher levels of eating pathology and higher conformity to feminine gender norms. This relationship was stronger for those who identified as homosexual, and was still present for heterosexual participants. Hepp, Spindler, and Milos (2005) conducted a study using the BSRI that focused more on participants who were already identified as having either anorexia nervosa or bulimia nervosa. The over 150 participants in that study completed the BSRI and several inventories related to disordered eating. Results indicated that those who scored highly on both feminine and masculine traits, or androgynous, endorsed less disordered eating behaviors. This study highlights the importance of femininity and
masculinity scales being used together, and that they should not be considered separate when considering disordered eating.

The CFNI (Mahalik et al., 2005) and CMNI (Mahalik et al., 2003) were originally developed as longer form inventories for investigating adherence to feminine and masculine gender role norms. Since their creation, a re-validation led to shortened versions of both forms, which are now widely used in a variety of research contexts, including disordered eating and alcohol use behaviors (CMNI-46, Parent & Moradi, 2009; CFNI-45, Parent & Moradi, 2010). Both the original forms and shortened forms continue to be used, and more recent research is choosing to use the shortened versions for ease of use and time limitations (e.g., Peralta & Barr, 2017). Murray et al. (2013) used both the original CMNI and CFNI to explore the impact of gender role conformity on male body image concerns. Participants were a variety of males who were classified as either muscular dysmorphic, anorexia nervosa, or gym-using controls. The participants completed the femininity and masculinity measures, as well as inventories about disordered eating and muscular dysmorphia. Results of the study found that males with higher levels of conformity to masculine norms scored higher on measures of muscle dysmorphia compared to the other two groups. The results also highlighted that males in the anorexia nervosa category scored higher on feminine norms than the other two groups. Green, Davids, Skaggs, Riopel, and Hallengren (2008) also used the CFNI to examine the impact of conformity to feminine gender role norms on eating disorder symptomology. Results of this study found that the “desire for thinness” subscale on the CFNI predicted significant variance in the severity of eating disorder symptoms in participants.
In order to understand the connection between gender role conformity and disordered eating or body image concerns more clearly, Murnen and Smolak (1997) conducted a meta-analysis. Their analysis found a small, heterogeneous positive relationship between femininity and eating problems, and a negative relationship between masculinity and eating problems. Although this study was from over 20 years ago, its implications and findings are reflected in more current research on gender role conformity and disordered eating. Given the increase in pressure from social media and marketing to look a certain way, and more recent research supporting the findings, these findings clearly hold true today.

**Conformity and Alcohol Use**

Conformity has been shown to be implicated in alcohol use, especially for emerging adults and adolescents. There is strong evidence that demonstrates how important peer pressure and conformity are to risk-taking behaviors, especially alcohol use in adolescents and college students. Coming from a developmental perspective, Schulenburg et al. (2001) suggested that binge drinking and other drinking behaviors in college students should be viewed through a developmental lens. These authors posit that given the social pressure that is present during the 18-25 age range, culture of college in America, and the unpredictable trajectory of alcohol problems in college students, these alcohol problems should be viewed as a life-stage specific syndrome, rather than a life-long problem. Schulenburg et al. (2001) propose that due to the conformity pressures on college and college-aged individuals, and the positive outcomes that are often reported by those in college using alcohol, it is the peer pressure and life-stage changes occurring that are important in determining motivation for drinking. Further supporting this argument,
Schulenburg and Maggs (2002) conducted a literature review on alcohol use in adolescence and the transition to adulthood, and found that the transition to college is a pivotal moment for most people, a time of vast changes in environment and freedom, and that drinking does increase during this time.

The developmental models of drinking in college students demonstrated strong support for the impact of environment and social factors on drinking. Although not through a developmental lens, other researchers have continued to find evidence for the impact of social pressure and conformity on drinking behaviors in college students. Regan and Morrison (2011) utilized Cooper’s (1994) model of drinking motivations to develop a scale measuring attitudes toward non-drinkers. Their results indicated that peer pressure, or conformity as it is outlined by Cooper (1994), is a main component in alcohol consumption. These results further solidified findings by White, Bates, and Johnson (1991), who found that peer attitudes regarding alcohol use, and alcohol use by peers, are the strongest and most consistent predictors of drinking behavior. Similarly, Neighbors et al. (2007) concluded through their study that social norms and social pressure are among the best predictors for alcohol consumption, and that drinking to cope is a better predictor of problems associated with consuming alcohol. Baer (2002) found supporting evidence to the concept of social pressure and drinking, as the results indicated social processes are the most important predictor for drinking, but do not exclude the importance of personal and individual differences also have an impact. Baer (2002) concluded that the factors involved in drinking in college is likely a combination of social pressures and individual differences.
Further supporting the connection of conformity and social pressure on drinking in college students is a study by Baer, Kivlahan, and Marlatt (1995). These researchers studied “heavy drinking” students, and posited four risk factors for an increase in alcohol use: subject, sex, family history of drinking problems, and type of college residence. These risk factors were most predictive of differential changes in drinking rates and alcohol related problems, as well as alcohol dependence during the first term of college. In addition, they found that disposition and the environment were associated with changes in drinking rates and dependency. More specifically, their results demonstrated that being associated with Greek life was associated with more frequent drinking, being of the male gender and having a history of conduct problems was associated with a higher quantity of drinks during drinking events (binge drinking), and that family history was not related. The increase in frequency of drinking with those that are associated with Greek life perhaps lends the most support to the notion that social pressures are associated with drinking in college students. Osberg, Insana, Eggert, and Billingsley (2011) continue to support the concept of binge drinking as a socially pressured behavior, finding through their research that college students who enter college with the belief that alcohol were a prominent feature of their experience are more likely to seek out and select situations in which heavy drinking is encouraged.

Along with the well-established impact of social pressure and conformity on drinking, there is also the impact of the culture of college campuses that may have an impact on drinking. Robb (2011), suggests that college campuses in America have a “culture of intoxication”, which is spurred by Greek life, developmental ages and norms, and independence that most college students have never experienced. Robb’s suggestions
are supported by other researchers that suggest the heightened academic difficulty, college campus societal norms and culture, lack of parental supervision, and identity development and exploration all have an impact on the development of culture of drinking on college campuses (Baer, 2002; Baer & Bray, 1999; Baer et al., 1995; Schulenburg & Maggs, 2002; Schulenburg et al., 2001). Larimer and Cronce (2002) found that freshman in college are more likely to engage in drinking and high-risk drinking behaviors, which helps support the notion that the culture of college, and being away from supervision and having independence for the first time, can spur on drinking behaviors. In a qualitative study that looked at perceptions of binge drinking by college students, by Wyre and Pruitt (2017), themes of social norms and peer pressure arose as factors involved in drinking in college students.

In a recent study examining the impact of conformity on alcohol use, Moss et al. (2015) found that higher scores on the Alcohol Use Disorders Identification Test (AUDIT; Saunders et al., 1993) were associated with lower scores on a general conformity measure. These results again demonstrate those who are less impacted or influenced by conformity are less likely to consume alcohol at hazardous levels and experience negative consequences from alcohol consumption. Conformity has also been used to examine beliefs and attitudes about certain topics, including alcohol use. In a study that examined the perspectives of adolescents, researchers found that peer pressure is a strong predictor of risk behavior, even more so than popularity.

**Gender Role Conformity and Alcohol Use**

In addition to general conformity and its impact on alcohol use, gender role conformity has also been used to help explain and predict alcohol use for a variety of
Iwamoto and Smiler (2013) used the Psychological Mediation Framework (Hatzenbuehler, 2009) to assess for the impact of masculine gender role norms on alcohol use in adolescents. The researchers gave approximately 250 adolescent participants the CMNI and measures of peer pressure and alcohol use frequency. Their results indicated that both males and females endorsed drinking more alcohol when they also endorsed higher levels of masculinity conformity and peer pressure. In a shift to emerging adults and college students, Iwamoto and colleagues conducted two larger scale studies examining the influence of feminine norms on binge drinking and alcohol related problems (Iwamoto, Corbin, Brady, et al., 2018; Iwamoto, Corbin, Takamatsu, et al., 2018). Iwamoto, Corbin, Takamatsu, et al. (2018) surveyed 1910 college women using the CFNI-45 and an index of alcohol related problems. Binge drinking was defined as set out by national standards, as having four or more drinks in a two hour sitting. Results of the study indicated that the feminine norms of wanting to be “sweet and nice” were negatively associated with binge drinking, whereas “adhering to appearance” was positively associated with both binge drinking and drinking related problems.

Iwamoto, Corbin, Takamatsu, et al. (2018) suggested with their results that there are certain aspects of feminine norms that impact drinking behavior in different ways, and that the impact of femininity on drinking behavior is complex and multidimensional. In a similar study, Iwamoto, Corbin, Brady, et al. (2018) investigated the impact of feminine norm conformity and drinking, and used slightly different measures than in the previous study. This study used the term “heavy episodic drinking”, and included measures of Greek affiliation, drinking norms, and several drinking related questionnaires. They found that women who endorsed sexual fidelity and appearance
were associated with the “latent trajectory” of episodic drinking, in which participants did not engage in heavy episodic drinking.

Measuring Conformity and Gender Role Conformity

The field of conformity research is complex and varied, with debates among researchers on how define conformity, its difference or similarities with other similar variables, and the best way to measure it. One difficulty that the field has faced is creating scales that are brief, practical, and broad enough to use on various populations. Many of the conformity measures that have been created are very lengthy, and often limit their populations to adolescents or have intense personality measures attached to them. In light of this, the field of psychology has moved forward in creating valid measures that are practical and can be used for various populations. One of these measures, the Resistance to Peer Influence scale (RPI; Steinberg & Monahan, 2007) is one measure that has been used with college-aged students. The measure, instead of measuring conformity, was designed to measure resistance to conformity. The scale consists of 10 items, where respondents choose between one of two statements. They then rate whether the statement they chose is “really true for me” or “sort of true for me”. The RPI was validated on over 3,600 participants from ages 10 to 30, and demonstrates strong validity and reliability, as well as the original participant pool being heterogeneous in terms of socioeconomic status and race/ethnicity. Cronbach’s alpha for the scales differed depending on demographic factors of the various samples. The reliability ranged from .70 to .76 for the lower income, detained, community, and serious offender samples; confirmatory factor analysis yielded reliability ranging from .92 to .99.
Another way in which conformity has been approached and measured is by measuring conformity to specific constructs, such as femininity and masculinity. The Bem Sex Role Inventory (BSRI; Bem, 1974) was one of the first empirically validated measures of psychological androgyny, and included items measuring both feminine and masculine gender role norms. Bem (1974) reports coefficient alphas of .78 for femininity scales and .87 for the masculinity scale. BSRI, also has demonstrated high test-retest reliability. The measure is not without criticism (Pedhazur, 1979), and given its creation date and use of a singular scale to measure both feminine and masculine norms, other gender role conformity scales were considered.

Two of the more commonly used and recent measures of conformity to femininity and masculinity are the Conformity to Feminine Norms Inventory-45 (CFNI-45; Parent & Moradi, 2010) and the Conformity to Masculine Norms Inventory-46 (CMNI-46; Parent & Moradi, 2009). These scales were created by performing confirmatory factor analyses on the original CMNI (Mahalik et al., 2003) and the CFNI (Mahalik et al., 2005). The CFNI-45 and CMNI-46 have been used in many studies looking at the impact of gender role conformity and eating and drinking behaviors. Based on a sample with undergraduate females, reliability estimated by Cronbach’s alpha resulted in an overall alpha of .79 based on total scores, with subscale score coefficients ranging from .68 to .89. Scores from the CMNI-46 have been shown to be reliable with adult populations to measure conformity to masculine gender norms. The CFNI-45 and CMNI-46, given their more recent validations and use in literature, was used for this study. In addition, this scale separates gender norms into femininity and masculinity, which by administering
both helps navigate the inclusivity of gender identities outside of the gender binary of male and female gender identities.

**Summary**

Alcohol use, disordered eating, and conformity have been studied for decades (e.g., Asch, 1952; Cooley & Toray, 1996; Cooper, 1994), and have been found to be common among college students. Drunkorexia is a relatively new addition to the field of psychology and psychopathology, first being coined in 2008, and has gained more attention in research since that time (e.g., Burke et al., 2010; Hunt & Forbush, 2016; Peralta & Barr, 2017). Thus far, research has demonstrated a strong connection between disordered eating, alcohol use, and the behavior of drunkorexia (Burke et al., 2010; Hunt & Forbush, 2016; Ward & Galante, 2015). Gender role conformity has been the most recently investigated factor that may help explain drunkorexia (Peralta & Barr, 2017).

The current study looks at disordered eating, alcohol use, and gender role conformity (feminine and masculine) together and how they explain drunkorexia. By having a greater understanding of the factors that contribute to this risky behavior, counseling psychologists are better able to identify, treat, and prevent the behavior.
CHAPTER III
METHODOLOGY

Research Design

This study was a non-experimental correlational research design (Remler & Van Ryzin, 2010). The primary investigator examined how gender role conformity may influence engagement in, and severity of, drunkorexia. Gender was be used as a controlling variable, given previous research has demonstrated gender differences in motivations and engagement of this behavior (Gorrell, 2015; Zwetzig & Martinez, 2016). Based on social learning theory (Rotter, 1954), conformity to social norms, in this case gender norms, were predicted to explain some variance in the behavior of drunkorexia. Previous research has demonstrated gender role conformity playing a role in both alcohol use and disordered eating; therefore, the combination of these types of behaviors, as occurs in drunkorexia, is likely to also be influenced by gender role conformity.

Participants and Sample Size

G*Power 3 is a software program that includes alpha level, number of predictors, and effect size in computing minimum sample size and is recommended for use in behavioral and social science research (Faul, Erdfelder, Lang, & Buchner, 2007). In order to compute the necessary sample size for the multiple linear regression, G*power 3 was used. In calculating the minimum sample size in G*power 3, the number of
predictors, power, and effect size were included. Gender was statistically controlled for in the study as an extraneous variable. To calculate the minimum sample size needed for the multiple linear regression, the researcher used an effect size of $f^2 = .15$, $\alpha = .05$, and power = .80, resulting in a minimum sample size of $N = 85$. For the ANCOVA, using G*power, a minimum sample size of 200 was calculated, which accounted for the difference in proportion of those who engage in drunkorexia and those who do not (160 do not engage, 40 who do engage). This minimum sample size was achieved through the sampling methods used.

Participants were sought from a Rocky Mountain region university using convenience sampling. The Office of Assessment was contacted and asked to provide 2,000 randomly selected undergraduate student emails of students between the ages of 18-25. All 2,000 students were emailed three times: One (1) initial email asking them to participate, and one (1) reminder email approximately two weeks later reminding them of the opportunity to participate, and a final reminder email approximately one (1) week later. Not enough participant data had been gathered after the second email, so the third email was sent out to get more participants to achieve a large enough sample size to achieve power. All participants were sent a recruitment email, detailed in Appendix A. Participants were directed to complete the online survey, which included an electronic version of the informed consent form (see Appendix B), and then directed to an optional entry form at the end of the survey to enter to win a Bear Bucks gift card. Participants were notified in the informed consent and recruitment letter that if they are currently in treatment for an eating or substance use disorder, they should not complete the survey. Participants that indicated in their demographic information they are in active treatment
for an eating or substance use disorder were not used in the data analysis. Not enough participants responded from the email surveys, so in-person recruitment (visiting classes with instructors’ permission) and recruitment through the UNC SONA system was also used.

After data was sufficiently prepared for analysis, there was complete information for 307 total individuals, 103 (33.6%) of which reported engaging in drunkorexia, and 204 (66.4%) of which reportedly did not engage in drunkorexia. Of those who reported engaging in drunkorexia, 20 (19.4%) were males, and 82 (79.6%) were female. Two hundred and twenty-three (72.6%) of participants came from the email request for surveys, and 84 (37.8%) of participants came from in-person recruitment and the SONA system. Participant ages ranged from 18 to 25, as stipulated by the inclusion criteria for the study \((M = 20.34, SD = 1.54)\). Participants were provided a definition of drunkorexia, and asked if they had engaged in the behavior in the last 3 months. Those who responded “No” \((n = 204)\) were not supposed to take the CEBRACS measure; however, due to a problem in survey flow logic, 141 participants accidentally were given the CEBRACS to take. Interestingly, of those 141 participants who reported they did not engage in drunkorexia and still took the CEBRACS measure, 60 of them (42%) responded positively to at least one item on the measure, indicating that they in fact did engage in the behavior. These 141 participants were not included in data analysis involving those who engaged in drunkorexia. Of those that responded “Yes” to engaging in drunkorexia, seven did not respond positively to any items on the CEBRACS. Other demographics are provided in Table 1.
Table 1
Demographics for all participants

<table>
<thead>
<tr>
<th>Ethnicity (N=306)</th>
<th>N</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American/Black</td>
<td>8</td>
<td>2.60</td>
</tr>
<tr>
<td>American Indian/Alaska Native</td>
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<td>.30</td>
</tr>
<tr>
<td>Arab American</td>
<td>1</td>
<td>.30</td>
</tr>
<tr>
<td>Asian/Asian American</td>
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<td>3.30</td>
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<td>Caucasian</td>
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<td>72.60</td>
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</tr>
<tr>
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</tr>
<tr>
<td>Native Hawaiian/Pacific Islander</td>
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<td>.30</td>
</tr>
<tr>
<td>Other</td>
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<table>
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<th>Gender Identity (N=307)</th>
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<tbody>
<tr>
<td>Men</td>
<td>66</td>
<td>21.50</td>
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<tr>
<td>Women</td>
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<td>Transgender</td>
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<tr>
<td>Genderfluid/Genderqueer</td>
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<td>1.62</td>
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<table>
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<tr>
<td>Asexual</td>
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<td>3.60</td>
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<tr>
<td>Bisexual</td>
<td>37</td>
<td>12.10</td>
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<tr>
<td>Gay</td>
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<td>1.60</td>
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<tr>
<td>Heterosexual</td>
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<tr>
<td>Lesbian</td>
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<td>1.00</td>
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<tr>
<td>Queer</td>
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<td>1.30</td>
</tr>
<tr>
<td>Pansexual/Demisexual</td>
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<td>2.60</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Classification in school (N=306)</th>
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</tr>
</thead>
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<tr>
<td>Freshman</td>
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</tr>
<tr>
<td>Sophomore</td>
<td>64</td>
<td>20.80</td>
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<tr>
<td>Junior</td>
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<td>30.40</td>
</tr>
<tr>
<td>Senior</td>
<td>86</td>
<td>30.00</td>
</tr>
</tbody>
</table>
Instrumentation

Demographics

Participants were first asked a series of demographic questions before answering any of the measures on the survey (see Appendix C). Questions included age, race, gender (male, female, and other), year in school, sexual orientation, and whether or not they have engaged in drunkorexia in the last 3 months. Participants responded either “yes” or “no” to engaging in drunkorexia. Participants were first provided a definition of binge drinking that read: “Drinking enough alcoholic beverages, in one sitting, to become intoxicated (drunk). Typically, this is 4 drinks for women, and 5 drinks for men, in approximately 2 hours.” They were then provided a definition of drunkorexia that included the variety of behaviors that have been found in the literature: “Intentionally restricting calories prior to or after binge drinking (e.g., not eating dinner before binge drinking, or not eating as many calories as is typical the day before or following binge drinking), OR purging (e.g., vomiting or using laxatives), exercise, meal alteration (low carb/fat), or drinking alteration (e.g., low calorie drinks) before, during, or after binge drinking?” (e.g., Burke et al., 2010; Rahal et al., 2012). As noted above, 141 participants mistakenly took the CEBRACS measure after answering “No” to engaging in drunkorexia, and were not included in analyses that involved the CEBRACS measure. Participants who respond “yes” to engaging in drunkorexia were asked to complete all measures (CEBRACS, EAT-26, AUDIT, CFNI-45, CMNI-46).

