Drunkorexia: gender differences in compensatory behavior in response to alcohol use

Sasha Gorrell
University at Albany, State University of New York, sashadmo@gmail.com

The University at Albany community has made this article openly available. Please share how this access benefits you.

Follow this and additional works at: https://scholarsarchive.library.albany.edu/legacy-etd

Part of the Clinical Psychology Commons

Recommended Citation

This Master’s Thesis is brought to you for free and open access by the The Graduate School at Scholars Archive. It has been accepted for inclusion in Legacy Theses & Dissertations (2009 - 2024) by an authorized administrator of Scholars Archive. Please see Terms of Use. For more information, please contact scholarsarchive@albany.edu.
Drunkorexia: Gender Differences in Compensatory Behavior
in Response to Alcohol Use

A Thesis presented to the Faculty
of the University at Albany, State University of New York
in partial fulfillment of
the requirements for the degree of

Master of Arts
College of Arts & Sciences
Department of Psychology

Sasha Gorrell
2015
Abstract

Compensatory eating behaviors (e.g., vomiting; caloric restriction) related to alcohol consumption may lead to both hazardous drinking as well as disordered eating (e.g., Barry & Piazza-Gardner, 2012; Eisenberg & Fitz 2014). Motivation for compensatory behaviors may differ; some of these behaviors may be more related to eating pathology (e.g., weight and shape concerns), or more related to alcohol (e.g., enhancing alcohol effects). What remains less well understood is whether motivation based on alcohol enhancement is associated specifically with reported eating disorder symptoms, and whether this relation may differ according to sex. An undergraduate sample (N = 530, 48% female) completed the Eating Disorders Diagnostic Scale, and Compensatory Eating Behaviors in Response to Alcohol Consumption Scale. Results indicated that females were more likely to endorse elevated scores on both measures. For both sexes, elevated body mass index led to greater association of compensatory behaviors with eating disorder symptoms; for women, bulimic behavior that was reported as related to alcohol use, and for men, reported dietary restraint and increased exercise related to alcohol use were significantly related to eating disorder pathology. Further investigation of these associations may ultimately help to determine if the compensatory behavior combination is best conceptualized as an eating disorder, an alcohol-use disorder, or a problem of its own merit.

Keywords: Drunkorexia, compensatory eating behavior, alcohol, eating disorder
Drunkorexia: Gender Differences in Compensatory Behavior in Response to Alcohol Use

Longitudinal study of college students has consistently found a relatively high prevalence of alcohol consumption (Wechsler, Lee, Kuo, Seibring, Nelson & Lee, 2002), with a wide range of associated negative consequences (Hingson, Heeren, Winter & Wechsler, 2005). One specific negative consequence includes the use of certain behaviors intended to minimize the impact of the amount the calories consumed in alcohol. Alcohol use that is associated with compensatory behaviors related to eating, weight and shape concern has been well documented within undergraduate populations (e.g., Barry & Piazza-Gardener, 2012; Bryant, Darkes & Rahal, 2012; Eisenberg & Fitz 2014; Piazza-Gardner & Barry, 2013; Kelly-Weeder, 2009). However, the precise nature of this pattern of behaviors – a line of research referred to with the colloquial term “drunkorexia,” remains unclear. In some work, drunkorexia refers specifically to caloric restriction prior to drinking alcohol (Burke, Cremeens, Vail-Smith & Woolsey, 2010). Other work has expanded the definition of this term to consider a broader pattern of problematic alcohol-related eating behaviors including self-induced vomiting (Blackmore & Gleaves, 2013), excessive exercise (Buchholz & Crowther, 2014) and proactive as well as reactive dietary restriction in response to alcohol use (Bryant, Darkes & Rahal, 2012). In short, drunkorexia may be conceptualized as alcohol use/abuse in combination with disordered eating behaviors.

I. Co-occurrence of eating behaviors and alcohol use in clinical populations

Consistent evidence confirms that alcohol use disorders and eating disorders frequently co-occur in clinical samples (see Grilo, Sinha & O Malley, 2002; Holderness, Brooks-Gunn, & Warren, 1994, for reviews). While well documented, some hypotheses regarding the etiological relation between these disorders have not been consistently empirically supported (Gadalla & Piran, 2007; Wolfe & Maisto, 2000). Discrepancies within the literature may be a result of the
nature and timing of onset for each set of behaviors, and their variance according to an interaction of individual differences. The combination of these behaviors may begin early; some work has indicated increased prevalence of eating disorder symptoms in adolescents who report using alcohol, with frequency and severity of alcohol consumption positively associated with some eating disorder behaviors (Arias, Hawke, Arias & Kaminer, 2009). Continuing into young adulthood, the presence of alcohol use may leave individuals vulnerable to subsequent development of eating disorders. For example, Blackmore and Gleaves (2013) found that alcohol use appeared to be a risk factor for the development of maladaptive compensatory eating disorder behaviors.

Despite a similar temporal etiological pattern in these studies, the risk for eating disorder following alcohol use is not a consistent finding. For example, one prospective study found that eating disorder was more predictive of alcohol use disorder than the reverse (Franko, Dorer, Keel, Jackson, Manzo & Herzog, 2005). Aligned with these results, another study found that the majority of individuals reported primary onset of an eating disorder, with only one third reporting the onset of the alcohol use disorder first (Bulik et al., 2004).

Comorbidity between substance use and eating disorders is more likely to occur, depending on specific eating disorder symptoms and/or diagnosis. Review of the literature confirms that the association has been most commonly identified with bulimia nervosa and binge/purge types of anorexia nervosa, as opposed to restricting-type only anorexia (Wolfe & Maisto, 2000). One early investigation reported that eating disorder not otherwise specified (EDNOS), but not anorexia or bulimia nervosa, was more common in individuals with substance use disorder than without substance use disorder (Grilo, Becker, Levy, Walker, Edell & McGlashan, 1995). More recent study of a transdiagnostic eating disorder sample found that
alcohol use disorders were significantly more prevalent in women with a combined anorexia nervosa with binge eating diagnosis as well as those with bulimia nervosa, as compared to women with anorexia nervosa (Bulik et al., 2004).

One study of female adolescents with eating disorders found that those with restrictive symptoms do not abstain from the use of substances, but use them less frequently than the general adolescent population. In contrast, those with purging symptoms use substances with a similar frequency to that found in the general adolescent population (Stock, Goldberg, Corbett, & Katzman, 2002). Overall, empirical evidence indicates that problematic alcohol use is more commonly found in eating disorder diagnostic subgroups with bulimic features.

II. Co-occurrence of eating behaviors and alcohol use in non-treatment-seeking populations

2.1 Alcohol & Eating Behaviors. The co-occurrence of maladaptive eating behaviors and alcohol use is also documented in non-treatment-seeking populations. In college populations, the relation of drinking and disordered eating behaviors has been more frequently studied in female samples (e.g., Anderson, Martens & Cimini, 2005; Lloyd-Richardson, Lucero, DiBello, Jacobson & Wing, 2008). Increased alcohol consumption is associated with increased binge eating in women (Piran & Robinson, 2006), as well as increases in cycles of dieting, binge eating and purging behaviors (Krahn, Kurth, Gomberg & Drewnowski, 2005). Findings from a study of college women indicated that those with probable binge eating disorder reported greater weekend alcohol consumption and were more likely to endorse binge drinking than women who endorsed sub-threshold symptoms or women without eating disorder symptoms (Luce, Engler & Crowther, 2007).

The correlation between eating disorder behaviors and alcohol use in non-clinical samples may relate more to the quantity of alcohol consumed, rather than to frequency of alcohol
use. Piran & Robinson (2011) found that binge eating, dieting and purging were most strongly associated with binge drinking but not with the frequency of alcohol consumption. Another study of a non-clinical (undergraduate) sample found that among women, greater scores on a measure of dietary restraint were positively associated with quantity, drinks per week, binge drinking, and yearly excessive drinking, but not with frequency (Stewart, Angelopoulos, Baker & Boland, 2000). One reason for this pattern of findings may relate to the shared behavioral factor of impulsivity in both alcohol use and eating disorder; a dysregulation in impulsivity may influence both binge drinking as well as bulimic symptoms (e.g., Piran & Robinson, 2011). Alternatively, increased binge drinking may be the result of attempts to restrict alcohol intake due to its caloric value – attempts that might then followed by alcohol binges (Stewart, Angelopoulos, Baker & Boland, 2000).

2.2 Greek life, Alcohol & Eating Behaviors. Some work on the relation between alcohol use and eating disordered behaviors in college populations has focused on how this association may function within Greek life. One study found that both gender and participation in Greek life were significant moderators of the relation between alcohol consumption and physical activity. The authors found a positive relation between physical activity and alcohol use among college students who are men and/or involved with the Greek system (Buscemi, Martens, Murphy, Yurasek & Smith, 2011). A study surveying females over their first, second and third years of college compared those who participated in sorority life with those who had not. Results indicated that women who join sororities are similar to those who do not in their baseline levels of disordered eating, but develop/maintain increased diet-related attitudes and behaviors (i.e., drive for thinness) over the course of their time in college as compared to women who did not join sororities (Allison & Park, 2004). As both men and women who engage in sorority life
drink more on average than those who do not (Huchting, Lac, Hummer & LaBrie, 2011), it is possible that this increase in alcohol consumption may also lead to an increase in risk for alcohol-related eating disorder behaviors.