Drunkorexia

Drunkorexia was measured by the Compensatory Eating and Behaviors in Response to Alcohol Consumption Scale (CEBRACS; see Appendix D). The CEBRACS
measure assesses frequency with which an individual engages in various behaviors of drunkorexia in the last three months. CEBRACS consists of 21 total questions, with the first six questions pertaining to behaviors before drinking alcohol, questions 7-14 relating to behaviors while consuming alcohol, and questions 15-21 relating to behaviors after the effects of alcohol have worn off. Questions are rated on a Likert scale from 1 (Never) to 5 (Almost all the time). All questions are phrased beginning with “In the past 3 months, I…” followed by specific behaviors. Some examples of behaviors included in the measure are “I…have not eaten at all while I was drinking because I wanted to get DRUNKER” and “I…have skipped one or more meals before drinking to make up for the number of calories in alcohol I anticipated consuming.” In its initial validation study, four factors came out of a factor analysis: alcohol effects, bulimia, diet and exercise, and restriction (Rahal et al., 2012). Cronbach’s alpha for the overall scale was .89, with factor alphas ranging from .75 to .95. Factor loadings for the four factors ranged from .60 to .96. It is important to note that Factor 4, Restriction, consists of only two items (Rahal et al., 2012).

In this study, the total score of all items was used for data analyses for the original research questions and hypotheses. For the post hoc analyses, subscale scores on the CEBRACS, rather than the total score, was used. Other studies on drunkorexia have used the total score for their analyses (Galante, 2015; Knight & Simpson, 2013; Peralta & Barr, 2017). A higher total score indicates a higher frequency with which one engages in the various behaviors involved in drunkorexia, or a higher level of drunkorexia. The CEBRACS measure did not require re-coding for scoring. Total factor scores were also calculated; although not specifically part of a formal research question being answered in
this study, recent research on the psychometrics of the CEBRACS measure indicates the factor scores are more reliable than the total score (Choquette, 2017). Although the total score has been used in recent studies on drunkorexia (e.g., Peralta & Barr, 2017), these researchers have noted the limitations in using the total CEBRACS score. In addition to the total score, the subscale scores on the CEBRACS were used for post hoc analyses.

**Eating Attitudes Test-26**

The Eating Attitudes Test-26 (see Appendix E; EAT-26; Garner, Olmstead, Bohr, & Garfinkel, 1982) was used to measure disordered eating behavior of participants. This measure was chosen due to its common use in a variety of settings and recent research, and the three factors of the measure capture non-clinical disordered eating. The EAT-26 consists of 26 questions with six response options ranging from “always” to “never.” Examples of questions are “I avoid eating when I am hungry” and “I think about burning up calories when I exercise.” Answers of “always” are scored a 3, “usually” are scored a 2, “often” is scored a 1, and all other response options (sometimes, rarely, never), are scored a 0. A total continuous score is calculated, with a possible range between 0 and 78.

The EAT-26 was developed from the Eating Attitudes Test-40, a 40-item questionnaire created in 1979 by Garner and Garfinkel. Garner et al. (1982) ran a factor analysis to restructure the EAT-40 to include relationships between symptom areas and clinical features of various eating disorders. The factor analysis included a total of 158 participants, including populations of adult males and females with normal body mass indices (BMI) and also included female participants who were diagnosed with anorexia nervosa (AN). The analysis resulted in three factors: dieting, bulimia and food
preoccupation, and oral control. Factor loadings ranged from .41 to .81. Factor I, dieting, had the highest correlation with the total EAT-26 score \( r = .93 \). Factor I’s Cronbach’s alpha was the highest \( \alpha = .90 \). The overall reliability for scores on the entire measure was .90 for anorexic participants and .83 for female controls (Garner et al., 1982). Recent psychometric analyses of the EAT-26 resulted in test-retest reliability of .84 to .89 (Banasiak, Wertheim, Koerner, & Voudouris, 2001). Factor analyses in recent years have been somewhat inconsistent (Pereira et al., 2008; Ocker et al., 2007). Overall, this measure, which is still used today, captures the non-clinical disordered eating behavior that occurs with drunkorexia, and evidence of previous reliability and validity supports its use with adult populations (Mintz & O’Halloran, 2000). Garfinkel and Newman (2001) summarized validity studies on the EAT-26 and found strong validity for it across clinical and non-clinical populations from various cultural backgrounds. Participant responses on the EAT-26 in this study were recoded appropriately, and a total score was calculated to be used in analyses. Given the psychometric validity of the total score on the EAT-26, factor scores were not considered for this study.

### Alcohol Use Disorder Identification Test

The Alcohol Use Disorder Identification Test (see Appendix F; AUDIT; Saunders et al., 1993) is a 10-item screening tool used in a variety of settings, such as medical and clinical agencies. This measure was chosen due to its brief length, ease of comprehension, and factors that align with the DSM-5 diagnosis of alcohol use disorder. The measure is intended to identify the level of danger or risk to self or others resulting from alcohol use. A 2009 review of psychometric properties of the AUDIT revealed the measure to be valid and reliable for use in multiple populations to detect harmful alcohol
use (de Meneses-Gaya et al., 2009). All psychometrics were deemed within acceptable ranges for research and clinical work (e.g., Cronbach’s alpha between .80 and .95.

Items three (3) through eight (8) are measured on a frequency scale ranging from “never” to “daily or almost daily.” Examples of these questions are “How often during the last year have you had a feeling of guilt or remorse after drinking?” and “How often do you have six or more standard drinks on one occasion?” Responses of “never” are scored a 0, “less than monthly” is a 1, “monthly” is a 2, “weekly” is a 3, and “daily or almost daily” is a 4. The first item is also measured on a frequency scale with slightly different options. This item pertains to how often someone has a drink containing alcohol with five options ranging from “never” to “4 or more times per week,” with the scoring the same as items three (3) through eight (8). Item two (2) is scored numerically in the same manner, with the five response options instead ranging from “1 or 2” drinks on a typical day to “10 or more” drinks on a typical day. Items nine (9) and ten (10) have three response options of “never,” “Yes, but not in the last year,” and “Yes, during the last year,” and are scored 0, 2, and 4, respectively. For this study, after recoding appropriately the scoring instructions, a total score for the AUDIT was calculated and used in analyses.

Conformity to Feminine/Masculine Norms Inventories

The Conformity to Feminine Norms Inventory-45 (see Appendix G; CFNI-45; Parent & Moradi, 2010) and Conformity to Masculine Norms Inventory-46 (see Appendix H; CMNI-46; Parent & Moradi, 2009) were chosen as measures of gender role conformity for several reasons. The factor structures of the CMNI-46 were supported and reliability estimates of their scores have been high, and their scores have exhibited strong psychometric properties from the initial validation study with 229 male-identifying
undergraduate students (Parent & Moradi, 2009). The factor structures for the CMFI-45 also have been supported in an initial validation study with undergraduate female-identifying participants and reliability within their scores and strong psychometric properties were found by researchers (Parent & Moradi, 2010). It is important to note that the concept of gender role conformity is complex and outside of the typical binary of male and female; by having all participants take both feminine and masculine measures, the complexity and spectrum of gender roles was captured. In general, it has been shown that males and females engage in this behavior in different ways, so capturing both aspects of gender role conformity was highly important.

The CMNI-46 was modified from the Conformity to Masculine Norms Inventory (CMNI; Mahalik et al., 2003) by completing a confirmatory factor analysis. This analysis yielded 46 items that loaded on 9 subscales. These nine subscales are as follows: emotional control (six items), winning (six items), risk-taking (five items), violence (six items), power over women (four items), playboy (four items), self-reliance (five items), primacy of work (four items), and heterosexual self-presentation (six items). Based on the confirmatory factor analysis, the authors also dropped some items that were outdated or offensive. All 46 items have four response options of “strongly disagree” to “strongly agree.” Scores can range from 0-3, with strongly disagree being scored a 0. A total score is calculated, along with total scale scores, with the total score potentially ranging from 0 to 138. In the sample of undergraduate men, reliability estimated by Cronbach’s alpha resulted in an overall alpha of .88 for total scores, with subscale score coefficients
ranging from .77 to .91 (Parent & Moradi, 2009). Scores from the CMNI-46 have been shown to be reliable with adult populations to measure conformity to masculine gender norms.

The CFNI-45 was modified from the Conformity to Masculine Norms Inventory (CMNI) (Mahalik et al., 2005) by completing a confirmatory factor analysis. This analysis yielded 45 items that loaded on nine subscales, each with five items. These nine subscales are as follows: thinness, domestic, invest in appearance, modesty, relational, involvement with children, sexual fidelity, romantic relationships, and sweet and nice. Based on the confirmatory factor analysis the authors also dropped some items that were outdated or offensive. All 45 items have four response options of “strongly disagree” to “strongly agree.” Scores can range from 0-3, with strongly disagree being scored a 0. A total score is calculated, along with total scale scores, with the total score ranging from 0 to 135. Based on a sample with undergraduate females, reliability estimated by Cronbach’s alpha resulted in an overall alpha of .79 based on total scores, with subscale score coefficients ranging from .68 to .89. Scores from the CMNI-46 have been shown to be reliable with adult populations to measure conformity to masculine gender norms. For this study, the total score of both the CFNI-45 and CMNI-46 were calculated after recoding to fit scoring instructions. Factor scores were not calculated for this measure due to these scores not being used in any analyses in the current study.

**Procedure**

Prior to data collection, this research project was reviewed and approved by the Institutional Review Board at the University of Northern Colorado (See Appendix I). The Office of Assessment was contacted and asked to provide 2,000 randomly selected
undergraduate student emails of students between the ages of 18-24. In-person recruitment (visiting classrooms with instructors’ permission) and recruitment through the SONA system was also used. Through all recruitment sources, participants were asked to follow a link to a Qualtrics survey, which took approximately 20 minutes to complete. Participants were first asked electronically consent to participate in the survey after viewing a copy of the consent form, and electronically consenting themselves to participate in the research. Participants were asked to provide basic demographic information. Those that responded “yes” to engaging in drunkorexia in the demographics section responded to all measures, and those that respond “no” did not take the CEBRACS measure (save for the 141 who mistakenly took it, as previously mentioned). Following the demographic questions, participants were asked to respond to four measures: CEBRACS, AUDIT, EAT-26, CFNI-45, and CMNI-46. Permission for use of the CFNI-45 and CMNI-46 can be found in Appendix J. The EAT-26 is a free-use measure that requires online registration to use. The researcher registered to use the EAT-26 and has full permission to use the measure.

After reaching the end of the survey, participants were thanked and given the option to be redirected to a completely separate survey if they would like to be entered for the chance to win one (1) of four (4) $50 Bear Bucks cards. Here, they were asked their full name, contact preference (email or telephone), and their telephone and student email address. Both email addresses and telephone numbers were gathered to help ensure winners could be reached if their preferred contact method didn’t work. Four winners were selected via random number generator, and the researcher attempted to reach the winners by their preferred contact method. Out of the first four participants selected, all
contacted via text message per their preferred contact method, three of the participants were still interested in receiving a Bear Bucks card. The fourth participant requested another participant be chosen. A fifth participant was chosen and accepted the prize. Two participants received their cards via mail, and two picked up their cards in person from dining services.

**Data Analysis Procedures**

In order to test the research questions, several different analyses were conducted on the sample. All data analysis was conducted through using IBM SPSS 24.0 statistical software (IBM Corp, 2016). Preliminary analyses that were conducted on the data included exploratory and descriptive analyses. Frequencies for all data, descriptive analyses to obtain the reliability of the measures for this study, as well as additional descriptive information (e.g., mean scores, standard deviation, ranges, correlation matrix) were ran. The data was checked for outliers and missing data. Any participants who were missing an entire measure needed for analysis were removed using listwise deletion. Given the very small number of missing data points, and the pattern revealed by the missing value analysis, all missing values were considered to be missing at least at random, or MAR. A combination of Little’s (1988) test and visual inspection of the pattern of missing data was used to determine randomness. Expectation-maximization was used to fill in missing data. Reliability coefficients were ran for all measures to confirm reliability in this sample.

Next, the researcher checked for the following assumptions needed for a linear regression analysis: variables are independent of one another, variables are normally distributed, linear relationship between predictors and outcome variable(s), variables are
measured without error, and homoscedasticity. As recommended by Pedhazur (1997), to assess for independence of variables, the variance inflation factor (VIF) was used to assess for multicollinearity. A VIF greater than 10 indicates the presence of multicollinearity. Additionally, correlation matrices were consulted for evidence of high correlation between independent variables, indicating multicollinearity. Histograms and Q-Q plots were visually inspected to check for normal distribution, skewness, and kurtosis to determine normality of the data. Visual inspection of scatter plots were used to assess for linear relationship between predictors and outcome variable, and homoscedasticity. Homoscedasticity is met if all data points are equal distances from the fitted regression line (Pedhazur, 1997). After running a hierarchical multiple linear regression, the researcher examined values for $F$, $R$, $R^2$, $R^2$ change, and beta coefficients to determine statistical and clinical significance of the data. Cohen’s $f^2$ were used to determine change in effect size after predictors are added into the model for each of the steps in the hierarchical regression; while beta coefficients were examined to determine direction and strength of relationship between the predictors and outcome. To determine the relative predictive strength of each variable, to determine which variable explains the most variance, each variable was separately added into the model and $R^2$ change were assessed.

In order to answer the first research question, Pearson’s correlations were ran between level of drunkorexia and both the feminine and masculine conformity measures. In order to control for gender, the correlations were ran separately for male and female participants. There were only 5 participants that identified as “other”, therefore they were excluded for the initial correlations when controlling for gender. The following
assumptions were checked: continuous variables, related pairs, absence of outliers, normality of variables, linearity, and homoscedasticity. The first two assumptions have already been met, with all variables being continuous and every case (participant) having both a score for level of drunkorexia and a score for gender role conformity. Histograms and Q-Q plots were visually inspected to check for normal distribution, skewness, and kurtosis to determine normality of the data. Visual inspection of scatter plots were used to assess for linear relationship between predictors and outcome variable, and homoscedasticity.

An ANCOVA was used to test the fourth research question, with gender acting as a control variable. The following assumptions were checked: continuous scale data, representative and random sample of population, normal distribution, large sample size, and homogeneity of variance. The first assumption has been met by all measures being continuous. The second assumption was met, as well it can be with a convenience sample, through the random emails gathered from the university. The sample size minimum of 200, as calculated through G*Power, was met through sampling methods. Levene’s test was used to check for the assumption of homogeneity of variance. The level of significance p was used to determine if the data yielded a statistically significant difference between those who engage in drunkorexia and those who do not.

Hypotheses

The following research questions and hypotheses were used to guide this study:

Q1 After controlling for gender, what relationship exists between gender role conformity, both masculine and feminine, and level of drunkorexia?

H1 Masculine gender role conformity will have a significant, positive correlation with level of drunkorexia.
A Pearson correlation was used to determine the relationship between masculine gender role conformity and the level of drunkorexia. An alpha level of .05 was used to determine significance.

H2 Feminine gender role conformity will have a significant, positive correlation with level of drunkorexia.

A Pearson correlation was used to determine the relationship between feminine gender role conformity and the level of drunkorexia. An alpha level of .05 was used to determine significance.

Q2 After controlling for gender, how do alcohol use, disordered eating, and gender role conformity (feminine and masculine) explain the level of drunkorexia?

H3 Masculine gender role conformity will explain a significant and unique amount of variance in the level of drunkorexia.

A multiple linear regression was used to examine whether or not masculine gender role conformity explained a significant amount of variance in the level of drunkorexia. Level of drunkorexia was the criterion variable, masculine gender role conformity was one of the explanatory variables, and gender was the control variable ran as the first step in the model. An alpha level of .05 was used to determine statistical significance.

H4 Feminine gender role conformity will explain a significant and unique amount of variance in the level of drunkorexia.

A multiple linear regression was used to examine whether or not feminine gender role conformity explained a significant amount of variance in the level of drunkorexia. Level of drunkorexia was the criterion variable, feminine gender role conformity was one of the explanatory variables, and gender was the control variable ran as the first step in the model. An alpha level of .05 was used to determine statistical significance.
H5  Alcohol use will explain a significant and unique amount of variance in the level of drunkorexia.

A multiple linear regression was used to examine whether or not alcohol use explained a significant amount of variance in the level of drunkorexia. Level of drunkorexia was the criterion variable, alcohol use was one of the explanatory variables, and gender was the control variable ran as the first step in the model. An alpha level of .05 was used to determine statistical significance.

H6  Disordered eating will explain a significant and unique amount of variance in the level of drunkorexia.