III. Measuring Drunkorexia

Currently, there are few formal measures of the unique combination of eating disordered behaviors that are compensatory, and specific to calories consumed in alcohol. Initial study of drinking and related disordered eating behaviors (i.e., the phenomenon identified as “drunkorexia”) in college students was generally based on single-item, self-report measures of alcohol use, exercise activity, and dieting behaviors (e.g., Barry & Piazza-Gardner, 2012; Burke, Cremeens, Vail-Smith & Woolsey, 2010; Kelly-Weeder, 2009). For example, Burke and colleagues (2010) used 3 survey items that asked freshman undergraduates to indicate if they 1) engaged in restricting caloric intake on days they knew alcohol consumption would occur, 2) if they restricted calories before drinking to avoid gaining weight, and 3) if they restricted calories to feel alcohol’s effects better. Similarly, Giles and colleagues (2009) used a single item measure to evaluate whether undergraduates restricted calories on days they planned to drink alcohol. If so, individuals were asked whether their intent was to reduce the calories consumed and/or to get drunk faster.

An early study that captured a broader view of these sets of co-occurring behaviors was conducted with 78 American college undergraduates, using a set of 12 open-ended interview-style questions that evaluated attitudes and customary practices related to both drinking and eating (Peralta, 2002). The qualitative findings from this study identified 4 main themes: 1) skipping meals or restricting food intake, 2) drinking less or drinking lower calorie beverages to reduce the total calories consumed, 3) engagement in exercise before or after drinking - either in
anticipation of, or in compensation for, alcohol calories and 4) purging, in an effort to rid the body of overall calories. While this sample was relatively small, possibly limiting more general conclusions, women were twice as likely as men to endorse any of the four compensatory themes.

In a more recent, larger college sample, a meaningful number of students reported engaging in behaviors intended to both compensate for alcohol-related calories and enhance alcohol’s effects (Bryant, Darkes & Rahal, 2012). As an extension of these findings, Rahal and colleagues (2012) developed the Compensatory Eating Behaviors in Response to Alcohol Consumption Scale (CEBRACS) in an effort to better assess specific compensatory behaviors, and when they occur (Rahal, Bryant, Darkes, Menzel & Thompson, 2012).

Based on a study conducted for initial development and validation of the CEBRACS, the authors report that this 21 item self-report questionnaire has four subscales: 1) Alcohol Effects (compensatory behaviors intended to enhance the effects of alcohol) 2) Bulimia (reflective of bulimic-type behaviors such as purging) 3) Dietary Restraint and Exercise (choosing lower calorie options or exercising to make up for alcohol-related calories) and 4) Restriction (skipping meals or not eating for a day). Original research validating the scale was performed in a sample of undergraduate students (Rahal et al., 2012; N=274, 19% male) with a demographic distribution of 75.2% White, 10.2% Hispanic, 6.9% Black, 4% Asian, and 3.6% Other ethnicity. The authors note that its low number of male participants, and lack of ethnic diversity limited this validation study.

To date, only one other published study has used the CEBRACS to assess drinking and eating behaviors in a college sample (Knight & Simpson, 2013). Results indicated that approximately 79% of the female Australian undergraduates surveyed reported engaging in some
form of compensatory behaviors in response to alcohol use. Instead of using a more formal measure such as the CEBRACS, some recent research on these patterns of behaviors has reverted to using a combination of single item, self-report measures (Eisenberg & Fitz, 2014). One research group has proposed a new measure, comprised of four Drunkorexia Motives and Behaviors scales to illustrate motivations for engaging in the behaviors, as well as how individuals may compensate for failed intentions to compensate (Ward & Galante, 2015). While this particular measure was validated in a primarily female sample, and should be studied further for its generalizability and validity in other populations with diversity in race and gender, it may be a promising measure of what occurs throughout an entire alcohol consumption event. Future work in developing comprehensive assessment of the drunkorexia phenomenon should include premeditated motivations and behaviors, adjusted behaviors during alcohol consumption, and post-drinking compensation – all across several domains of behavior (e.g., restricting as well as purging).

**IV. Motive for Drunkorexia**

Motives for drunkorexia include a combination of complex behavioral influences associated with both alcohol, as well as eating behaviors. Frequently cited motivations for alcohol use include reinforcement value (e.g., Smith, Martens, Murphy, Buscemi, Yurasek & Skidmore, 2010), sensation seeking (e.g., Hittner & Swickert, 2006) and impulsivity (e.g., Magid, MacLean & Colder, 2007). These factors may serve to drive both alcohol use as well as eating disordered behaviors (e.g., Bulik et al., 2004). Specific to college populations, some work has suggested that alcohol behavior among some undergraduates is mutually influenced by pressures to conform both to body image norms and to drinking norms (i.e., increased use of alcohol and fear of weight gain; Peralta, 2002).
One alcohol-related consequence that may contribute to drunkorexia is the increased likelihood of weight gain during college (Anderson, Shapiro & Lundgren, 2003). Increased calories consumed in alcoholic beverages and associated weight gain is a commonly reported disadvantage associated with drinking (Collins et al., 2014). Giles and colleagues (2009) found that 69% of students who engaged in drunkorexia in the past month reported that weight concerns were the reason for engaging in this behavior. In a sample of undergraduate women, binge drinkers were more likely to have greater weight concern than those who reported drinking less. Furthermore, women who endorsed greater binge drinking reported that their increased weight concern was specific to alcohol-related weight gain (Vickers et al., 2004). Motivated by fear of weight gain due to alcohol consumption, individuals may be more likely to engage in compensatory behaviors associated with drunkorexia, including increased exercise, calorie restriction, and purging.

V. Drunkorexia Behaviors

5.1 Exercise Related to Drinking

Associations have been made between eating disorders and excessive exercise (e.g., Mond & Calogero, 2009; Shroff et al., 2006) and also between eating disorders and excessive drinking (e.g., Grilo, Sinha & O’Malley, 2002; Luce, Engler & Crowther, 2007). The common association of eating disorders between excessive exercising and extreme drinking suggests that college student who drink more may be more likely to engage in related maladaptive eating behaviors (e.g., drunkorexia), as well as a greater likelihood of engaging in excessive exercise.

While this implication is speculative, consistent evidence within the literature confirms a positive relation between physical activity level and alcohol consumption (French, Popovici & Maclean, 2009). Systematic review of this association has demonstrated its consistency across
demographics (Piazza-Gardner & Barry, 2012), including the college population (Musselman & Rutledge, 2010). In one college sample, frequent exercisers drank significantly more often and a significantly greater quantity than less frequently exercising peers; this finding suggests that the relation is consistent for both the frequency as well as the amount of alcohol consumed (Moore & Werch, 2008). Certain drinking behaviors in college populations may be unique to college athlete status (e.g., Huchting, Lac, Hummer & LaBrie, 2011). Athletes may drink more as part of team rituals or celebrations, or respond to a “work hard, play hard” cultural norm (Green, K., Nelson, T. F., & Hartmann, D. (2014), an example of a circumstance where exercise would not necessarily be conceptualized as “compensatory” for alcohol use.

Combination of alcohol and exercise behavior that is compensatory in nature may derive from reasons other than adhering to athletic status or social conformity. Some recent work has indicated that motives to participate in increased exercise may reflect broader concerns related to alcohol-related weight gain (Barry & Piazza-Gardner, 2012). Individuals who drink more tend to work out with more intensity; as well, increases in physical activity prior to or following alcohol consumption lead to decreased weight concerns (Piazza-Gardner & Barry, 2014). A recent study of a nationally representative sample of college students (N = 22,488) found that physical activity and disordered eating behaviors uniquely predicted binge drinking (Barry & Piazza-Gardner, 2012). Interestingly, the positive association between physical activity and alcohol consumption was only found for high levels of exercise. In contrast, moderate-intensity activity was negatively associated with binge drinking; for each additional reported day of moderate exercise, individuals were less likely to be binge drinkers. Notably, these relations were significant while controlling for age, college year, race, gender, Greek status, and geographical residence. The authors concluded that very active college students are more likely
to binge drink than nonathletic peers. They further emphasize the potential of a drunkorexia model in explaining the counterintuitive alcohol–increased activity association in college populations.

5.2 Meal Alteration Related to Drinking

5.2.1 Calorie restriction. Despite the later addition of other compensatory behaviors to a formal conception of “drunkorexia,” restriction of calories prior to drinking (to compensate for the anticipated calories in alcohol) is the original basis for the term. Restriction of calories may occur after drinking, but most often, it occurs prior to alcohol use; the latter may increase the likelihood of negative consequences, above and beyond alcohol related outcomes (Burke, Cremeens, Vail-Smith & Woolsey, 2010; Eisenberg & Fitz, 2014; Giles, Champion, Sutfin, McCoy & Wagoner, 2009). Altering food consumption (e.g., calorie restriction, skipping meals) is reportedly a common means of alleviating fear of weight gain in college populations (Peralta, 2002). In the case of drunkorexia, limiting food consumption may be serving a more nuanced purpose: to increase the effects of alcohol, and/or to reduce the impact of the alcohol-related calories consumed.

In limiting food consumption, drinkers are able to achieve a higher level of intoxication, lacking food in their stomach that would absorb some of the alcohol. As well, restricting meals may save money, allowing for allocation of resources to purchase greater quantities of alcohol, rather than food (Bryant, Darkes & Rahal, 2012). In one large undergraduate sample, a significant number of individuals who reported more frequent heavy drinking were more likely to restrict their food intake to feel the effects of alcohol faster and to achieve greater intoxication than were non–binge drinkers (Bryant, Darkes & Rahal, 2012). Other work that surveyed a large sample of first year college students found that 14% reported restricting calories prior to
drinking; 6% of this group reported their restriction was intended to avoid weight gain and 10% reported it was intended to enhance alcohol's effects. Notably, the authors found no significant differences between males and females (Burke, Cremeens, Vail-Smith & Woolsey, 2010). A recent study of male and female university students ($N = 3409$), found that intentionally changing eating behavior prior to drinking alcohol was a common report (46%). Interestingly, men were more likely to increase their intake before drinking to “avoid a hangover” whereas women were more likely to decrease their intake to “avoid gaining weight.” In an extension of this study that examined only females, those who reported restricting food prior to drinking to avoid weight gain scored higher on measures of disordered eating, whereas those who reported restricting to get drunk faster scored higher on measures of alcohol abuse (Roosen & Mills, 2015).