A multiple linear regression was used to examine whether or not level of disordered eating explained a significant amount of variance in the level of drunkorexia. Level of drunkorexia was the criterion variable, level of disordered eating was one of the explanatory variables, and gender was the control variable ran as the first step in the model. An alpha level of .05 was used to determine statistical significance.

Q3  After controlling for gender, which variable (alcohol use, disordered eating, feminine gender role conformity, masculine gender role conformity) accounts for most variability in level of drunkorexia?

H7  Masculine gender role conformity will explain the most variability in the level of drunkorexia.

A hierarchical multiple linear regression was used to examine which explanatory variable accounts for the most variability in the level of drunkorexia. Level of drunkorexia was the criterion variable, level of disordered eating was one of the explanatory variables, and gender was the control variable. In this analysis, the following entry format was used: gender (step 1), masculine gender role conformity (step 2). Step 2 was repeated with each explanatory variable to assess for the variable resulting in the largest change in $R^2$. 
Q4 After controlling for gender, is there a difference in level of gender role conformity (feminine and masculine) between those who engage in drunkorexia and those who do not?

H8 A significant difference exists in the level of feminine gender role conformity between those who engage in drunkorexia and those who do not.

An analysis of covariance (ANCOVA) was used to examine group differences in level of feminine gender role conformity based on drunkorexia status. Drunkorexia status (engage in behavior or not) was the explanatory variable, level of feminine gender role conformity was the criterion variable, and gender was the covariate. An alpha level of .05 was used to determine statistical significance.

H9 A significant difference exists in the level of masculine gender role conformity between those who engage in drunkorexia and those who do not.

An analysis of covariance (ANCOVA) was used to examine group differences in level of masculine gender role conformity based on drunkorexia status. Drunkorexia status (engage in behavior or not) was the explanatory variable, level of masculine gender role conformity was the criterion variable, and gender was the covariate. An alpha level of .05 was used to determine statistical significance.

Summary

The purpose of this study was to gain a better understanding of the factors that help explain the behavior of drunkorexia. Participants were recruited through convenience sampling from a university in the Rocky Mountain region. Data was collected via an anonymous online survey through Qualtrics. After listwise deletion of cases with a large majority of data missing, 307 total participants were used for analyses. One hundred and three participants reported engaging in drunkorexia, and 204 reported
not engaging in drunkorexia. Preliminary analyses were conducted on all measures and participants, including reliability analyses and checking assumptions for all statistical analyses. Data was analyzed using multiple linear regression, hierarchical linear regression, ANCOVA, and Pearson’s correlation. Results of the analyses are presented in Chapter IV.
CHAPTER IV
DATA ANALYSIS AND RESULTS

This chapter reports the results of the current study resulting from the previously mentioned analyses. The first section describes an exploratory factor analysis of the Compensatory Eating Behaviors in Response to Alcohol Consumption Scale (CEBRACS). The second section describes descriptive statistics and frequencies of the sample for each measure. The third section describes the reliability estimates of all used measures. The final section describes the results for each research question and hypothesis. An important note on interpretation of the results is that all analyses were evaluated at the .05 level. There is a risk of an increased family-wise error rate given multiple tests ran on the same data set. For results of analyses to test the research hypotheses, both non-corrected and Bonferroni corrected (α=.012) interpretations are provided in the results tables via asterisks and bold text.

Factor Analysis

Drunkorexia

An exploratory factor analysis of the CEBRACS was ran due to newer research indicating weaker reliability for the CEBRACS total score. Although not part of the main research questions for this study, the researcher deemed it important to explore the relationship between the factor scores of the measure and the other variables being assessed. An exploratory factor analysis was conducted using principle components analysis in SPSS 24.0. Criteria for the principal components solutions are based on an examination of Cattell’s scree plot, common variance, and the pattern of coefficients of ≥.3. The researcher attempted several different rotations, and found the quartimax
rotation resulted in the closest approximation to simple structure. A principal components analysis was conducted on all 21 items of the CEBRACS measure to determine how many factors underlie responses to the measure. In the original validation of the measure, the CEBRACS resulted in four factors (Rahal et al., 2012). Factor loadings were only included if they were ≥.3. Visual inspection of the scree plot and pattern matrix resulted in a three factor structure. The three factors explained 69.02% of variance. Factor loadings are shown in Table 2. Three items did not result in clear factor loadings after rotation, and are noted in the table below. Through the content of the items of each factor, the factors can be described as follows: Factor 1 – Alcohol Effects, Factor 2 – Diet and Exercise, and Factor 3 – Purging.
<table>
<thead>
<tr>
<th>Item</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I have eaten less than usual during one or more meals before drinking to get DRUNKER</td>
<td>.82</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I have eaten less than usual during one or more meals before drinking to feel the effects of alcohol FASTER</td>
<td></td>
<td>.85</td>
<td></td>
</tr>
<tr>
<td>6. I have skipped one or more meals before drinking to feel the effects of alcohol FASTER</td>
<td></td>
<td></td>
<td>.85</td>
</tr>
<tr>
<td>7. I have eaten less than usual while I was drinking because I wanted to feel the effects of the alcohol FASTER</td>
<td></td>
<td></td>
<td>.80</td>
</tr>
<tr>
<td>9. I have not eaten at all while I was drinking because I wanted to feel the effects of the alcohol</td>
<td></td>
<td></td>
<td>.66</td>
</tr>
<tr>
<td>12. I have eaten less than usual while I was drinking because I wanted to get DRUNKER</td>
<td></td>
<td></td>
<td>.84</td>
</tr>
<tr>
<td>14. I have not eaten at all while I was drinking because I wanted to get DRUNKER</td>
<td></td>
<td></td>
<td>.76</td>
</tr>
<tr>
<td>2. I have exercised before drinking to make up for the calories in alcohol that I anticipated consuming</td>
<td></td>
<td></td>
<td>.80</td>
</tr>
<tr>
<td>4. I have skipped one or more meals before drinking to make up for the number of calories in alcohol that I anticipated consuming</td>
<td>.46*</td>
<td>.65*</td>
<td></td>
</tr>
<tr>
<td>10. I have eaten low-calorie or low-fat foods while I was drinking to make up for the calories in alcohol that I was consuming</td>
<td></td>
<td></td>
<td>.71</td>
</tr>
<tr>
<td>11. I drank low-calorie beer or alcoholic drinks to get fewer of the calories that are in alcohol</td>
<td></td>
<td></td>
<td>.74</td>
</tr>
<tr>
<td>16. I have eaten low-calorie or low-fat foods during one or more meals to make up for the calories in alcohol that I had consumed previously while I was under the effects of alcohol</td>
<td></td>
<td></td>
<td>.86</td>
</tr>
<tr>
<td>18. I have exercised to make up for the calories in alcohol that I had consumed previously while I was under the effects of alcohol</td>
<td></td>
<td></td>
<td>.83</td>
</tr>
<tr>
<td>19. I have made myself vomit to make up for the calories in alcohol that I had consumed previously while I was under the effects of alcohol</td>
<td>.35*</td>
<td>.49*</td>
<td></td>
</tr>
</tbody>
</table>
A principle component analysis was then conducted with forcing four factors on the CEBRACS items in an attempt to map onto the original four factors of the CEBRACS proposed by Rahal et al. (2012). A promax rotation results in the closest approximation to a simple factor structure, with a kappa of 4. Factor loadings were only included if they were ≥.3. Visual inspection of the scree plot and pattern matrix resulted in a three factor structure. Forcing four factors resulted in explaining 73.34% of variance.

Factor loadings are shown in Table 3. Through the content of the items of each factor, the factors can be described as follows: Factor 1 – Alcohol Effects, Factor 2 – Diet and

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>20. I have eaten less than usual during one or more meals to make up for the calories in alcohol that I had consumed previously while I was under the effects of alcohol</td>
<td></td>
<td></td>
<td>.80</td>
</tr>
<tr>
<td>21. I have skipped an entire day or more of eating to make up for the calories in alcohol that I had consumed previously while I was under the effects of alcohol</td>
<td></td>
<td>.39*</td>
<td>.57*</td>
</tr>
<tr>
<td>5. I have taken laxatives before drinking to make up for the calories in alcohol that I anticipated consuming</td>
<td></td>
<td></td>
<td>.87</td>
</tr>
<tr>
<td>8. I have taken diuretics while I was drinking to make up for the calories in alcohol that I was consuming</td>
<td></td>
<td></td>
<td>.75</td>
</tr>
<tr>
<td>13. I have taken laxatives while I was drinking to make up for the calories in alcohol that I was consuming</td>
<td></td>
<td></td>
<td>.82</td>
</tr>
<tr>
<td>15. I have taken diuretics to make up for the calories in alcohol that I had consumed previously while I was under the effects of alcohol</td>
<td></td>
<td></td>
<td>.84</td>
</tr>
<tr>
<td>17. I have taken laxatives to make up for the calories in alcohol that I had consumed previously while I was under the effects of alcohol</td>
<td></td>
<td></td>
<td>.88</td>
</tr>
</tbody>
</table>

*Item not clearly loaded on a single factor
Exercise, and Factor 3 – Purging, and Factor 4 – Restricting. The content of this analysis more closely resembles the original factor structure of the CEBRACS. It is important to note that by forcing four factors, the fourth factor resulted in an eigenvalue of less than 1 (.907).

Table 3
*Principle Component Analysis of CEBRACS, Promax Rotation, Four Forced Factors*

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I have eaten less than usual during one or more meals before drinking to get DRUNKER</td>
<td>.88</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I have exercised before drinking to make up for the calories in alcohol that I anticipated consuming</td>
<td></td>
<td>.80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I have eaten less than usual during one or more meals before drinking to feel the effects of alcohol FASTER</td>
<td>.93</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. I have not eaten at all while I was drinking because I wanted to feel the effects of the alcohol FASTER</td>
<td>.67</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. I have exercised before drinking to make up for the calories in alcohol that I anticipated consuming</td>
<td></td>
<td>.84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. I have skipped one or more meals before drinking to feel the effects of alcohol FASTER</td>
<td>.87</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. I have eaten less than usual while I was drinking because I wanted to feel the effects of the alcohol FASTER</td>
<td>.89</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. I have eaten less than usual while I was drinking because I wanted to get DRUNKER</td>
<td></td>
<td></td>
<td></td>
<td>.90</td>
</tr>
<tr>
<td>9. I have not eaten at all while I was drinking because I wanted to feel the effects of the alcohol FASTER</td>
<td></td>
<td></td>
<td></td>
<td>.70</td>
</tr>
<tr>
<td>10. I have eaten low-calorie or low-fat foods while I was drinking to make up for the calories in alcohol I was consuming</td>
<td></td>
<td></td>
<td>.56</td>
<td></td>
</tr>
<tr>
<td>11. I drank low calorie beer or alcoholic drinks to get fewer of the calories that are in alcohol</td>
<td></td>
<td></td>
<td></td>
<td>.90</td>
</tr>
</tbody>
</table>
Table 3 continued

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>16. I have eaten low-calorie or low-fat foods during one or more meals to make up for the calories in alcohol that I had consumed previously while I was under the effects of alcohol</td>
<td></td>
<td></td>
<td>.83</td>
<td></td>
</tr>
<tr>
<td>18. I have exercised to make up for the calories in alcohol that I had consumed previously while I was under the effects of alcohol</td>
<td></td>
<td></td>
<td></td>
<td>.90</td>
</tr>
<tr>
<td>5. I have taken laxatives before drinking to make up for the calories in alcohol that I anticipated consuming</td>
<td></td>
<td></td>
<td></td>
<td>.99</td>
</tr>
<tr>
<td>8. I have taken diuretics while I was drinking to make up for the calories in alcohol that I was consuming</td>
<td></td>
<td>.69*</td>
<td>.31*</td>
<td></td>
</tr>
<tr>
<td>17. I have taken laxatives to make up for the calories in alcohol that I had consumed previously while I was under the effects of alcohol</td>
<td></td>
<td></td>
<td></td>
<td>.88</td>
</tr>
<tr>
<td>19. I have made myself vomit to make up for the calories in alcohol that I had consumed previously while I was under the effects of alcohol</td>
<td></td>
<td></td>
<td></td>
<td>.82</td>
</tr>
<tr>
<td>20. I have eaten less than usual during one or more meals to make up for the calories in alcohol that I had consumed previously while I was under the effects of alcohol</td>
<td></td>
<td>.52*</td>
<td>.54*</td>
<td></td>
</tr>
<tr>
<td>21. I have skipped an entire day or more of eating to make up for the calories in alcohol that I had consumed previously while I was under the effects of alcohol</td>
<td></td>
<td></td>
<td></td>
<td>.89</td>
</tr>
</tbody>
</table>

* Item not clearly loaded on a single factor

Results of the principle component analyses indicate that the forced four factor structure, in an attempt to map onto the original factor structure, was the same as the original structure except for three items. Items 4 (skip meal before drinking) and 20 (eaten less after drinking) were not clearly loaded on one factor. Factor 19, while in the
original factor analysis was heavily loaded onto bulimia, in this sample was clearly
loaded on Factor 4 – Restricting. In the three factor structure on this sample, item 19 was
not clearly loaded on a single factor.

**Reliability Analyses**

Reliability estimates of all measures are displayed in Table 4. All reliability
estimates using Cronbach’s alpha fell above the recommended minimum that is
appropriate for research (≥.70). Reliability estimates for the CEBRACS, EAT-26, and
AUDIT are based on only those participants who reported engaging in drunkorexia (n-
103) as analyses with those measures only included those who engaged in drunkorexia.

Table 4

<table>
<thead>
<tr>
<th></th>
<th>n (items)</th>
<th>α</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEBRACS</td>
<td>21</td>
<td>.91</td>
</tr>
<tr>
<td>Alcohol Effects</td>
<td>7</td>
<td>.93</td>
</tr>
<tr>
<td>Bulimia</td>
<td>6</td>
<td>.85</td>
</tr>
<tr>
<td>Diet and Exercise</td>
<td>6</td>
<td>.90</td>
</tr>
<tr>
<td>Restricting</td>
<td>2</td>
<td>.72</td>
</tr>
<tr>
<td>CFNI-45</td>
<td>45</td>
<td>.83</td>
</tr>
<tr>
<td>CMNI-46</td>
<td>46</td>
<td>.85</td>
</tr>
<tr>
<td>AUDIT</td>
<td>10</td>
<td>.76</td>
</tr>
<tr>
<td>EAT-26</td>
<td>26</td>
<td>.86</td>
</tr>
</tbody>
</table>

Overall, the reliability analysis for the CEBRACS total score was excellent with a
Cronbach’s alpha of .91. The CFNI-45 (α=.83) and CMNI-46 (α=.85) displayed similar,
good internal consistency. The EAT-26 demonstrated good internal consistency with this
sample (α=.86). The AUDIT had the lowest internal consistency, which may be explained
by its low number of items, but was still in the acceptable range of ≥.70. All measures
produced strong reliability estimates, and were appropriate for use with this sample.
Descriptive Statistics and Frequencies

Drunkorexia

Descriptive statistics for the CEBRACS total score are presented in Table 5. For the CEBRACS total score, participants averaged 34.22 points ($SD=11.48$), with acceptable criteria of $+/-2$ for skewness and kurtosis (Field, 2013). The CEBRACS does not categorize drunkorexic behavior into categories; it instead provides a continuum of severity of the behavior, with higher scores indicating higher severity, with scores ranging from 21 to 105. Although skewness and kurtosis were within the acceptable range, visual inspection of the histogram for the measure suggested the sample was positively skewed toward lower total scores. In calculating the points-per-item, participants scored higher on the Diet and Exercise subscale than the total score or any other subscale score.

Disordered Eating

Descriptive statistics for the EAT-26 ($n=103$) for those who engaged in drunkorexia are presented in Table 5. Participants’ responses on the EAT-26 were normally distributed, with a skewness of 1.36 and kurtosis of 1.51. However, it should be noted that visual inspection of the histogram revealed a positively skewed distribution, with most participants reporting lower levels of disordered eating.

Alcohol Use

Descriptive statistics for the AUDIT ($n=103$) for those who engaged in drunkorexia are presented in Table 5. Participants’ responses on the AUDIT were normally distributed, with a skewness of .948 and kurtosis of 1.17. Visual inspection of the histogram confirmed normality of responses.
Feminine Gender Role Conformity

Descriptive statistics for the CFNI-45 ($n=307$) for those who engaged in drunkorexia are presented in Table 5. Participants’ responses on the CFNI-45 were normally distributed, with a skewness of .008 and kurtosis of -.135. Visual inspection of the histogram confirmed normality of responses.

Masculine Gender Role Conformity

Descriptive statistics for the CMNI-46 ($n=307$) for those who engaged in drunkorexia are presented in Table 9. Participants’ responses on the CMNI-46 were normally distributed, with a skewness of .075 and kurtosis of .194. Visual inspection of the histogram confirmed normality of responses.

Table 5

<table>
<thead>
<tr>
<th>Scale Description</th>
<th>$n$</th>
<th>$M$</th>
<th>$SD$</th>
<th>$Mdn$</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEBRACS Total Score (21 items)</td>
<td>103</td>
<td>34.22</td>
<td>11.48</td>
<td>32.00</td>
<td>1.36</td>
<td>2.00</td>
</tr>
<tr>
<td>Alcohol Effects (7 items)</td>
<td>103</td>
<td>11.67</td>
<td>5.08</td>
<td>10.00</td>
<td>1.50</td>
<td>2.36</td>
</tr>
<tr>
<td>Bulimia (6 items)</td>
<td>103</td>
<td>6.95</td>
<td>2.25</td>
<td>6.00</td>
<td>3.82</td>
<td>16.08</td>
</tr>
<tr>
<td>Diet and Exercise (6 items)</td>
<td>103</td>
<td>12.41</td>
<td>5.62</td>
<td>11.00</td>
<td>.713</td>
<td>-.235</td>
</tr>
<tr>
<td>Restriction (2 items)</td>
<td>103</td>
<td>3.19</td>
<td>1.57</td>
<td>3.00</td>
<td>1.44</td>
<td>1.46</td>
</tr>
<tr>
<td>CMNI-46</td>
<td>307</td>
<td>56.19</td>
<td>12.81</td>
<td>56.00</td>
<td>.075</td>
<td>.194</td>
</tr>
<tr>
<td>CFNI-45</td>
<td>307</td>
<td>79.84</td>
<td>12.96</td>
<td>81.00</td>
<td>.008</td>
<td>-.135</td>
</tr>
<tr>
<td>EAT-26</td>
<td>103</td>
<td>12.60</td>
<td>11.25</td>
<td>8.00</td>
<td>1.36</td>
<td>1.51</td>
</tr>
<tr>
<td>AUDIT</td>
<td>103</td>
<td>9.12</td>
<td>5.40</td>
<td>8.00</td>
<td>.948</td>
<td>1.17</td>
</tr>
</tbody>
</table>

Correlation Matrix for all Variables

A correlation matrix for participants who engage in drunkorexia is included below in Table 6, separated by gender. When using the Bonferroni corrected alpha level, there were several significant correlations. For women, there was a significant positive
correlation between feminine gender role conformity and disordered eating. There were also significant negative correlations between feminine gender role conformity and masculine gender role conformity for women. For men, there was a significant positive correlation between total level of drunkorexia and alcohol use, and a significant negative correlation between feminine gender role conformity and alcohol use.
Table 6

Correlations by Gender for Total Level of Drunkorexia, Feminine Gender Role Conformity, Masculine Gender Role Conformity, Disordered Eating, and Alcohol Use

<table>
<thead>
<tr>
<th></th>
<th>Drunkorexia</th>
<th>Feminine GRC</th>
<th>Masculine GRC</th>
<th>Disordered Eating</th>
<th>Alcohol Use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Men</td>
<td>Wom</td>
<td>Total</td>
<td>Men</td>
<td>Wom</td>
</tr>
<tr>
<td>Drunk</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-.246</td>
<td>.180</td>
</tr>
<tr>
<td>FGRC</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>.144</td>
<td>-.291*</td>
</tr>
<tr>
<td>MGRC</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>.439</td>
<td>-.209</td>
</tr>
<tr>
<td>Dis Eat</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-.403</td>
<td>.091</td>
</tr>
<tr>
<td>Al Use</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: *p < .01, **p < .001; Men (N=20), Women = Wom (N=82), Total (N=103), Drunk = Drunkorexia, FGRC = Feminine Gender Role Conformity, MGRC = Masculine Gender Role Conformity, Dis Eat = Disordered Eating, Al Use = Alcohol Use; Bold = significant when Bonferroni correction is used
Statistical Analyses and Results

Preparation for the Data Analyses

All statistical analyses were conducted using SPSS 24.0. All hypotheses were conducted at $\alpha=.05$. Missing data analyses were conducted for each measure, and missing data patterns were analyzed. After listwise deletion of participants who did not complete the majority of one or more measures, Little’s MCAR Test was used to determine whether or not the remaining missing data was missing at random. In order to use certain corrections for missing data, missing data must be missing at least at random, and preferably completely at random. Little’s MCAR Test was conducted for all measures. A significance of $>.05$ on the Little’s MCAR Test indicates the data is missing at least at random. The missing data analysis indicated that the CEBRACS, CMNI-46, and AUDIT were missing at least at random. Frequencies of missing data and results of Little’s MCAR Test for each measure are in Table 7. A very small percentage of total missing data occurred for each measure. There are various ways to handle missing data, including imputation. Expectancy Maximization (EM) was used for all measures to impute the missing data. EM generally requires Little’s MCAR Test to result in an alpha of $>.05$. Although not all measures satisfied the condition of missing at random, this could be a function of the low percentage of missing data. As suggested by Schafer (1999), if the percentage of missing data is $>5\%$, there is not a significant amount of data missing that would be of concern. Given the very low amount of missing data, less than 1% on any measure, EM was used for all missing data. This imputation method resulted in the complete dataset with 307 total participants.
<table>
<thead>
<tr>
<th></th>
<th>Total Missing</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$n$</td>
<td>%</td>
<td>Little’s MCAR (p-value)</td>
</tr>
<tr>
<td>CEBRACS</td>
<td>1</td>
<td>.04</td>
<td>.460</td>
</tr>
<tr>
<td>EAT-26</td>
<td>4</td>
<td>.15</td>
<td>.013</td>
</tr>
<tr>
<td>CFNI-45</td>
<td>22</td>
<td>.16</td>
<td>.028</td>
</tr>
<tr>
<td>CMNI-46</td>
<td>39</td>
<td>.28</td>
<td>.251</td>
</tr>
<tr>
<td>AUDIT</td>
<td>1</td>
<td>.47</td>
<td>.252</td>
</tr>
</tbody>
</table>

**Research Question Q1**

Q1 After controlling for gender, what relationship exists between gender role conformity, both masculine and feminine, and level of drunkorexia?

**Hypothesis H1**

H1 Masculine gender role conformity will have a significant, positive correlation with level of drunkorexia.

A Pearson’s product moment correlation was used to determine the relationship between masculine gender role conformity and the level of drunkorexia ($n=103$). An alpha level of .05 was used to determine significance. Visual inspection of a scatterplot for the data revealed a non-linear monotonic relationship. For this reason, a Pearson’s correlation and a Spearman’s correlation were both ran. There was no statistically significant correlation between masculine gender role conformity and level of drunkorexia for either males ($r(18)=-.047, p=.845$) or females ($r(80)=-.050, p=.657$) when running a Pearson’s correlation (Table 8). The Spearman’s correlation was also nonsignificant for masculine gender role conformity and level of drunkorexia.

**Hypothesis H2**

H2 Feminine gender role conformity will have a significant, positive correlation with level of drunkorexia.
A Pearson’s product moment correlation was used to determine the relationship between feminine gender role conformity and the level of drunkorexia ($n=97$). An alpha level of .05 was used to determine significance. Visual inspection of a scatterplot for the data revealed a non-linear monotonic relationship. For this reason, a Pearson’s correlation and a Spearman’s correlation were both ran. There was no statistically significant correlation between feminine gender role conformity and level of drunkorexia for either males ($r(18)= -.246, p=.296$) or females ($r(80)= .180, p= .107$) when running a Pearson’s correlation (Table 8). The Spearman’s correlation was also nonsignificant for feminine gender role conformity and level of drunkorexia.

Table 8

<table>
<thead>
<tr>
<th>Total Level of Drunkorexia</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Masculine GRC</td>
<td>-.047 ($p=.845$)</td>
<td>-.050 ($p=.657$)</td>
</tr>
<tr>
<td>Feminine GRC</td>
<td>-.246 ($p=.296$)</td>
<td>.180 ($p=.107$)</td>
</tr>
</tbody>
</table>

*Note: GRC = Gender Role Conformity*

**Research Question Q2**

Q2 After controlling for gender, how do alcohol use, disordered eating, and gender role conformity (feminine and masculine) explain the level of drunkorexia?

**Hypothesis H3**

H3 Masculine gender role conformity will explain a significant and unique amount of variance in the level of drunkorexia.

A multiple linear regression was used to examine whether or not masculine gender role conformity explained a significant amount of variance in the level of drunkorexia. Level of drunkorexia was the criterion variable, masculine gender role conformity was one of the explanatory variables, and gender was the control variable. An
alpha level of .05 was used to determine statistical significance. Through visual
inspection of the plots of studentized and unstandardized residuals, as well as all
explanatory variables with the criterion variable, the assumption of linearity was met. The
explanatory variables did not have homoscedasticity; however, the CEBRACS total score
that was used in the analysis did not meet the assumption of homoscedasticity. Cohen,
Cohen, West, and Aiken (2003) suggested transformations of variables to help meet this
assumption.

Transforming the CEBRACS total score by taking the inverse, the assumption
was then met. The inverse score of CEBRACS was then used for the multiple linear
regression analysis. The assumption of normality was met, as assessed through visual
inspection of a Q-Q plot. There was no evidence of multicollinearity, as assessed by
tolerance values greater than 0.1 and no correlations greater than 0.7. There were no
studentized deleted residuals greater than ±3 standard deviations, no leverage values
greater than 0.2, and values for Cook's distance above 1. The multiple regression model
statistically significantly predicted level of drunkorexia, $F(5, 97) = 9.532, p < .001$, adj. $R^2$
= .295. After controlling for gender, masculine gender role conformity was not a
significant predictor of level of drunkorexia within the model, $p = .587$ (Table 9).

**Hypothesis H4**

H4 Feminine gender role conformity will explain a significant and unique
amount of variance in the level of drunkorexia.

A multiple linear regression was used to examine whether or not feminine gender
role conformity explained a significant amount of variance in the level of drunkorexia.
Level of drunkorexia was the criterion variable, feminine gender role conformity was one
of the explanatory variables, and gender was the control variable. An alpha level of .05
was used to determine statistical significance. The inverse score of CEBRACS was used in the analysis, per homoscedasticity assumption violations previously mentioned. All other assumptions were met, as outlined in Hypothesis 3. The multiple regression model statistically significantly predicted level of drunkorexia, $F(5, 97) = 9.532, p<.001$, adj. $R^2 = .295$. After controlling for gender, feminine gender role conformity was not a significant predictor of level of drunkorexia within the model, $p = .592$ (Table 9).

**Hypothesis H5**

H5 Alcohol use will explain a significant and unique amount of variance in the level of drunkorexia.

A multiple linear regression was used to examine whether or not alcohol use explained a significant amount of variance in the level of drunkorexia. Level of drunkorexia was the criterion variable, alcohol use was one of the explanatory variables, and gender was the control variable. An alpha level of .05 was used to determine statistical significance. All other assumptions were met, as outlined in Hypothesis 3. The multiple regression model statistically significantly predicted level of drunkorexia, $F(5, 97) = 9.532, p<.001$, adj. $R^2 = .295$. After controlling for gender, alcohol use was a significant predictor of level of drunkorexia within the model, $p <.001$ (Table 9).

**Hypothesis H6**

H6 Disordered eating will explain a significant and unique amount of variance in the level of drunkorexia.

A multiple linear regression was used to examine whether or not level of disordered eating explained a significant amount of variance in the level of drunkorexia. Level of drunkorexia was the criterion variable, level of disordered eating was one of the explanatory variables, and gender was the control variable. All other assumptions were
met, as outlined in Hypothesis 3. An alpha level of .05 was used to determine statistical significance. The multiple regression model statistically significantly predicted level of drunkorexia, $F(5, 97) = 9.532, p<.001$, adj. $R^2 = .295$. After controlling for gender, disordered eating was a significant predictor of level of drunkorexia within the model at the .05 level, $p < .05$ (Table 9). After using the Bonferroni correction, disordered eating did not remain a significant variable in the model.

Table 9
Summary of Multiple Regression Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE_B</th>
<th>β</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>-.004</td>
<td>.002</td>
<td>-.201</td>
<td>-2.121</td>
<td>.036</td>
</tr>
<tr>
<td>Alcohol use</td>
<td>-.001</td>
<td>.000</td>
<td>-.489</td>
<td>-5.732</td>
<td>.000**</td>
</tr>
<tr>
<td>Dis Eating</td>
<td>.000</td>
<td>.000</td>
<td>-.214</td>
<td>-2.379</td>
<td>.019*</td>
</tr>
<tr>
<td>Masculine GRC</td>
<td>3.388E-5</td>
<td>.000</td>
<td>.050</td>
<td>.545</td>
<td>.587</td>
</tr>
<tr>
<td>Feminine GRC</td>
<td>-3.502E-5</td>
<td>.000</td>
<td>-.053</td>
<td>-.537</td>
<td>.592</td>
</tr>
</tbody>
</table>

*Note: N = 103. GRC = Gender Role Conformity; Dis Eating = Disordered Eating; *p < .05; **p < .001; Bold = significant when Bonferroni correction is used

**Research Question Q3**

Q3 After controlling for gender, which variable (alcohol use, disordered eating, feminine gender role conformity, masculine gender role conformity) accounts for most variability in level of drunkorexia?

**Hypothesis H7**

H7 Masculine gender role conformity will explain the most variability in the level of drunkorexia.

A hierarchical multiple linear regression was used to examine which explanatory variable accounts for the most variability in the level of drunkorexia. Level of drunkorexia was the criterion variable, masculine gender role conformity was one of the explanatory variables, and gender was the control variable. In this analysis, the following entry format was used: gender (step 1), feminine gender role conformity, disordered eating, and alcohol use (step 2), and masculine gender role conformity (step 3). Step 3
was repeated by substituting each explanatory variable to assess for greatest change in $R^2$.

The addition of masculine gender role conformity (Model 3) did not lead to a significant increase in $R^2$ (.002), $F(1, 97) = .297, p = .587$ (Table 9). After repeating step 3 by substituting in the significant variables in the overall model from the second research question (alcohol use and disordered eating), alcohol use accounted for the most unique variance explained ($F(1, 97) = 32.856, p < .001$), with an $R^2$ change of .227, and remained significant after the Bonferroni correction. See Tables 10-12.

Table 10

*Hierarchical Regression Results for Model Explaining Total Level of Drunkorexia*

<table>
<thead>
<tr>
<th>Explanatory Variable</th>
<th>$B$</th>
<th>SE $B$</th>
<th>$\beta$</th>
<th>$t$ value</th>
<th>$p$ value</th>
<th>Adj $R^2$</th>
<th>$F$ change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>-.004</td>
<td>.002</td>
<td>-.209</td>
<td>-2.14</td>
<td>.035*</td>
<td>.034</td>
<td>4.593</td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.300</td>
<td>12.789</td>
</tr>
<tr>
<td>Feminine GRC</td>
<td>-4.24E-5</td>
<td>.000</td>
<td>-.064</td>
<td>-.667</td>
<td>.506</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dis Eating</td>
<td>.000</td>
<td>.000</td>
<td>-.215</td>
<td>-2.39</td>
<td>.018*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol Use</td>
<td>-.001</td>
<td>.000</td>
<td>-.488</td>
<td>-5.74</td>
<td>.545</td>
<td>.000**</td>
<td>.587</td>
</tr>
<tr>
<td>Step 3</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>.295</td>
<td>.297</td>
</tr>
<tr>
<td>Masculine GRC</td>
<td>3.388E-5</td>
<td>.000</td>
<td>.050</td>
<td>.545</td>
<td>.587</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note:* N = 103. *p < .05; **p < .001; Bold = significant when Bonferroni correction is used; GRC = Gender Role Conformity; Dis Eating = Disordered Eating

Table 11

*Hierarchical Regression Results for Model Explaining Total Level of Drunkorexia*

<table>
<thead>
<tr>
<th>Explanatory Variable</th>
<th>$B$</th>
<th>SE $B$</th>
<th>$\beta$</th>
<th>$t$ value</th>
<th>$p$ value</th>
<th>Adj $R^2$</th>
<th>$F$ change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.034</td>
<td>4.593</td>
</tr>
<tr>
<td>Gender</td>
<td>-.004</td>
<td>.002</td>
<td>-.209</td>
<td>-2.14</td>
<td>.035*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.261</td>
<td>11.364</td>
</tr>
<tr>
<td>Feminine GRC</td>
<td>-8.12E-5</td>
<td>.000</td>
<td>-.123</td>
<td>-1.27</td>
<td>.206</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masculine GRC</td>
<td>3.682E-5</td>
<td>.000</td>
<td>.054</td>
<td>.579</td>
<td>.564</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol Use</td>
<td>-.001</td>
<td>.000</td>
<td>-.504</td>
<td>-5.78</td>
<td>.000**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.295</td>
<td>5.658</td>
</tr>
<tr>
<td>Dis Eating</td>
<td>.000</td>
<td>.000</td>
<td>-.214</td>
<td>-2.37</td>
<td>.019*</td>
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<td></td>
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</tbody>
</table>

*Note:* N = 103. *p < .05; **p < .001; Bold = significant when Bonferroni correction is used; GRC = Gender Role Conformity; Dis Eating = Disordered Eating
Table 12
Hierarchical Regression Results for Model Explaining Total Level of Drunkorexia

<table>
<thead>
<tr>
<th>Explanatory Variable</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>t value</th>
<th>p value</th>
<th>Adj R²</th>
<th>F change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Gender</td>
<td>-.004</td>
<td>.002</td>
<td>-.209</td>
<td>-.214</td>
<td>.035*</td>
<td>4.593</td>
</tr>
<tr>
<td>Step 2</td>
<td>Feminine GRC</td>
<td>1.677E-5</td>
<td>.000</td>
<td>.025</td>
<td>.226</td>
<td>.822</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Masculine GRC</td>
<td>2.519E-5</td>
<td>.000</td>
<td>.037</td>
<td>.352</td>
<td>.725</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dis Eating</td>
<td>.000</td>
<td>.000</td>
<td>-.251</td>
<td>-.243</td>
<td>.017*</td>
<td></td>
</tr>
<tr>
<td>Step 3</td>
<td>Alcohol Use</td>
<td>-.001</td>
<td>.000</td>
<td>-.489</td>
<td>-5.73</td>
<td>.000**</td>
<td></td>
</tr>
</tbody>
</table>

Note: N = 103. *p < .05; **p < .001; Bold = significant when Bonferroni correction is used; GRC = Gender Role Conformity; Dis Eating = Disordered Eating

Research Question Q4

Q4 After controlling for gender, is there a difference in level of gender role conformity (feminine and masculine) between those who engage in drunkorexia and those who do not?

Hypothesis H8

H8 A significant difference exists in the level of feminine gender role conformity between those who engage in drunkorexia and those who do not.

An analysis of covariance (ANCOVA) was used to examine group differences in level of feminine gender role conformity based on drunkorexia status. Drunkorexia status (engage in behavior or not) was the explanatory variable, level of feminine gender role conformity was the criterion variable, and gender was the covariate. An alpha level of .05 was used to determine statistical significance. Standardized residuals were normally distributed, as assessed by Shapiro-Wilk's test (p > .05). There were no outliers in the data, as assessed by no cases with standardized residuals greater than ±3 standard deviations. There was not homogeneity of regression slopes as the interaction term was statistically significant, $F(1, 304) = 8.78, p = .003$. Keppel (1991) suggests that when an ANCOVA is being ran with non-experimental data, homogeneity of the regression slopes
is less important, and an ANCOVA can still be used with valid results. After controlling for gender, there was not a statistically significant difference in feminine gender role conformity between those who engage in drunkorexia and those who do not, $F(1, 304) = 2.606, p = .107$, partial $\eta^2 = .009$. See Table 13.