Dieting with alcohol use may contribute to a cycle of maladaptive eating and drinking behaviors. These cycles may be particularly common in college populations, where rates of binge drinking are elevated (e.g., Kelly-Kelly-Weeder, 2010). Dieting, binge eating severity, and alcohol use were studied in a large sample of women ($N = 1384$) in their first year of college. The authors found that reports of alcohol use in the past month, intoxication on half or more of drinking occasions, and heavy drinking ($\geq$ five drinks) were all significantly positively associated with dieting and binge eating severity (Krahn, Kurth, Gomberg & Drewnowski, 2005). Consistent with this work, Piran and Robinson (2011) found that in both large college and community samples, the cluster of behaviors characterized by binge eating, dieting and purging was significantly associated with binge drinking.

### 5.2.2 Dietary restraint

Most work with college populations links dietary restraint with binge drinking (e.g., Krahn, Kurth, Gomberg & Drewnowski, 2005). One study of undergraduate women reporting high dietary restraint found that although the intent to drink
alcohol did not impact overall caloric intake of restrained eaters prior to drinking, restrained eaters reported significantly fewer eating episodes than unrestrained eaters on days they intended to drink (Luce, Crowther, Leahey & Buchholz, 2013).

Consistent with other work (e.g., Piran & Robinson, 2011) Stewart and colleagues (2000) found that for women, dietary restraint was positively associated with a composite drinks per week measure (Quantity X Frequency). Examining quantity and frequency separately however, quantity but not frequency was significantly correlated with restraint. These findings suggest that young women who self-report greater dietary restraint do not drink more often than others, but when they do drink, they drink significantly more alcohol. One explanation for this finding may be related to the cycle of limiting caloric intake that may cause binge eating (Polivy & Herman, 1985); by extension, attempts to limit alcohol consumption in women who report higher dietary restraint may lead to higher rates of binge drinking.

One study that did not show a positive association between restraint and alcohol consumption investigated drinking patterns and dietary restraint across the menstrual cycle in women with elevated drinking levels (7–20 drinks/week). Individuals who reported higher dietary restraint did not drink more than those with lower restraint in this study, but the high-restraint group drank less than the low-restraint group during the follicular phase. These findings suggest that among women with higher dietary restraint, hormonal fluctuations may modulate alcohol consumption across the menstrual cycle. The authors note that their sample was from the general population, and should be replicated in a college population where rates of binge drinking and dietary restraint are comparatively higher (Dimatteo, Reed & Evans, 2012).

The relation of dietary restraint with alcohol consumption may be a specific risk factor for young, female drinkers who are of late adolescence and college age. One evaluation of 40
female social drinkers found that women who reported high dietary restraint as well as greater disinhibition also reported more episodes of drunkenness compared to other dietary groups in their study (Higgs & Eskenazi, 2007). Similarly, a longitudinal survey of 480 college-age women who were at high risk for developing an eating disorder found that participants reported higher rates of binge drinking and frequent binge drinking throughout college. In this study, binge drinking was positively correlated with dieting and dietary restraint, suggesting that those prone to dieting-related behavior may also be more at risk for alcohol related problems (Khaylis, Trockel & Taylor, 2009).

5.2.3 Purging. For some individuals, a desire to compensate for the calories consumed in alcohol may motivate purging, behavior that appears to have a relatively high base rate in college (Blackmore & Gleaves, 2013). One early study of this behavior attempted to determine if there were different rates of vomiting after eating versus vomiting after drinking, or both. Of the undergraduate women in this study (N = 229), 19.7% reported self-induced vomiting after the consumption of food and/or alcohol; this total included 4.8% of the sample who only reported purging after eating, 7.4% who purged only after drinking, and an additional 7.4% who reported purging after both eating and drinking (Meilman, Von Hippel & Gaylor, 1991). A more recent study of 107 female college students investigated rates of self-induced vomiting. Of those who reported drinking, 59.8 % intentionally induced vomiting (at least once) after drinking alcohol; referring to the past 6 months, 86 % of the participants who reported this behavior indicated that they did so between one and five times (Blackmore & Gleaves, 2013). Notably, 48.6 % reported that intentionally vomiting after consuming alcohol was an “ok” behavior (agreeing or strongly agreeing with the statement).
Weight concern may be a strong motivation in the initiation of the tendency to purge. An early prospective study of the temporal relation of alcohol use and bulimic behavior in boys and girls aged 10-15 (N = 11,358) found that for girls, weight concerns were significantly predictive of beginning to get drunk and starting to engage in bulimic behaviors (Field, Austin, Frazier, Gillman, Camargo & Colditz, 2002). Once bulimic behavior has been established in early adolescence, a pattern of purging and drinking behaviors may continue into college years. For example, a study of 21 college women who reported purging determined that women who purged reported more frequent alcohol use than a matched group of healthy controls (Anderson, Martens & Cimini, 2005).

Laxative use is often paired with vomiting in measures of purging behavior. A recent, nationally representative sample of college students (N = 22,488) was examined to evaluate the role of physical activity and disordered eating behaviors in relation to binge drinking. Of the four eating disordered behaviors examined (i.e., dieting, vomiting/laxative use, diet pills, exercise for weight loss), vomiting and laxative use were the strongest predictors of binge drinking; individuals who vomited or used laxatives to lose weight were 1.76 times more likely to binge drink (Barry & Piazza-Gardner, 2012).

VI. Moderators of Drunkorexia

6.1 Differences According to Sex. Several individual characteristics appear to increase the likelihood that an individual will engage in compensatory behaviors specific to drunkorexia. In general, women are more often studied in relation to eating disorder behaviors; by extension, more is currently known about the specific characteristics that may lead some women to engage in drunkorexia. Studies that include both sexes indicate that women are, by and large, more likely than men to engage in the majority of drunkorexia behaviors (Bryant, Darkes & Rahal,
2012). However, some domains where men are also engaging in the behaviors are important to note. For one, several studies of both sexes indicate that males report calorie restriction on the days that they intend to drink (Burke, Cremeens, Vail-Smith & Woolsey, 2010; Giles, Champion, Sutfin, McCoy & Wagoner, 2009).

In addition to calorie restriction, men report differences in exercise, related to alcohol use. In a recent study of a nationally representative sample of college students (N = 26,062), for males, there was a positive relationship between exercise and alcohol use. In contrast, there was a small negative association between exercise and drinking behaviors among females. In this study, associations between exercise and weight loss behaviors were more strongly correlated for females as compared with males. Additionally, weight loss behaviors were positively associated with drinking in both sexes, an association stronger among females (Barry, Whiteman, Piazza-Gardner & Jensen, 2013). Similarly, another study of a mixed sex college sample found that men were as likely as females to be exercising both before and after alcohol consumption as a strategy to compensate for alcohol-related calories. Notably, men were less likely than women to use compensatory strategies to enhance the effects of alcohol (Bryant, Darkes & Rahal, 2012).

6.2 Exercise. Within studies of female samples, several individual characteristics have been identified that increase the likelihood of drunkorexia behaviors. One recent study compared college women who reported the use of exercise as a compensatory behavior for alcohol use, with those who did not. The authors found that women who reported compensatory exercise also reported consuming more alcohol, more binge drinking episodes, more exercise, greater body dissatisfaction, and dietary restraint than women who did not exercise to compensate for alcohol use. Consistent with prior work (Piran & Robinson, 2011; Stewart, Angelopoulos, Baker & Boland, 2000), women who used exercise as a compensatory behavior
consumed greater quantities of alcohol, but did not drink more frequently than those who did not use exercise as a compensatory behavior (Buchholz & Crowther, 2014).

6.3 Restraint. As discussed prior, women higher in dietary restraint are more at risk for behavioral compensation related to alcohol use, a factor that is particularly relevant for women who are heavier drinkers (Dimatteo, Reed & Evans, 2012; Stewart, Angelopoulos, Baker & Boland, 2000). For those who are restrained eaters generally, dietary restraint may increase, relative to consuming alcohol. One study of college women found a positive step-wise relation between dieting severity and problematic alcohol use. The authors cite that their findings were particularly important in establishing this pattern as a graded relation, extending not just to the severe ends of the clinical spectrum (i.e., eating disorder or alcoholism) but also to subclinical, frequently encountered levels of dieting and alcohol use (Krahn, Kurth, Gomberg & Drewnowski, 2005).

6.4 Negative Affect. Among women, heavier drinking may be a result of response to negative affect. Some work showed that among college-age women at risk for eating disorder, binge drinking was positively correlated with a tendency to cope using substances, and to cope using denial (Khaylis, Trockel & Taylor, 2009). Similarly, in another study of college women, eating behavior characteristic of bulimia (i.e., purging) was most strongly related to the use of alcohol as an avoidant coping mechanism. As both drinking and maladaptive eating behaviors have been hypothesized as performing an avoidant coping function, the findings from this study suggest that they may serve similar functions among certain women (Anderson, Simmons, Martens, Ferrier & Sheehy, 2006). Similarly, a study of a sample that was characterized into diagnostic eating disorder categories determined that individuals who reported symptoms of binge eating disorder, and bulimia nervosa were more likely to report drinking larger amounts
(binge drinking), and drinking to cope with negative affect as compared to those who did not report these symptoms (Luce, Engler & Crowther, 2007).

In contrast to these findings, some studies suggest that the relation between depressive affect and later alcohol use is stronger for men than women; as such, men may be more likely than women to seek the rewarding effects of alcohol in response to negative emotion (Nolen-Hoeksema, 2012). In support of this idea, one study of college women that included an examination of the influence of depression in drinking and eating behavior found that self-reported depression was not associated with binge drinking. The authors suggest that based on their findings, negative affect was not a significant motive for binge drinking, and that binge drinking may not be a response to emotional distress (Vickers et al., 2004). Future work should attempt to reconcile the conflicting findings regarding the role of negative affect in drunkorexia, across sex differences.