Given the violation of the assumption of homogeneity of regression slopes, a two-way ANOVA was ran in addition to the ANCOVA. Although not part of the original research questions and data analysis plan, a two-way ANOVA was ran to provide more information on the potential interaction effect of drunkorexia status and gender.

Standardized residuals were normally distributed, as assessed by Shapiro-Wilk's test ($p > .05$). There was not homogeneity of variance as assessed by Levene’s Test ($p = .982$). Jaccard (1998) suggests that this assumption is robust, and if the ratio of variances between the smallest group and largest group is below 3, than the analysis is still appropriate to run. The variance ratios were all less than 3, so the analysis was still performed. Visual inspection of the interaction plots for gender and drunkorexia status appeared to be significant; however, there was not a statistically significant interaction between gender and drunkorexia status on feminine gender role conformity, $F(1, 304) = 2.965, p = .086$, partial $\eta^2 = .010$.

Table 13
Adjusted and Unadjusted Means and Variability for Drunkorexia Status with the CFNI-45

<table>
<thead>
<tr>
<th>Groups</th>
<th>$N$</th>
<th>Adjusted $M$</th>
<th>Adjusted $SD$</th>
<th>Unadjusted $M$</th>
<th>Unadjusted $SD$</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES Drunkorexia</td>
<td>103</td>
<td>81.49</td>
<td>13.70</td>
<td>81.48</td>
<td>1.25</td>
</tr>
<tr>
<td>NO Drunkorexia</td>
<td>204</td>
<td>79.00</td>
<td>12.54</td>
<td>79.01</td>
<td>.887</td>
</tr>
</tbody>
</table>
Hypothesis H9

H9  A significant difference exists in the level of masculine gender role conformity between those who engage in drunkorexia and those who do not.

An analysis of covariance (ANCOVA) was used to examine group differences in level of masculine gender role conformity based on drunkorexia status. Drunkorexia status (engage in behavior or not) was the explanatory variable, level of masculine gender role conformity was the criterion variable, and gender was the covariate. An alpha level of .05 was used to determine statistical significance. Standardized residuals for the interventions and for the overall model were normally distributed, as assessed by Shapiro-Wilk's test ($p > .05$). There was homogeneity of regression slopes as the interaction term was not statistically significant, $F(1, 304) = 1.416, p = .235$. There were no outliers in the data, as assessed by no cases with standardized residuals greater than ±3 standard deviations. After controlling for gender, there was not a statistically significant difference in masculine gender role conformity between those who engage in drunkorexia and those who do not, $F(1, 304) = 3.432, p = .065$, partial $\eta^2 = .011$. See Table 14.

Table 14
Adjusted and Unadjusted Means and Variability for Drunkorexia Status with the CMNI-45

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>Adjusted M</th>
<th>SD</th>
<th>Unadjusted M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES Drunkorexia</td>
<td>103</td>
<td>58.00</td>
<td>13.24</td>
<td>58.01</td>
<td>1.21</td>
</tr>
<tr>
<td>NO Drunkorexia</td>
<td>204</td>
<td>55.27</td>
<td>12.53</td>
<td>55.27</td>
<td>.856</td>
</tr>
</tbody>
</table>

Post Hoc Analyses

Given none of the research questions and hypotheses bore significant results for this sample, several post hoc analyses were conducted on the data. In line with suggestions by Choquette (2017), the CEBRACS total score is not the best psychometric
to use for measurement of drunkorexia. Instead, Choquette (2017) suggests using subscale scores for measurement of various components of drunkorexia, rather than an entire total score. Post hoc analyses were ran in the same order and method as the above research questions and hypotheses, using the subscale scores on the CEBRACS rather than the total score. Again, only participants who reported engaging in drunkorexia \((n=103)\) were included. Methods and results are explained below.

**Pearson’s Correlations**

A Pearson’s product correlation was ran for the both feminine (CFNI-45) and masculine (CMNI-46) gender role conformity, and each subscale of the drunkorexia measure (CEBRACS; see Table 15). An alpha level of .05 was used to determine significance. There was a statistically significant correlation between feminine gender role conformity (CFNI-45) and the Diet and Exercise subscale of the CEBRACS for females \(r(80)=.289, p< .01\) and all drunkorexia engaging participants \(r(101)=.298, p< .01\). There was also a statistically significant negative correlation between masculine gender role conformity and the Diet and Exercise subscale for all participants \(r(101)=-.213, p< .05\), which remained significant when the Bonferroni correction was used.

**Table 15**

*Correlation Matrix with CEBRACS subscales, by gender*

<table>
<thead>
<tr>
<th></th>
<th>CFNI-45</th>
<th>CMNI-46</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
<td>All</td>
</tr>
<tr>
<td>AE</td>
<td>-.296</td>
<td>.004</td>
<td>-.021</td>
</tr>
<tr>
<td>BUL</td>
<td>-.177</td>
<td>.053</td>
<td>-.080</td>
</tr>
<tr>
<td>D&amp;E</td>
<td>-.188</td>
<td><strong>.289</strong></td>
<td><strong>.298</strong></td>
</tr>
<tr>
<td>RES</td>
<td>-.219</td>
<td>.148</td>
<td>.179</td>
</tr>
</tbody>
</table>

AE=Alcohol Effects, BUL=Bulimia, D&E=Diet and Exercise, RES=Restriction

*p .05, **p < .01; Bold = significant when Bonferroni correction is used
Regressions

Given the statistical significance found in the above correlations for the Diet and Exercise subscale of the drunkorexia measure (CEBRACS), a post hoc multiple linear regression was again ran with Diet and Exercise as the criterion variable rather than the total score of the CEBRACS. Gender was still used as a control variable in the analysis. Disordered eating (EAT-26), alcohol use (AUDIT), and both feminine (CFNI-45) and masculine (CMNI-46) gender role conformity were entered as explanatory variables. An alpha level of .05 was used to determine significance. The multiple regression model statistically significantly predicted level of drunkorexia, $F(5, 97) = 6.737, p<.001$, adj. $R^2 = .219$. Disordered eating and alcohol use were the only significant explanatory variables in the model.

Given the correlation of feminine gender role conformity was not significant for males in the above post hoc correlation analysis, the multiple regression analysis was re-ran using only females, and with taking out masculine gender role conformity (CMNI-46). The CMNI-46 demonstrated no relational nor predictive power in previous analyses, and was therefore taken out of the analysis. A multiple linear regression was ran with Diet and Exercise as the criterion variable, disordered eating, alcohol use, and feminine gender conformity as explanatory variables. Only females who reported engaging in drunkorexia were included in the analysis. This multiple regression model statistically significantly predicted scores on the Diet and Exercise subscale of the drunkorexia measure (CEBRACS), $F(2, 81) = 7.565, p<.001$, adj. $R^2 = .196$. In this regression model, including only females who engaged in drunkorexia, feminine gender role conformity (CFNI-45, $p=.041$), disordered eating (EAT-26, $p=.015$), and alcohol use (AUDIT,
were significant predictors in the model when using a .05 significance level. When using the Bonferroni corrected level, only the AUDIT remained a significant predictor of the Diet and Exercise subscale score in this analysis. Like the original analyses, alcohol use accounted for the greatest change in $R^2$ in the model (.066), although it was much more minimal.

**Summary**

This chapter first presented results of the factor analysis of the measure of drunkorexia (CEBRACS), followed by the reliability analyses for all measures. Descriptive statistics were also reported. Finally, all each research questions and hypotheses were tested and results presented. All measures demonstrated acceptable to excellent reliability for this sample. All subscales on the CEBRACS also demonstrated strong reliability. The measures for feminine gender role conformity (CFNI-45), masculine gender role conformity (CMNI-46), disordered eating (EAT-26), and alcohol use (AUDIT) were all normally distributed. The CEBRACS total score was positively skewed, and was transformed to an inverse for the multiple linear regression. Hypotheses H1 and H2 were tested using bivariate correlations. Given the lack of linearity between the CFNI-45/CMNI-46 and the CEBRACS, both Pearson’s product moment and Spearman’s correlations were ran. H1 and H2 were not supported, with no significant relationship between the measures for either males or females.

Hypotheses H3, H4, H5, and H6 were tested using a multiple regression analysis, controlled for gender. Hypotheses H3 and H4 were not supported, with a $p$-value greater than .05, indicating neither feminine gender role conformity (CFNI-45) nor masculine gender role conformity (CMNI-46) were significant predictors of total level of
drunkorexia. Hypotheses H5 and H6 were supported, with p-values less than .05, indicating disordered eating (EAT-26) and alcohol use (AUDIT) were significant predictors of total level of drunkorexia (CEBRACS). Disordered eating did not remain a significant variable after using the Bonferroni correction. A hierarchical multiple regression was ran to test hypothesis H7. Hypothesis H7 was not supported, with a p-value less than .05. This analysis suggested alcohol use was the strongest predictor of total level of drunkorexia. Hypotheses H8 was tested using an ANCOVA and two-way ANOVA, which did not support the hypothesis with a p-value greater than .05, indicating there was not a significant difference in feminine gender role conformity (CFNI-45) between those who engaged in drunkorexia and those who did not. Finally, Hypothesis H9 was tested using an ANCOVA. Hypothesis H9 was not supported with a p-value greater than .05, indicating there was not a significant difference in masculine gender role conformity (CMNI-46) between those who engaged in drunkorexia and those who did not.

Post hoc analyses indicated a small significant relationship between feminine gender role conformity (CFNI-45) and the Diet and Exercise subscale of the drunkorexia measure (CEBRACS). When including only females and not including masculine gender role conformity (CMNI-46) in the model, feminine gender role conformity became a significant predictor of the Diet and Exercise subscale of the drunkorexia measure; however, it did not account for a meaningful amount of variance. Chapter V discusses the findings as well as addresses the implications of the study. Limitations and future directions are also discussed.
CHAPTER V
DISCUSSION AND IMPLICATIONS

Drunkorexia, a behavior involving binge drinking and compensatory eating or dieting behaviors, has been found in approximately 15-39% of college-aged individuals (Burke et al., 2010; Giles et al., 2009; Roosen & Mills, 2015). Its prevalence, along with increased risk of negative consequences (injury, blacking out, assault, general health problems), make drunkorexia a particularly risky behavior (Giles et al., 2009). In an attempt to better understand this behavior, researchers have suggested gender role conformity as an underlying factor that informs the development of drunkorexia (Peralta & Barr, 2017). Gender role conformity is defined as “adhering to societal rules and standards about how to be feminine/masculine and is demonstrated in an individuals’ behaviors, feelings, and thoughts” (Mahalik et al., 2003; Mahalik et al., 2005). There is a need for counseling psychologists to further explore different factors, such as gender role conformity, that may help inform a further understanding of this behavior. In having a better understanding of what contributes to the development of drunkorexia, counseling psychologists could be better able to accurately diagnose and treat those who present with this behavior.
The current study examined the relationship and predictive power of gender role conformity, both feminine and masculine, alcohol use, and disordered eating on the level of drunkorexia. This study also examined the differences in gender role conformity amongst those who engage in drunkorexia and those who do not. Overall, the results demonstrated that neither feminine nor masculine gender role conformity had a significant relationship with the total level of drunkorexia, when including both males and females. When looking at subscale scores rather than the total score of drunkorexia, feminine gender role conformity was significantly related to the Diet and Exercise subscale for females, although the correlation was small. The results also did not indicate that either gender role conformity was a significant predictor of the total level of drunkorexia. Feminine gender role conformity was a significant predictor for the Diet and Exercise subscale score for females, but did not account for a meaningful amount of variance. Alcohol use and disordered eating were both significant predictors of total level of drunkorexia and the Diet and Exercise subscale score; disordered eating was no longer a significant variable when using the Bonferroni correction alpha of .012. Alcohol use accounted for the most unique variance, but the amount was minimal. Finally, the results did not indicate a significant difference in gender role conformity between those who engage in drunkorexia and those who do not.

Prior research has demonstrated between 15-39% of college-aged participants engage in drunkorexia. In this study, approximately 1/3 (33.55%) of participants reported engaging in the behavior. An important consideration is the definition of drunkorexia in this study and others. In this study, engaging in drunkorexia was defined as engaging in at least one drunkorexic behavior (as measured by the CEBRACS) at least one time in the
past three months. Other researchers, such as Peralta and Barr (2017) utilized this same definition due to using the CEBRACS scale. Before the CEBRACS and other measures of drunkorexia were created, some researchers used simply a “yes or no” question about restriction of calories before drinking to define drunkorexia. The lack of clear definition of the behavior accounts for the large differences in rates of engagement in drunkorexia, and is a consideration that researchers are currently tackling (e.g., Choquette, Rancort, et al., 2018). That being said, this study’s high level of engagement captures the commonality of drunkorexic behaviors, and the importance for counseling psychologists to be aware of its impact. In addition, if those who accidentally took the CEBRACS measure and scored positive on at least one item are included, upwards of 53% of participants in this study reported engaging in at least one drunkorexic behavior in the last three months.

An important consideration with the data is to consider the sample and demographics of the sample. Most notably, compared to the major study that informed the development of this study’s research questions (Peralta & Barr, 2017), this sample was more homogeneous in its demographics. The current study sample was 76.5% female. Peralta and Barr’s (2017) study, the only study at the time examining drunkorexia and gender role conformity, had a slightly more diverse sample in consideration of gender (60% female, 40% male), and a similar distribution of race/ethnicity. Given the behavior has been shown to involve gender differences (e.g., Eisenberg & Fitz, 2014), a more diverse sample in terms of gender may have yielded different results. This study helped fill the gap in research presented by Peralta and Barr (2017) by analyzing both masculine and feminine gender role conformity separately, rather than utilizing a measure
of androgyny. In this sense, participants were able to score low or high on both masculine and feminine gender role conformity, rather than being limited by a binary view found in measures of androgyny. This study also aimed to examine the power of various previously established factors of drunkorexia, such as disordered eating and alcohol use, in addition to gender role conformity. While non-experimental social research can never capture a phenomenon perfectly, the addition of all relevant factors into the analyses provided additional information beyond that of Peralta and Barr’s (2017) study.

It is possible the low number of males did not provide enough power for analyses considering gender as a control variable. In addition, visual inspection of histograms demonstrated overall lower-trending scores on the CEBRACS and EAT-26. While skewness and kurtosis were within acceptable ranges, responses were overall on the lower ends of each of these measures. Although none of these measures have specific cut-offs or categories to guide what is considered a “low” score, the lower trending scores on these measures, which are the main measures of interest, may have impacted the power behind the regression analyses.

**Discussion of the Results**

Research Question Q1 asked: After controlling for gender, what relationship exists between gender role conformity, both masculine and feminine, and level of drunkorexia? Gender was a control variable, with each of the correlation analyses ran separately for males and females, given past research indicating differences in how males and females engage in drunkorexia (e.g., Eisenberg & Fitz, 2014; Zwetzig & Martinez, 2016). A total of 102 participants were eligible to be included in the analysis (20 male, 82 female). Hypotheses H1 and H2 were tested to answer Research Question Q1. Hypothesis
H1 stated: Masculine gender role conformity will have a significant, positive correlation with level of drunkorexia. Hypothesis H2 stated: Feminine gender role conformity will have a significant, positive correlation with level of drunkorexia.

Results for Research Question Q1 indicated that, after controlling for gender, neither feminine gender role conformity nor masculine gender role conformity had a significant relationship with level of drunkorexia. This result is contrary to results found by Peralta and Barr (2017), in which masculine gender role conformity, measured in the same way, was related to level of drunkorexia. It is possible that the relatively heavily female sample, with only 20 males engaging in drunkorexia, limits the possibility of finding a relationship between masculine gender role conformity and level of drunkorexia due to low power. Another possible explanation, which is carried throughout the discussion of the results and a limitation in this study, is the use of the total score of the CEBRACS to measure drunkorexia. Limitations of this measure, and using the total score, are explained later in this chapter.

The lack of relationship between feminine gender role conformity may be explained by limitations in measuring drunkorexia and using the total score. Given there was a small yet significant relationship between female gender role conformity and the Diet and Exercise subscale, and feminine gender role conformity was a predictor of the Diet and Exercise subscale for females, although very small, the use of the total CEBRACS score likely limits original analyses. The use of the subscale scores rather than the total score is supported by Choquette’s (2017) psychometric analysis of the measure. To this author’s knowledge, this is the first study examining the relationship specifically between feminine gender role conformity and drunkorexia, rather than using
a measure of androgyny. Measures of androgyny, while useful and commonly used in research, are limited in that the range of scores are from high masculine to high feminine along the same axis, with androgyny being in the middle, indicating neither strong feminine nor masculine traits. In line with Peralta and Barr’s (2017) suggestion, this study instead used a separate measure for both feminine gender role conformity and masculine gender role conformity, with the potential for scoring high or low on both feminine and masculine traits. This approach is in line with modern research and viewpoints on sex and gender, with gender expression and identity varying outside of traditional binary views. With the relatively homogeneous diversity of the sample, particularly in regard to ethnic and racial diversity, may also be a factor to consider. It is possible that Caucasian women respond differently than would females from other racial and ethnic backgrounds. Some researchers have demonstrated a connection between race and perceived gender stereotypes (Galinsky, Hall, & Cuddy, 2013). Wilson and Leaper (2016) found some racial groups, specifically Latinx and Asian/Asian Americans, have stronger pressure to conform to gender norms, and an intersection between ethnic-racial identity and gender identity. Future research may consider investigating the relationship more closely with a more diverse sample of both gender and race, and continue to explore the intersection of demographic characteristics and drunkorexia.

Research Question Q2 asked: After controlling for gender, how do alcohol use, disordered eating, and gender role conformity (feminine and masculine) explain the level of drunkorexia? One hundred and three participants were eligible to be included in this analysis (20 male, 82 female, 1 other gender). Hypothesis H3 stated: Masculine gender role conformity will explain a significant and unique amount of variance in the level of
drunkorexia. Hypothesis H4 stated: Feminine gender role conformity will explain a significant and unique amount of variance in the level of drunkorexia. Hypothesis H5 stated: Alcohol use will explain a significant and unique amount of variance in the level of drunkorexia. Hypothesis H6 stated: Disordered eating will explain a significant and unique amount of variance in the level of drunkorexia. Results for Research Question Q2 indicated significant overall model fit with feminine gender role conformity, masculine gender role conformity, alcohol use, and disordered eating as explanatory variables. Gender role conformity (both feminine and masculine) were non-significant variables in the model. Alcohol use and disordered eating were both significant variables in the model. Gender by itself was also a statistically significant predictor of level of drunkorexia.

Alcohol use and disordered eating have been found to be significant predictors of drunkorexia in several studies (Burke et al., 2010; Giles et al., 2009; Hunt & Forbush, 2016; Peralta & Barr, 2017; Ward et al., 2015). Given the behavior of drunkorexia consists of both alcohol use and disordered eating or dieting as part of its operational definition, it is no surprise that both were found to be significant predictors of drunkorexia. Peralta and Barr (2017) as the first researchers to publish specifically about gender role conformity and drunkorexia, found masculine gender role conformity to be a significant predictor of drunkorexia. Given this study’s homogeneous sample in terms of gender, and a lack of general relationship found between masculine gender role conformity and drunkorexia, this result is not surprising. As previously mentioned, lower overall scores on the measures of drunkorexia and both masculine and feminine gender role conformity may also be implicated. The general lower-trending scores on these
measures may have limited the power behind the analyses. In following the theory
guiding this study, Rotter’s Social Learning Theory (1954), reinforcement value plays a
large role in whether or not a behavior is likely to happen. Given the positive
expectancies of alcohol use and eating and dieting behaviors involved in drunkorexia
(e.g., getting more drunk, having fun, not gaining weight), the significance of alcohol use
and disordered eating fit well within this model of reinforcement value. When
considering significance with the Bonferroni corrected significance level of $\alpha=.012$,
disordered eating remained significant across all analyses, including post hoc analyses.

Research Question Q3 asked: After controlling for gender, which variable
(alcohol use, disordered eating, feminine gender role conformity, masculine gender role
conformity) accounts for most variability in the level of drunkorexia? Among the sample,
103 participants were eligible to be included in the analysis. Hypothesis H7 stated:
Masculine gender role conformity will explain the most variability in the level of
drunkorexia. Given the previous predictive power of masculine gender role conformity as
found by Peralta and Barr (2017), masculine gender role conformity was predicted to
account for the most variance in level of drunkorexia. Hypothesis H7 was not supported
by the results of the hierarchical multiple regression. Masculine gender role conformity
was not a significant predictor in the overall model, as noted for Research Question Q2;
therefore, it was not found to explain a significant amount of variance in level of
drunkorexia. Analyses of all four explanatory variables in the model revealed alcohol use
to account for the most unique variance in total level of drunkorexia with the largest $R^2$
change of .227 (22.7% variance explained). Like previous discussion points, it is possible
that the relatively low sample of males who engage in drunkorexia, it is possible that
there was not enough predictive power to replicate Peralta and Barr’s (2017) results.

Alcohol use was ($R^2$ change = .066) also by far the strongest predictor of the Diet and Exercise subscale score, with the next highest change in $R^2$ coming from disordered eating ($R^2$ change = .039). Although it was the strongest predictor, the small $R^2$ change of .066 is minimal, and thus caution is needed in making interpretations.

The final research question, Q4, asked: After controlling for gender, is there a difference in level of gender role conformity (feminine and masculine) between those who engage in drunkorexia and those who do not? All participants ($n = 307$) were eligible for inclusion in this analysis. Hypothesis H8 and H9 were tested to answer this research question. Hypothesis H8 stated: A significant difference exists in the level of feminine gender role conformity between those who engage in drunkorexia and those who do not. Hypothesis H9 stated: A significant difference exists in the level of masculine gender role conformity between those who engage in drunkorexia and those who do not.

Results for Research Question Q4 indicated that there was not a difference in level of gender role conformity (feminine or masculine) between those who engage in drunkorexia and those who do not. In this sample, between those who engage in drunkorexia and those who do not, there is not a difference in level of either gender role conformity. Due to an assumption violation when running the analysis with feminine gender role conformity, a two-way ANOVA analysis was also ran to determine any interaction with gender and drunkorexia status, which was also non-significant. This lack of significance with masculine gender role conformity may again be explained by the homogeneous sample in terms of gender. In addition, the measures for gender role
conformity, both masculine and feminine, trended toward lower scores. This homogeneity in the scores of masculine and feminine gender role conformity may explain the lack of significance for research question Q4.

Results from the post hoc analyses indicated no support for masculine gender role conformity in relation to drunkorexia and any subscales on the CEBRACS. Feminine gender role conformity was positively and significantly related to the Diet and Exercise subscale of the CEBRACS, particularly for females. Given the lack of support for masculine gender role conformity, and the small number of male participants, the post hoc multiple linear regression was ran with only females and feminine gender role conformity. This post hoc multiple linear regression resulted in feminine gender role conformity being a significant predictor of Diet and Exercise on the CEBRACS measure; however, the amount of variance it accounted for was quite small. The statistical significance, although small, could indicate a connection between feminine gender role conformity and drunkorexia. This study addressed the gap in the literature by examining feminine gender role conformity and masculine gender role conformity separately, rather than measuring femininity as a lack of masculine traits or beliefs. To this author’s knowledge and through extensive searches of the existing literature, this is the first study to demonstrate a significant relationship between feminine gender role conformity and any drunkorexic behaviors. Alcohol use remained the strongest predictor of drunkorexic behavior in the post hoc analyses.

**Summary of the Results**

The research questions and hypotheses related to gender role conformity did not yield significant results for the total score of drunkorexia; however, feminine gender role
conformity had a significant and predictive relationship with the Diet and Exercise subscale of drunkorexia for females, although small. The lack of significance with the total score could be explained by homogeneity of participants (mostly female), the overall lower trending scores on the key measure of drunkorexia, limitations in measurement, or there may not be a strong relationship between drunkorexia and the total drunkorexia score. Interestingly, the broad definition of drunkorexia used in this study resulted in ~50% of participants reporting engaging in the behavior of drunkorexia in the last three months. Not surprisingly, alcohol use and disordered eating were significant predictors of level of drunkorexia, and alcohol use accounted for the greatest amount of unique variance in the level of drunkorexia in both original and post hoc. Results of this study indicate no significant relationships between gender role conformity and the total score of drunkorexia; however, results of the study did suggest stronger relationships and predictive power with alcohol use and disordered eating, and suggest Diet and Exercise is related to feminine gender role conformity.

Implications and Future Directions

Theoretical Implications

The findings of this study add to the previous literature by supporting findings regarding positive expectancies and reinforcement value as important components of behavioral expectancy, as indicated in Rotter’s (1954) Social Learning Theory. Rotter (1954) posited that reinforcement value, in this case as established and evidenced by alcohol use and disordered eating, and expectancy are implicated in the chance a behavior occurs. The positive expectancies of alcohol use and disordered eating with the behavior of drunkorexia (e.g., Burke et al., 2010), and actual reinforcement value of the behavior,
adds to evidence for social learning theory in explaining the behavior. Psychological situation, another component of Rotter’s (1954) model is a lens over the theory that is impacted by social situations, peer influence, and past social experiences may also have an impact on the chance that a behavior will occur.

In this study, gender role conformity was posited to be part of the psychological situation that provides context for the occurrence of the behavior. Given the significant finding of feminine gender role conformity and the Diet and Exercise subscale of the drunkorexia measure, this study supports the concept of psychological situation – peer and social influences – as a determinant of behavior potential. Although no significance was found with the total score of drunkorexia and gender role conformity, the significant and predictive relationship between feminine gender role conformity and Diet and Exercise drunkorexic behaviors may highlight some level of social influence that can be described as part of the psychological situation in Rotter’s (1954) model.

This study also reinforced the role of alcohol use and disordered eating in the behavior of drunkorexia. It is important for counseling psychologists to be aware of alcohol use and disordered eating in their clientele, and use of psychometrically sound screeners for both is indicated. Various screening tools are used across settings, and it is important for counseling psychologists to be aware of the intersection of alcohol use and disordered eating. For example, if one uses a measure to screen for alcohol use and it screens positively, results of this study indicate initiating a screen for disordered eating may also be useful. In consideration of therapy with clients who present with the behavior of drunkorexia, the results of this study suggest examination of expectancies and reinforcement value of behaviors may be indicated.
A recent study of Italian high school students suggested that positive expectancies, particularly enhancing positive emotions, from alcohol consumption was predictive of drunkorexic behavior in females (Pompili & Laghi, 2018). For Italian males in the study, difficulty regulating emotions was predictive of engagement in drunkorexic behavior. Given disordered eating and alcohol use are involved in the behavior of drunkorexia, and are considered adding to reinforcement value within the theoretical model, investigating and approaching the behavior through the lens of positive expectancies and actual outcome may be appropriate. In addition, examination of emotion regulation may be an area for future study.

It is important for counseling psychologists to be aware of and have competency in evidence-based approaches for treating substance use and disordered eating problems. Motivational interviewing and other evidence based therapies, such as cognitive behavioral therapy, are important basic evidence-based approaches that counseling psychologists should be familiar with to treat these concerns (Smedslund et al., 2011; Treasure & Ward, 1997). Theoretical models for substance use and disordered eating are varied; some models suggest a medical model, while others suggest an interpersonal model (Goddard et al., 2011; Leach & Kranzler, 2013). Awareness of these models, and in the spirit of evidence-based practice guidelines from the American Psychological Association, highlight the importance of using clinical judgment and client characteristics and preferences to best work with and treat clients with a variety of disorders, including disordered eating and alcohol use.

New theoretical models of drunkorexia have recently been suggested by several researchers, with each researcher emphasizing the importance of a consistent operational
definition that is needed in the field. Thompson-Memmer, Glassman, and Diehr (2019) proposed classifying the behavior as an “other specified feeding and eating” disorder in order to help operationalize the definition of drunkorexia, as well as increase the chance of treatment for the behavior to be covered by insurance. These researchers also propose the necessity of a medically accurate diagnostic term (e.g., alcoholimia) in the future of research and treatment with drunkorexia. Choquette, Rancourt, et al. (2018) also proposed a new term and definition for drunkorexia: Food and Alcohol Disturbance (FAD).

Choquette, Rancourt, et al. (2018) suggest that prior definitions and terms of drunkorexia do not sufficiently capture the accurate behaviors involved in FAD, and that FAD is a broader term that fits well within their suggested theoretical model. Choquette, Rancourt, et al. (2018) propose a modified version of Fairburn’s (2008) transdiagnostic model (see Figure 1) to understand FAD. The model combines both alcohol use and compensatory behaviors, and implicates life events and mood changes as part of the behavior. These mood changes are consistent with other finding, where emotional regulation and positive expectancies of mood changes have been supported in the behavior of drunkorexia (Pompili & Laghi, 2018). In essence this transdiagnostic theoretical model of FAD introduces a cycle of binging and compensatory behaviors to explain the behavior, with a core psychopathology of overvaluation of shape and weight. Choquette, Rancourt, et al. (2018) note the importance of examining this model with further evidence, and with different populations (e.g., all genders). The FAD model was tested with French and USA populations, and found that while FAD occurred in both populations, French participants were more likely to engage in compensatory behaviors,
and USA participants were more likely to engage in high levels of alcohol consumption (Choquette, Ordaz et al., 2018). Nationality moderated the relationship between alcohol use and FAD, which suggests cultural differences need be considered when approaching the behavior (Choquette, Ordaz et al., 2018).

Figure 1. Transdiagnostic Model of Food and Alcohol Disturbance (FAD)

Practice Implications

The results from both the original and post hoc analyses in this study support previous findings that individuals who engage in drunkorexia have underlying explanatory factors of alcohol use and disordered eating (e.g., Burke et al., 2010; Giles et al., 2009). In addition, with approximately half of participants reporting engaging in drunkorexia in the last three months, the need for counseling psychologists to understand the behavior and its underlying factors is imperative. As previously discussed, given the intersection of alcohol use and disordered eating and dieting behaviors within the operational definition of the behavior, it is not surprising that this study’s significant relationships were on measures of alcohol use and disordered eating. This finding highlights the necessity for providers to assess and screen for both disordered eating and
substance use with patients. Dependent upon setting, these results suggest a screening battery of both alcohol use and disordered eating to be a worthwhile clinical undertaking. Counseling psychologists, at the very least, should be aware of the intersection of alcohol use and disordered eating, and understand how this intersection can lead to increased health risk behaviors (Giles et al., 2009).

Although not a strong correlation, the statistically significant connection between feminine gender role conformity and the Diet and Exercise subscale of drunkorexia may hold important clinical considerations. Much of the research on the negative health consequences of drunkorexia have used only restriction before drinking as their definition of drunkorexia, and less research has been conducted on the consequences of non-restricting type behaviors, such as diet and exercise (e.g., Burke et al., 2010, Giles et al., 2009). In this study, the significant finding with the Diet and Exercise subscale of drunkorexia highlights behaviors such as meal alteration during and after drinking alcohol, exercising before and after drinking alcohol, restricting calories after drinking alcohol, and meal alteration (low calorie/low fat) during and after drinking alcohol. Many of these behaviors, if done infrequently, likely don’t carry as high of risk of developing negative health related consequences as other behaviors, such as calorie restriction before drinking.

However, the compensatory behaviors involved in drunkorexia, particularly if done with higher consistency or frequency, carry a risk of developing into more severe disordered eating patterns, or full blown eating disorders. Compensatory behaviors have been found to be a potential “gateway” to more significant or severe disordered eating or eating disorders (Stilles-Shields, Labuschagne, Goldschmidt, Doyle, & Le Grange, 2012).
The relationship between the Diet and Exercise drunkorexic behaviors and feminine gender role conformity, for females, highlights the importance of considering social pressures as factors for engaging in drunkorexia. This study’s findings with diet and exercise and gender role conformity, although a small correlation, certainly highlights the importance for future research into the constructs to better understand drunkorexia. Previous research has demonstrated that those who score higher on femininity are more likely to have higher levels of eating psychopathology (Meyer et al., 2001). If the compensatory behaviors involved in drunkorexia are frequently used, the risk for developing more serious symptomology is higher, and counseling psychologists should be aware of the social pressures that may influence clients’ eating and drinking behaviors, particularly for females.

In consideration of the role of gender role conformity, although not related to the total score of drunkorexia, it is recommended that counseling psychologists continue to look beyond just the presenting symptoms of a patient in order to understand their behavior. In line with the biopsychosocial model (Engel, 1980), considering patients within their social contexts in an important step in case conceptualization in treatment planning. Taking an ideographic approach to patients and understanding them as a whole will likely lead to more effective treatment and positive outcomes, which is also in line with the definition of evidence-based practice in APA guidelines (APA, 2002). Although only one previous study has demonstrated a significant relationship between gender role conformity and total level of drunkorexia (Peralta & Barr, 2017), consideration of patients within their biopsychosocial context – one’s psychological, social, and biological
factors – is a useful lens with a variety of presenting problems, including alcohol use and disordered eating.

When considering the theoretical implications of this study within the newly proposed FAD model (Choquette, Rancort, et al., 2018), the overvaluation of shape and weight, and the correlation between diet and exercise and feminine gender role conformity fits into the model. Overvaluation of shape and weight, likely influenced by some social and gender norms, may be involved in the diet and exercise behaviors that can be present in those who engage in drunkorexia. In addition, the primary component of the FAD model is the drinking episode, which fits closely with the measure of alcohol use – and the most statistically significant findings – in this study. One important component in the FAD model is “life events and mood changes.” The broad use of “life events” may include social and peer interactions and influences that could change the way in which one engages in a drinking episode. Future research should continue to consider other factors that may impact the way in which individuals engage in the behavior.

The field as a whole has continued to support more research into the intersection of disordered eating and alcohol use. Since the origination of this study, several studies on the behavior of drunkorexia have been published. In the first completely qualitative study of this behavior, researchers interviewed 45 college students in the UK to better understand the intersection of eating and alcohol use (Scott et al., 2019). Scott et al. (2019) discovered themes of sociability, identity, and traditions as part of the experience of undergraduate students and their eating and drinking behaviors. In fact, they found that long-term health related consequences of eating and drinking behaviors were less
important to participants than the impact on social status and appearance. Interestingly, these researchers found relatively low levels of drunkorexia within their sample, which may in part be due to the culture of UK college students. Regardless, of those that did engage in some type of compensatory behavior with drinking, motivations were around enhancing the effects of alcohol. Further enhancing the need for intervention with alcohol use is a study by Tuazon et al. (2019) which found that for students who received an alcohol related infraction at their college, both females and males were very likely to engage in drunkorexic behaviors. Tuazon et al. (2019) findings support previous literature suggesting those who engage in drunkorexia are more likely to have negative consequences than their non-drunkorexic peers. Tuazon et al.’s (2019) findings enhance the evidence that alcohol use is a critical part of drunkorexia and is an area for clinical focus.

Amongst the new research being published on drunkorexia, several studies have found evidence for some cultural and social components that may be specific for females who engage in the behavior of drunkorexia. Hill, Martin, and Lego (2019) found that internalization of the “thin ideal” was the strongest predictor for engagement in drunkorexia. Anderson and Bulik (2004) established gender differences in drive for thinness, where drive for thinness predicted female gender in their sample. Eisenberg, Johnson, and Zucker (2018), found that for females sexual objectification is related to drunkorexic behavior; a relationship that was not found for males. These studies, among others (e.g., Zwetzig & Martinez, 2016) suggest differences in motivations and factors involved for engaging in the behavior of drunkorexia. These findings highlight the importance of Counseling Psychologists in utilizing the biopsychosocial model (Engel,
1980) to approach concerning clinical behaviors from a broad lens that includes the symptoms and their biological, psychological, and social factors.

**Limitations**

As with much research relying on self-report survey methods, this study is not without limitations. Firstly, the sampling characteristics were limited, and resulted in a relatively homogeneous sample. With nearly 75% of the population being female and Caucasian, and only 20 men who identified engaging in drunkorexia, the generalizability of the results are limited. In addition, all participants came from the same university, and was a convenience sample. Although the original list of emails to recruit participants was a random sample from the university, there is still bias in who chose to participate in the survey and those who did not. There may be some inherent differences in the folks that chose to take the survey versus those who did not. In addition, some research has demonstrated high rates of disordered eating and substance use within certain populations, such as LGBTQ+ populations (Diemer et al., 2015).