6.5 Weight Concern. Weight concern may be one of the most influential moderating factors in determining for whom drunkorexia behaviors are the most likely or problematic. A recent study of the prevalence and nature of drunkorexia behaviors in undergraduates found that women had more weight concerns than men, making them more likely to engage in drunkorexia. Furthermore, women who reported heavier drinking with stronger weight control motivations were most at risk for drunkorexia (Eisenberg & Fitz, 2014). Similarly, in an earlier study of undergraduate women, those who reported any binge drinking were more likely to report greater weight concern than those who reported no binge drinking. The authors note that the relationship between weight concern and binge drinking in this (and other) cross-sectional study is not clear. Women who binge drink may have increased weight concerns as a result weight gain related to calories in alcohol. In contrast, the authors propose that binge drinking may occur in response to
body dissatisfaction or as a means to distract from negative affect related to appearance (Vickers et al., 2004).

**Current study**

There is evidence of high correlation between increased drinking and associated maladaptive eating behaviors, across sexes (e.g., Kelly-Kelly-Weeder, 2011; Ward & Galante, 2015). What remains less well understood is whether the use of compensatory behaviors is qualitatively different between sexes in specific association with eating disorder risk. Further investigation of these factors may ultimately help to determine if the behavior combination is best conceptualized as an eating disorder, an alcohol-use disorder, or a problem of its own merit. The current study had two main aims. First, the investigation assessed whether reported compensatory behaviors and reported eating disorder behaviors in the current sample differed according to sex. It was expected that females would report greater overall scores on the CEBRACS, as well as the Eating Disorder Diagnostic Scale (EDDS; Stice, Telch, & Rizvi, 2000). Second, as engaging in compensatory behaviors related to alcohol use may place some individuals at greater risk for developing serious eating disorder pathology, this study examined the association between reported compensatory behaviors and reported eating pathology on the EDDS, with CEBRACS subscale scores. It was hypothesized that females, but not males, would report a significant association between some compensatory subscales, and eating disorder symptoms. Based on a lack of evidence from prior literature, no direct hypotheses of which subscales would be specifically implicated for females were made, related to this second aim.
Materials and Methods

Participants

The current study sample is drawn from a larger study (N = 761) of recruited undergraduates enrolled in introductory Psychology classes at a large Northeastern university during the spring and fall of 2014. Participants signed up for a study slot via an online website and were given course credit for their participation in the study. For the current analyses, participants (N = 530, 48% female) were selected from the original sample based on having endorsed consuming at least one alcoholic beverage within the prior 30 days. Inclusion criterion for the study was participation in the university’s research pool; students were excluded if they were not at least 18 years of age, or if they did not report sex, height or weight. Reported ethnicity in the current sample consists of White (57%), Hispanic (13%), Black (12%), Asian (8%), Other (.6%) and 9% who chose not to respond.

Measures

Demographics Form. Participants completed a basic demographics form, including items regarding self-reported ethnicity, sex, age, and year in school.

Alcohol Consumption. Alcohol consumption was measured using two single items that respectively measured frequency and quantity of alcohol use. In order to assess frequency, participants responded to the question “How often did you drink in the past month? (check one)” with response options ranging from (1) “I did not drink at all” to (6) “Nearly every day.” To gauge quantity of drinking, participants responded to the question “Think of a typical weekend (Friday or Saturday) in the last month. How much did you drink on that evening? (check one).” Participants reported the appropriate number, with options to indicate any specific number up to 30 drinks, and then another option for “More than 30.” Past work has supported
the use of single-item measures in assessing alcohol consumption and has suggested that single-items show comparable validity and reliability to scales with multiple items (Dollinger & Malmquist, 2009; Zimmerman et al., 2006)

**Eating Disorder Diagnostic Scale (EDDS; Stice, Telch, & Rizvi, 2000).** The EDDS was used to measure eating disorder symptomatology in the sample. The EDDS is a 22-item self-report scale for diagnosing anorexia nervosa, bulimia nervosa, and binge-eating disorder. The scale relates strongly to diagnostic interview data, and has shown good internal consistency and test-retest reliability (Stice et al., 2000); in our sample, the Cronbach’s α was .84 for men, and .82 for women. The response scale used by the measure varies across different items, as certain items required responses on a Likert-type scale ranging from 1 (“Not at all”) to 7 (“Extremely”), whereas others require that participants endorse the amount of times a certain behavior occurred. Using an individual’s responses on the measure, one can also generate an “ED symptom composite score,” which was calculated in the present study. Items on this scale included self-reported height and weight, which were used to calculate participants’ BMI (kg/m³).