Another limitation with this study lies with the measures themselves; firstly being self-report measures, secondly with high face validity of potentially sensitive items, and finally with using the total scores of the items. Self-report measures inherently run the risk of being biased, particularly because of social desirability. This particular risk was increased with the measures used in this study, given their potential to be sensitive items about behaviors and sense of self. When confronted with questions regarding one’s beliefs or values, the risk of answering in a way that paints them in a positive light is increased (Krumpal, 2013). Innovative new research is working on how to identify gender role conformity through Implicit Association Test methods (van Well, Kolk, &
Although at the cusp of new research, relying less on self-report measures for most all psychological phenomenon is an important step for the field to take.

One unintended finding was the lack of accuracy with which people responded to whether or not they engaged in drunkorexia. In an attempt to limit survey fatigue, participants self-selected either “yes” or “no” as to whether they engaged in drunkorexia or not, and those who said “no” were not supposed to take the CEBRACS. Due to a survey flow error, some of those that answered “no” were still given the CEBRACS measure of drunkorexia. This resulted in ~40% of those who said “no” actually responding in a positive manner to at least one item on the CEBRACS measure. This unintended error also led to a limitation and thought for future directions in researching this behavior. This error highlights the importance of having participants fill out all measures, rather than self-identifying into a group. It also may have an impact on the results of some analyses in this study, given some who said “no” to engaging in drunkorexia should have been considered in the drunkorexia group.

As previously mentioned, several of the measures had predominantly lower scores. While not statistically skewed, the less variability in the range of scores on several measures, primarily the EAT-26 and CEBRACS, may have limited the power with some analyses. If participants are not responding to the measures in different ways, and with less variance in scores, there is potentially a lower chance to find significance in the analyses. Choquette (2017), in a large psychometric evaluation of the CEBRACS scale with a diverse sample, suggested that the total score for the measure is not the most psychometrically sound way to measure drunkorexic behavior. Limitations of the
measure itself, paired with lack of accuracy in self-report, should be considerations for future research in this area.

It is possible that the sample used in this study simply did not have as high of scores in other related studies. It is also possible that there is a difference in the “type” of compensatory people engage in, and that one measure of drunkorexia may not accurately capture the differences between different motivations. For example, there may be subgroups of the behavior, such as those whose motivations revolve around the alcohol effects of drunkorexia, and the few questions on the CEBRACS about this motivation may not fully capture their experience. The qualitative study conducted by Scott et al. (2019) highlights social factors as a major theme; a theme which may not fully be captured by the measures used in this study. The survey was 148 items, not including the demographic questions, which may have created some amount of survey fatigue in participants’ later responses. Future studies may consider utilizing attention checks or other methods of combatting fatigue. Finally, given the relatively new area of research on gender role conformity with drunkorexia, and the field still working toward narrowing down even a consistent definition or term of drunkorexia, there may not be a clear link between some drunkorexic behaviors (e.g., restricting) and drunkorexia.

**Conclusion**

In summary, this study explored the relationship between gender role conformity and the behavior of drunkorexia. Gender role conformity, both masculine and feminine, were not significantly related to the total score on a measure of drunkorexia; however, feminine gender role conformity had a significant relationship to the Diet and Exercise subscale of a measure of drunkorexia, particularly for females. Neither masculine nor
feminine gender role conformity were significant predictors of total level of drunkorexia. Disordered eating and alcohol use were significant predictive variables, with alcohol use accounting for the most unique variance in total level of drunkorexia. Post hoc analyses supported a relationship between feminine gender role conformity and the Diet and Exercise subscale of drunkorexia, and was a significant predictor. Post hoc analyses again highlighted the importance of alcohol use as the most significant predictor of drunkorexic behavior. It is important for counseling psychologists to be aware of both eating and drinking behaviors in their clientele, particularly when working with young adult populations.

Future research on the behavior needs to take into account the recent definitions proposed by leaders in the field of drunkorexia research, beginning with changing the terminology of the behavior to be more reflective of the actual behaviors involved. Food and Alcohol Disturbance (FAD; Choquette, Rancort, et al., 2018) has been proposed as a new term within the transdiagnostic model (Fairburn, 2008) as a broad lens through which to view the variety of behaviors that encompass drunkorexia. Validation of FAD as a construct, particularly among different populations, is an area for future research. As research on drunkorexia continues, counseling psychologists need to use the biopsychosocial model in developing an ideographic approach to each client with food and alcohol disturbances. Recent research implicating various social factors (e.g., sexual objectification, drive for thinness) may be important for some individuals engaging in this behavior, particularly women.

The homogeneous sample of Caucasian females, as well as low scores on a key measure, may have limited significant findings. This study did not find a relationship
between masculine gender role conformity and total score of drunkorexia, a relationship previously found by Peralta and Barr (2017). This difference may be accounted for by sampling differences or regional differences. Future research should strive for heterogeneous samples across gender, region, and ethnic identities. In addition, research suggests high rates of drunkorexic behavior in those in the LGBTQ+ community, or individuals who are questioning their sexuality or gender (Calzo, Turner, Marro, & Phillips II, 2019; Diemer et al., 2015). Explanations for the higher rates of eating disorders in sexual and gender minority populations have included risk factors of fear of rejection or actual rejection, discrimination and minority stress, higher rates of PTSD, and inability to meet the body image ideals that exist within LGBT+ cultural communities (National Eating Disorder Association, 2019). Diversity in sampling is an important task for the field in general to consider when studying behaviors.

The behavior of drunkorexia appears to be complex, with a variety of different types of behaviors and motivations counting toward engaging in the behavior (e.g., Burke et al., 2010; Hunt & Forbush, 2016). Recent efforts to classify the behavior and operational definition have led to quite broad definitions being put in place (Choquette, Rancort, et al., 2018). It is possible the complexity of the ways in which one can engage in the behavior increases difficulty in classifying, defining, and measuring it. Perhaps categories of the types of ways to engage in the behavior, and how to measure functional impact of the behavior, are areas for future research. Relying on one standard definition and threshold for the behavior should be an area for future consideration by researchers and clinicians alike. Counseling psychologists and other researchers should continue to
view the behavior through a biopsychosocial lens, and continue to take an ideographic approach to their clientele as further research is conducted.
REFERENCES


APPENDIX A

RECRUITMENT EMAIL
Dear interested participant,

I hope your semester is going well! My name is Sarah Zwetzig, and I am a Ph.D. student in Counseling Psychology at UNC. I am conducting research examining drinking behaviors in relationship with eating and drinking behaviors of college undergraduates as part of my dissertation research. This study has been approved by the UNC IRB (Approval Number 1350619-1). I am hoping you will consider participating.

I am looking for individuals, between the ages of 18-25 years of age, enrolled as undergraduate students, and willing to participate in a survey lasting approximately 25 minutes. If you are interested and are not currently in treatment for an eating disorder (e.g., anorexia nervosa, bulimia) or a substance abuse disorder (e.g., alcohol use disorder), you may be eligible to participate. If you meet these criteria and are interested in participating, please continue reading below.

Those who choose to participate will first be asked to fill out a demographics questionnaire. Individuals may then answer questions related to their consumption of alcohol, eating behaviors, and perceptions of self. The survey is available via Qualtrics. The survey requires approximately 25 minutes to complete. The survey will not ask for any identifying data (e.g., name, address). All participants will have the option to enter into a raffle for one (1) of four (4) $50 Bear Bucks cards. The results of this study could lead to better understanding factors that contribute to college undergraduates’ behaviors surrounding alcohol consumption.

To participate, please email click on the link below to begin.

[Qualtrics Survey Link]

Please remember that participation is voluntary, and you may discontinue the survey at any time. If you feel uncomfortable during or after the survey, and would like to talk to someone, you may contact or go to the UNC Counseling Center, located in Kepner Hall:

UNC Counseling Center
1901 10th Ave., Greeley, CO 80639
970-351-2496

Sincerely,
Sarah Zwetzig
University of Northern Colorado
Counseling Psychology Doctoral Student
zwet6988@bears.unco.edu
APPENDIX B

CONSENT FORM
CONSENT FORM

CONSENT FORM FOR HUMAN PARTICIPANTS IN RESEARCH
University of Northern Colorado

Study Title: Eating and Drinking Behaviors of Emerging Adults

Researcher:
Sarah Zwetzig, BA, Doctoral Student; Department of Applied Psychology and Counselor Education; zwet6988@bears.unco.edu

Research Advisor: Basilia Softas-Nall, Ph.D., Department of Applied Psychology and Counselor Education
Phone: 970.351.1631 E-mail: basilia.softas-nall@unco.edu

Purpose and Background: The purpose of this study is to better understand eating and drinking behaviors of emerging adults and their perceptions of self.

Those who agree to participate in this study were invited to complete one online survey that takes approximately 25 minutes to complete. Participants were asked about their eating behaviors, drinking behaviors, and perceptions of themselves. You were asked to answer questions such as, “How often do you have a drink containing alcohol?” and rate your agreement or disagreement to questions such as, “I am aware of the calorie content of foods that I eat.” Participants will also be asked to complete several demographic questions, such as gender, age, and race/ethnicity. All responses were maintained for three years through the online survey platform, Qualtrics, which only the researcher and research advisor will have access to. No identifying information were gathered, and all responses will remain anonymous.

At the end of the survey, you will have the option of navigating to a separate form to enter into the raffle for one (1) of four (4) $50 Bear Bucks cards. Your responses to the study survey are not connected in any way to the raffle entry form. Those who wish to enter into the raffle were asked to provide their name, and preferred contact method and contact information (email or phone). Winners of the raffle were contacted by their preferred contact method within two weeks of survey completion, currently estimated to be the week of May 5, 2019.
Confidentiality: Your responses will only be shared with members of the investigation team. By participating in this study, you have given us permission to release information to these persons.

Although confidentiality cannot be guaranteed, every effort were made to maintain your confidentiality. The results of this study may be published in the professional literature, but no publication will contain information that will identify you. The research data were kept in a password protected file on the primary researcher’s password protected computer, and only the researcher will have access to the data.

Risks: Foreseeable risks include discomfort in answering potentially sensitive questions about eating and drinking behaviors. In this study, you were asked about drinking alcohol, which may be illegal depending upon your age. The researcher do not condone engagement in illegal activities; however, it is important to study these topics in an anonymous manner. I will keep information about you as confidential as possible, but complete confidentiality cannot be guaranteed. On rare occasions, courts have subpoenaed (required release) research records. If emotional distress occurs, the UNC Counseling Center may be contacted for free counseling services. Contact information is listed below.

UNC Counseling Center
1901 10th Ave., Greeley, CO 80639
970-351-2496

Benefits: There were no direct benefits to the participant. Participants may gain personal insight by reflecting on their own behaviors and perceptions of self.

Compensation: All participants will have the option to enter into a raffle for one (1) of four (4) $50 Bear Bucks cards. No other compensation were provided.

Costs: The cost of participating in this study is the time invested to participate in the survey.

Questions: If you have any questions about the study, you may contact the researcher by phone or email. You may also contact the researcher’s advisor, Dr. Basilia Softas-Nall, by phone or email.

Participation is voluntary. You may decide not to participate in this study and if you begin participation you may still decide to stop and withdraw at any time. Your decision were respected and will not result in loss of benefits to which you are otherwise entitled. Having read the above and having had an opportunity to ask any questions, by continuing with this survey you are indicating that you would like to participate in this research. A copy of this form may be obtained from the primary researcher for future reference. If you have any concerns about your selection or treatment as a research participant, please contact the Office of Research, Kepner Hall, University of Northern Colorado Greeley, CO 80639; 970-351-1910.
APPENDIX C

DEMOGRAPHIC QUESTIONS
DEMOGRAPHIC QUESTIONS

Demographics:

1) Age: ____

2) To which gender do you most identify?: Male, Female, Transgender, Other: ______

3) Ethnicity: White/Caucasian_____, African American/Black_____, Hispanic/Latino/Latina_____, Asian American_____, Arab American_____, Native American_____, Multiethnic_____, Other: ______

4) Classification by credits: Freshman, Sophomore, Junior, Senior, Other: _____

5) To which sexual orientation do you most identify?:

Please use this definition for the following questions:

Binge drinking: Drinking enough alcoholic beverages, in one sitting, to become intoxicated (drunk). Typically, this is 4 drinks for women, and 5 drinks for men, in approximately 2 hours.

6) In the last 3 months, have you engaged in either or both of the following?

   a) intentionally restricting calories prior to or after binge drinking (e.g., not eating dinner before binge drinking, or not eating as many calories as is typical the day before or following binge drinking)

   b) purging (e.g., vomiting or using laxatives), exercise, meal alteration (low carb/fat), or drinking alteration (e.g., low calorie drinks) before, during, or after binge drinking?

      __ Yes ___ No
APPENDIX D

COMPENSATORY EATING AND BEHAVIORS IN RESPONSE TO ALCOHOL CONSUMPTION SCALE (CEBRACS)
COMPENSATORY EATING AND BEHAVIORS IN RESPONSE TO ALCOHOL CONSUMPTION SCALE (CEBRACS)

Please read each of the following statements very carefully and respond accurately and honestly. All of these statements reflect actual behaviors you may have done in the past 3 months. You were asked whether you have done any of the behaviors before, during, or after drinking alcohol. Please read carefully because many of the statements are closely related to each other. Drinking refers to drinking any alcoholic beverages such as: beer, wine, wine coolers or spirits, hard liquors or mixed drinks.

**BEFORE drinking**

Instructions: For the following statements think about behaviors you have engaged in BEFORE you anticipated drinking alcohol. That is, think of situations where you knew you would be drinking alcohol in the future (e.g. planed to go to out drinking with friends, attended a wedding or birthday where you planned to drink, or attended any other event or situation where you knew you would be drinking later).

<table>
<thead>
<tr>
<th>Never</th>
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<tbody>
<tr>
<td>1</td>
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<table>
<thead>
<tr>
<th>Rarely (~25% of the time)</th>
<th>Sometimes (~50% of the time)</th>
<th>Often (~75% of the time)</th>
<th>Almost all the time</th>
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<tr>
<td>2</td>
<td>3</td>
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</table>

___ 1. In the past 3 months, I have eaten less than usual during one or more meals before drinking to get DRUNKER.

___ 2. In the past 3 months, I have exercised before drinking to make up for the calories in alcohol that I anticipated consuming.

___ 3. In the past 3 months, I have eaten less than usual during one or more meals before drinking to feel the effects of alcohol FASTER.

___ 4. In the past 3 months, I have skipped one or more meals before drinking to make up for the number of calories in alcohol that I anticipated consuming.

___ 5. In the past 3 months, I have taken laxatives before drinking to make up for the calories in alcohol that I anticipated consuming.

___ 6. In the past 3 months, I have skipped one or more meals before drinking to feel the effects of alcohol FASTER.
**WHILE under the effects of alcohol**

Instructions: For each of the following statements, think about behaviors you have engaged in **WHILE** you were drinking or under the effects of alcohol (e.g. while you were drinking during a wedding reception, party, bar, club, football game). This also includes situations where you may have been done drinking, but the effects of alcohol had not completely worn off. As an example, imagine arriving home from a party where you had been drinking and you could still feel the effects of alcohol even though you had stopped drinking earlier in the night.

<table>
<thead>
<tr>
<th>Never</th>
<th>Rarely (~25% of the time)</th>
<th>Sometimes (~50% of the time)</th>
<th>Often (~75% of the time)</th>
<th>Almost all the time</th>
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___ 7. In the past 3 months, I have eaten less than usual while I was drinking because I wanted to feel the effects of the alcohol FASTER.

___ 8. In the past 3 months, I have taken diuretics while I was drinking to make up for the calories in alcohol that I was consuming.

___ 9. In the past 3 months, I have not eaten at all while I was drinking because I wanted to feel the effects of the alcohol FASTER

___ 10. In the past 3 months, I have eaten low-calorie or low-fat foods while I was drinking to make up for the calories in alcohol that I was consuming.

___ 11. In the past 3 months, I drank low-calorie beer or alcoholic drinks to get fewer of the calories that are in alcohol.

___ 12. In the past 3 months, I have eaten less than usual while I was drinking because I wanted to get DRUNKER.

___ 13. In the past 3 months, I have taken laxatives while I was drinking to make up for the calories in alcohol that I was consuming.

___ 14. In the past 3 months, I have not eaten at all while I was drinking because I wanted to get DRUNKER.
**AFTER effects from alcohol have worn off**

Instructions: For each of the following statements, think about behaviors you have engaged in AFTER you had been drinking alcohol and were no longer under the effects of alcohol. This might include your behavior later that same day, the next day, or several days after the effects of alcohol have worn off.

<table>
<thead>
<tr>
<th>Never</th>
<th>Rarely (~25% of the time)</th>
<th>Sometimes (~50% of the time)</th>
<th>Often (~75% of the time)</th>
<th>Almost all the time</th>
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___ 15. In the past 3 months, I have taken diuretics to make up for the calories in alcohol that I had consumed previously while I was under the effects of alcohol.

___ 16. In the past 3 months, I have eaten low-calorie or low-fat foods during one or more meals to make up for the calories in alcohol that I had consumed previously while I was under the effects of alcohol.

___ 17. In the past 3 months, I have taken laxatives to make up for the calories in alcohol that I had consumed previously while I was under the effects of alcohol.

___ 18. In the past 3 months, I have exercised to make up for the calories in alcohol that I had consumed previously while I was under the effects of alcohol.

___ 19. In the past 3 months, I have made myself vomit to make up for the calories in alcohol that I had consumed previously while I was under the effects of alcohol.

___ 20. In the past 3 months, I have eaten less than usual during one or more meals to make up for the calories in alcohol that I had consumed previously while I was under the effects of alcohol.

___ 21. In the past 3 months, I have skipped an entire day or more of eating to make up for the calories in alcohol that I had consumed previously while I was under the effects of alcohol.
APPENDIX E

EATING ATTITUDES TEST-26 (EAT-26)
EATING ATTITUDES TEST-26 (EAT-26)

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Usually</th>
<th>Often</th>
<th>Sometimes</th>
<th>Never</th>
<th>Rarely</th>
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<tbody>
<tr>
<td>1. I am terrified about being overweight.</td>
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<td>2</td>
<td>1</td>
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<tr>
<td>2. I avoid eating when I am hungry.</td>
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<td>3. I find myself preoccupied with food.</td>
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<td>4. I have gone on eating binges where I feel that I may not be able to stop.</td>
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<td>5. I cut my food into small pieces.</td>
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<td>6. I am aware of the calorie content of foods that I eat.</td>
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<td>7. I particularly avoid food with a high carbohydrate content (i.e. bread, rice, potatoes, etc.)</td>
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<td>8. I feel that others would prefer if I ate more.</td>
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<td>9. I vomit after I have eaten.</td>
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<td>10.</td>
<td>I feel extremely guilty after eating.</td>
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<td>11.</td>
<td>I am occupied with a desire to be thinner.</td>
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<td>12.</td>
<td>I think about burning up calories when I exercise.</td>
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<tr>
<td>13.</td>
<td>Other people think that I am too thin.</td>
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<td>14.</td>
<td>I am preoccupied with the thought of having fat on my body.</td>
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<tr>
<td>15.</td>
<td>I take longer than others to eat my meals.</td>
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<tr>
<td>16.</td>
<td>I avoid foods with sugar in them.</td>
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<tr>
<td>17.</td>
<td>I eat diet foods.</td>
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<tr>
<td>18.</td>
<td>I feel that food controls my life.</td>
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<td>19.</td>
<td>I display self-control around food.</td>
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<td>20.</td>
<td>I feel that others pressure me to eat.</td>
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<tr>
<td>21.</td>
<td>I give too much time and thought to food.</td>
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</tbody>
</table>
22. I feel uncomfortable after eating sweets.

23. I engage in dieting behavior.

24. I like my stomach to be empty.

25. I have the impulse to vomit after meals.

26. I enjoy trying new rich foods.
APPENDIX F

ALCOHOL USE DISORDER IDENTIFICATION TEST (AUDIT)
ALCOHOL USE DISORDER IDENTIFICATION TEST (AUDIT)

Please answer the following questions based on your actions and experiences within the past year.

<table>
<thead>
<tr>
<th>Question</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How often do you have a drink containing alcohol?</td>
<td>Never</td>
<td>Monthly or less</td>
<td>2-4 times a month</td>
<td>2-3 times a week</td>
<td>4 or more times a week</td>
</tr>
<tr>
<td>2. How many standard drinks containing alcohol do you have on a typical</td>
<td>1 or 2</td>
<td>3 or 4</td>
<td>5 or 6</td>
<td>7 to 9</td>
<td>10 or more</td>
</tr>
<tr>
<td>day when drinking?</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>3. How often do you have six or more drinks on one occasion?</td>
<td>Never</td>
<td>Less than monthly</td>
<td>Monthly</td>
<td>Weekly</td>
<td>Daily or almost daily</td>
</tr>
<tr>
<td>4. How often have you found that you were not able to stop drinking once</td>
<td>Never</td>
<td>Less than monthly</td>
<td>Monthly</td>
<td>Weekly</td>
<td>Daily or almost daily</td>
</tr>
<tr>
<td>you had started?</td>
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<tr>
<td>5. How often have you failed to do what was normally expected of you</td>
<td>Never</td>
<td>Less than monthly</td>
<td>Monthly</td>
<td>Weekly</td>
<td>Daily or almost daily</td>
</tr>
<tr>
<td>because of drinking?</td>
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<tr>
<td>6. How often have you needed a drink in the morning to get yourself</td>
<td>Never</td>
<td>Less than monthly</td>
<td>Monthly</td>
<td>Weekly</td>
<td>Daily or almost daily</td>
</tr>
<tr>
<td>going after a heavy drinking?</td>
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</tr>
<tr>
<td>7. How often have you had a feeling of guilt or remorse after drinking?</td>
<td>Never</td>
<td>Less than monthly</td>
<td>Monthly</td>
<td>Weekly</td>
<td>Daily or almost daily</td>
</tr>
<tr>
<td>8. How often have you been unable to remember what happened the night</td>
<td>Never</td>
<td>Less than monthly</td>
<td>Monthly</td>
<td>Weekly</td>
<td>Daily or almost daily</td>
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<tr>
<td>before because you had been drinking?</td>
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<tr>
<td>9. Have you or someone else been injured as a result of your drinking?</td>
<td>No</td>
<td>Yes, but not in the past</td>
<td>Yes, during the past year</td>
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</tbody>
</table>


10. Has a relative or friend, doctor or other health worker been concerned about your drinking or suggested you cut down?

<table>
<thead>
<tr>
<th></th>
<th>No</th>
<th>Yes, but not in the past year</th>
<th>Yes, during the past year</th>
</tr>
</thead>
</table>

APPENDIX G

CONFORMITY TO FEMININE NORMS
INVENTORY-45 (CFNI-45)
CONFORMITY TO FEMININE NORMS INVENTORY-45 (CFNI-45)

Thinking about your own actions, feelings, and beliefs, please indicate how much you personally agree or disagree with each statement. There are no right or wrong answers. It is best you respond with your first impression when answering.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I would be happier if I was thinner</td>
<td></td>
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<tr>
<td>2. It is important to keep your living space clean</td>
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<tr>
<td>3. I spend more than 30 minutes a day doing my hair and make-up</td>
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<tr>
<td>4. I tell everyone about my accomplishments</td>
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<tr>
<td>5. I clean my home on a regular basis</td>
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<tr>
<td>6. I feel attractive without makeup</td>
<td></td>
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<tr>
<td>7. I believe that my friendships should be maintained at all costs</td>
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<tr>
<td>8. I find children annoying</td>
<td></td>
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<tr>
<td>9. I would feel guilty if I had a one-night stand</td>
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<tr>
<td>10. When I succeed, I tell my friends about it</td>
<td></td>
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<tr>
<td>11. Having romantic relationships is essential in life</td>
<td></td>
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<tr>
<td>12. I enjoy spending time making my living space look nice</td>
<td></td>
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<td></td>
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<tr>
<td>13. Being nice to others is extremely important</td>
<td></td>
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<tr>
<td>14. I regularly wear makeup</td>
<td></td>
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<tr>
<td>15. I don’t go out of my way to keep in touch with friends</td>
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<tr>
<td>16. Most people enjoy children more than I do</td>
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<tr>
<td>17. I would like to lose a few pounds</td>
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<tr>
<td>18. It is not necessary to be in a committed relationship to have sex</td>
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<tr>
<td>19.</td>
<td>I hate telling people about my accomplishments</td>
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<tr>
<td>20.</td>
<td>I get ready in the morning without looking in the mirror very much</td>
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<tr>
<td>21.</td>
<td>I would feel burdened if I had to maintain a lot of friendships</td>
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<tr>
<td>22.</td>
<td>I would feel comfortable having casual sex</td>
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<tr>
<td>23.</td>
<td>I make it a point to get together with my friends regularly</td>
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<tr>
<td>24.</td>
<td>I always downplay my achievements</td>
<td></td>
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<tr>
<td>25.</td>
<td>Being in a romantic relationship is important</td>
<td></td>
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<tr>
<td>26.</td>
<td>I don’t care if my living space looks messy</td>
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<tr>
<td>27.</td>
<td>I never wear make-up</td>
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<tr>
<td>28.</td>
<td>I always try to make people feel special</td>
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<tr>
<td>29.</td>
<td>I am not afraid to tell people about my achievements</td>
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<tr>
<td>30.</td>
<td>My life plans do not rely on my having a romantic relationship</td>
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<tr>
<td>31.</td>
<td>I am always trying to lose weight</td>
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<tr>
<td>32.</td>
<td>I would only have sex with the person I love</td>
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<tr>
<td>33.</td>
<td>When I have a romantic relationship, I enjoy focusing my energies on it</td>
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<tr>
<td>34.</td>
<td>There is no point to cleaning because things will get dirty again</td>
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<tr>
<td>35.</td>
<td>I am not afraid to hurt people’s feelings to get what I want</td>
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<tr>
<td>36.</td>
<td>Taking care of children is extremely fulfilling</td>
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<tr>
<td>37.</td>
<td>I would be perfectly happy with myself even if I gained weight</td>
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<tr>
<td>38.</td>
<td>If I were single, my life would be complete without a partner</td>
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<td>39.</td>
<td>I rarely go out of my way to act nice</td>
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<td>40.</td>
<td>I actively avoid children</td>
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<tr>
<td>41.</td>
<td>I am terrified of gaining weight</td>
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<tr>
<td>42.</td>
<td>I would only have sex if I was in a committed relationship like marriage</td>
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<tr>
<td>43.</td>
<td>I like being around children</td>
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<td>44.</td>
<td>I don’t feel guilty if I lose contact with a friend</td>
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<tr>
<td>45.</td>
<td>I would be ashamed if someone thought I was mean</td>
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</tbody>
</table>
APPENDIX H

CONFORMITY TO MASCULINE NORMS INVENTORY-46 (CMNI-46)
CONFORMITY TO MASCULINE NORMS INVENTORY-46 (CMNI-46)

Thinking about your own actions, feelings, and beliefs, please indicate how much you personally agree or disagree with each statement. There are no right or wrong answers. It is best you respond with your first impression when answering.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
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</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>In general, I will do anything to win</td>
<td></td>
<td></td>
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<tr>
<td>2</td>
<td>If I could, I would frequently change sexual partners</td>
<td></td>
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<tr>
<td>3</td>
<td>I hate asking for help</td>
<td></td>
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<tr>
<td>4</td>
<td>I believe that violence is never justified</td>
<td></td>
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<tr>
<td>5</td>
<td>Being thought of as gay is not a bad thing</td>
<td></td>
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<tr>
<td>6</td>
<td>In general, I do not like risky situations</td>
<td></td>
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<tr>
<td>7</td>
<td>Winning is not my first priority</td>
<td></td>
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<tr>
<td>8</td>
<td>I enjoy taking risks</td>
<td></td>
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<tr>
<td>9</td>
<td>I am disgusted by any kind of violence</td>
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<tr>
<td>10</td>
<td>I ask for help when I need it</td>
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<tr>
<td>11</td>
<td>My work is the most important part of my life</td>
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<tr>
<td>12</td>
<td>I would only have sex if I was in a committed relationship</td>
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<tr>
<td>13</td>
<td>I bring up my feelings when talking to others</td>
<td></td>
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<tr>
<td>14</td>
<td>I would be furious if someone thought I was gay</td>
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<tr>
<td>15</td>
<td>I don’t mind losing</td>
<td></td>
<td></td>
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<tr>
<td>16</td>
<td>I take risks</td>
<td></td>
<td></td>
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<tr>
<td>17</td>
<td>It would not bother me at all if someone thought I was gay</td>
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<tr>
<td>18</td>
<td>I never share my feelings</td>
<td></td>
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<tr>
<td>19</td>
<td>Sometimes violent action is necessary</td>
<td></td>
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<tr>
<td>20</td>
<td>In general, I control the women in my life</td>
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<td>-------------------------------------------------------------------------------------------</td>
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<tr>
<td>21.</td>
<td>I would feel good if I had many sexual partners</td>
<td></td>
<td></td>
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<tr>
<td>22.</td>
<td>It is important for me to win</td>
<td></td>
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<tr>
<td>23.</td>
<td>I don’t like giving all my attention to work</td>
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<tr>
<td>24.</td>
<td>It would be awful if people thought I was gay</td>
<td></td>
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<tr>
<td>25.</td>
<td>I like to talk about my feelings</td>
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<td></td>
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</tr>
<tr>
<td>26.</td>
<td>I never ask for help</td>
<td></td>
<td></td>
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<tr>
<td>27.</td>
<td>More often than not, losing does not bother me</td>
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<tr>
<td>28.</td>
<td>I frequently put myself in risky situations</td>
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<tr>
<td>29.</td>
<td>Women should be subservient to men</td>
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<tr>
<td>30.</td>
<td>I am willing to get into a physical fight if necessary</td>
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<tr>
<td>31.</td>
<td>I feel good when work is my first priority</td>
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<tr>
<td>32.</td>
<td>I tend to keep my feelings to myself</td>
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<tr>
<td>33.</td>
<td>Winning is not important to me</td>
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<tr>
<td>34.</td>
<td>Violence is almost never justified</td>
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<tr>
<td>35.</td>
<td>I am happiest when I’m risking danger</td>
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<tr>
<td>36.</td>
<td>It would be enjoyable to date more than one person at a time</td>
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<tr>
<td>37.</td>
<td>I would feel uncomfortable if someone thought I was gay</td>
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<tr>
<td>38.</td>
<td>I am not ashamed to ask for help</td>
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<tr>
<td>39.</td>
<td>Work comes first</td>
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<tr>
<td>40.</td>
<td>I tend to share my feelings</td>
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<tr>
<td>41.</td>
<td>No matter what the situation I would never act violently</td>
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<tr>
<td>42.</td>
<td>Things tend to be better when men are in charge</td>
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<tr>
<td>43.</td>
<td>It bothers me when I have to ask for help</td>
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<tr>
<td>44.</td>
<td>I love it when men are in charge of women</td>
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<tr>
<td>45.</td>
<td>I hate it when people ask me to talk about my feelings</td>
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</tbody>
</table>
46. I try to avoid being perceived as gay
APPENDIX I

INSTITUTIONAL REVIEW BOARD
APPROVAL LETTER
IRB APPROVAL LETTER

UNIVERSITY OF
NORTHERN COLORADO

Institutional Review Board

DATE: December 3, 2018
TO: Sarah Zwetzig, BA
FROM: University of Northern Colorado (UNCO) IRB
PROJECT TITLE: [1356619-1] Eating and Drinking Behaviors of Emerging Adults
SUBMISSION TYPE: New Project
ACTION: APPROVAL/VERIFICATION OF EXEMPT STATUS
DECISION DATE: November 30, 2018
EXPIRATION DATE: November 30, 2022

Thank you for your submission of New Project materials for this project. The University of Northern Colorado (UNCO) IRB approves this project and verifies its status as EXEMPT according to federal IRB regulations.

Sarah -

Thank you for an exceptionally well-prepared IRB application. Your materials and protocols are approved and you may begin participant recruitment and data collection.

Best wishes with your research and don't hesitate to contact me with any IRB-related questions or concerns.

Sincerely,

Dr. Megan Stellino, UNC IRB Co-Chair

We will retain a copy of this correspondence within our records for a duration of 4 years.

If you have any questions, please contact Nicole Morse at 970-351-1910 or nicole.morse@unco.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within University of Northern Colorado (UNCO) IRB's records.
APPENDIX J

PERMISSION EMAIL AND FORM TO USE CFNI-45/CMNI-46
Hi,
I’m at UT-Austin now—I rarely check the old TTU email.
Thanks for your interest in the measure!
Sounds good to me! Please find the measures and use agreement attached. Good luck!

On Feb 17, 2018, at 9:26 AM, Zwetzig, Sarah <Sarah.Zwetzig@unco.edu> wrote:

Dr. Parent,

I hope this email finds you well! I had send the below email to your TTU email, and am not sure that you received it, and then found your profile through UT Austin, and wasn’t sure which was correct—I apologize if you are receiving duplicates! I have also copied my dissertation chair, Dr. Basilia Softas-Nall on this email as a contact point if necessary.

Please see below the details of my experience and hope for use of the CNFI/CNMI scales in my
Permission Form for Use of the Conformity to Masculine Norms Inventory - 46 and/or Conformity to Feminine Norms Inventory - 45 in Research

1. Contact Information

Name: Sarah Zwetzig  
E-mail Address: Sarah.Zwetzig@unco.edu

Phone: 970-258-4578  
Fax: (970) 351-7635

Mailing Address:  
1815 9th Avenue #A  
Greeley, CO 80631

2. Please briefly describe the research study:

Exploring the impact of conformity on the motivations for
Diurexia

3. Approximately how many participants will complete the CMNI-46 and/or CFNI-45? If you are using both measures specify number of participants by gender per measure:

Hypothetically 400 total, 200 per gender
Both genders (or all genders) take both measures

4. If this is a senior/honors thesis, master’s thesis, doctoral dissertation, or other student research, who is supervising the research (please provide faculty member’s name, mailing address, e-mail, and phone number):

Name: Basilia Safa-Talini  
E-mail: basilia.safa-talini@unco.edu
Mailing Address: 501 20th St., Greeley, CO 80639, 
Phone: 970-351-1631

Please read the following conditions, sign and return to Mike C. Parent at the address, fax number, or e-mail below.

Conditions of Use

I certify that I (or my supervising professor) have an advanced professional degree in psychology, psychiatry, counseling, social work, or a closely related field AND relevant training in the use of assessment instruments.

I agree to use the CMNI-46 and/or CFNI-45 for research purposes only.

After completion of my research project, I will transmit to Mike C. Parent via email the following information for the CMNI-46 and/or CFNI-45, using data from the final sample used in my research (i.e., not including any participants removed prior to analysis for reasons such as missing data or random responding): the total number of participants who completed the CMNI-46 and/or CFNI-45, any specific population demographics that were requirements of participation in the study, and reliability coefficients for all subscales of the CMNI-46 and/or CFNI-45.
I agree not to change the inventories’ instructions, items, or scaling; and agree to provide a copy to Mike C. Parent of any publications that may result from use of the CMNI-46 and/or CFNI-45 in my research.

I understand that permission to use/reproduce the measures will only be granted for the project that I described herein and that if I wish to use/reproduce the measures for other projects, I must obtain additional approval. I understand that I may not provide the inventories to others for their use but will direct them to Mike C. Parent.

I also agree that the CMNI-46 and/or CFNI-45 will not be appended to written materials (e.g., dissertations, theses, teaching/instructional handouts, workshop guides, manuscripts, etc.) that are circulated for general reading.

I understand that the CMNI-46 and/or CFNI-45 may not be published in a journal or online. I understand that the CMNI-46 and/or CFNI-45 may not be posted on the internet, and any internet surveys using the inventories must be secured such that the items’ security are maintained and the content removed from the internet following completion of the survey.

[Signature]  [Date]  2-21-18

Signature of Supervising Professor (if applicable)  Date  2-21-18

Please retain a copy of this form, and return one to Mike C. Parent, Ph.D. at MS 2051 Psychology Building, Texas Tech University, Lubbock, TX 79409-2051; or e-mail at michael.parent@ttu.edu; or fax at (806)-742-0818.