**Compensatory Eating Behaviors in Response to Alcohol Consumption Scale (CEBRACS; Rahal, Bryant, Darkes, Menzel & Thompson, 2012).** The CEBRACS is a 21-item self-report measure that asks respondents to rate items pertaining to the last three months, for three time periods: before drinking, while under the effects of alcohol (during drinking), and after the effects of alcohol have worn off (after drinking). It uses a Likert-type rating scale from 1 to 5 (“Never” to “Almost all the time”). Each of the three main sections generally assesses the same compensatory behaviors in response to calories consumed from drinking alcohol. Ordered randomly within each time frame, these behaviors include eating less than usual, skipping meals or days of eating, eating low-fat or low-calorie food, exercising, vomiting, and taking diet pills,
diuretics, or laxatives. The scale demonstrated discriminant and convergent validity in its original development. It also demonstrated good internal consistency in the scale validation sample (Chronbach’s $\alpha = .89$) and in the current study (Chronbach’s $\alpha = .71$ for men, and .84 for women).

**Procedure**

During one in-lab appointment, participants provided informed consent and completed the self-report questionnaires described above. All students were granted course credit for their participation. The university’s Institutional Review Board approved all study methods and procedures.

**Analytic Plan**

Prior to analyses, data were screened using the Statistical Package for the Social Sciences (SPSS-21). All items were inspected for skewness, kurtosis, and univariate and multivariate outliers; preliminary testing indicated that for all scales, skewness and kurtosis were within limits unlikely to affect parameter estimates. Given the specialized clinical nature of some of the symptoms reported on the CEBRACS (e.g., laxative use), data trends indicated significant skew in some subscales. Several transformations were attempted but the problem persisted. Previous research was conducted with non-transformed data (Rahal, Bryant, Darkes, Menzel & Thompson, 2012). Therefore, after removing significant multivariate outliers, the current study proceeded with the analyses using non-transformed CEBRACS subscales.

For the first study aim, two univariate analyses of variance (ANOVA) models were used to determine whether respondent sex (male or female) was significantly related to CEBRACS and EDDS total scores. As presumably compensatory motives and subsequent behaviors may
differ systematically across weight classes as well as drinking styles, analyses included BMI, as well as frequency, and quantity of alcohol use as covariates.

For the second study aim, two separate linear regression analyses were conducted, one for males, and one for females. Each set of regression analyses controlled for BMI, alcohol frequency, and alcohol quantity, and all four CEBRACS subscales were entered into the model simultaneously to determine their association with EDDS total scores.

Post-hoc power analyses indicated that for the regression models with 7 predictors each, our sample size was adequate for capturing an effect size of .2.

Results

Descriptive statistics

Analyses included bivariate correlations in order to assess the relation of all variables within the study (available in Table 1). Male and female participants were similar in age (M\text{male} = 18.96, SD = 1.75; M\text{female} = 19.48, SD = 1.56) as well as BMI (M\text{male} = 23.68, SD = 3.63; M\text{female} = 23.30, SD = 4.60). Descriptive statistics for all alcohol, eating, and related compensatory variables are available in Table 2.

Aim 1: Univariate ANOVA comparison of CEBRACS and EDDS between sexes

A univariate analysis of variance indicated that Levene’s test of homogeneity of variance was significant for both EDDS totals, \( F(1, 461) = 6.49, p = .01 \) and for CEBRACS totals, \( F(1, 437) = 5.95, p = .02 \); further inspection of the variance ratio for each model did not suggest that more robust tests were indicated. A univariate analysis of variance conducted with the outcome variable of EDDS totals showed a significant effect of sex, \( F(1, 463) = 45.66, p < .001, \text{partial } \eta^2 = .091 \). Significant effects were also found for the covariate BMI, \( F(1, 463) = 44.95, p < .001, \text{partial } \eta^2 = .089 \) and frequency of alcohol consumption, \( F(1, 463) = 7.84, p < .01, \text{partial } \eta^2 \)
A univariate analysis of variance conducted with the outcome variable of CEBRACS totals showed a significant effect of sex, $F(1, 439) = 5.80$, $p = .02$, $\text{partial } \eta^2 = .013$. Significant effects were also found for the covariate frequency of alcohol consumption, $F(1, 439) = 7.76$, $p < .01$, $\text{partial } \eta^2 = .018$ and for quantity of alcohol consumption, $F(1, 439) = 5.68$, $p = .02$, $\text{partial } \eta^2 = .013$; a significant effect was not indicated for BMI, $F(1, 439) = .144$, $p = .71$.

Marginal means for EDDS and CEBRACS totals within sex condition were higher for females ($M_{\text{female-edds}} = 16.52$; $M_{\text{female-cebracs}} = 26.86$) than for males ($M_{\text{male-edds}} = 9.80$; $M_{\text{male-cebracs}} = 25.59$), indicating that the influence of sex on EDDS and CEBRACS totals was in the direction that we hypothesized in the first study aim.

**Aim 2: Regression analyses**

In the set of regression analysis for females, the full model with all four subscales entered simultaneously was significant, $F(7, 197) = 7.74$, $p < .001$, accounting for 22% of the variance in EDDS total scores. Within the full model, BMI, $b = .26$, $t(197) = 3.94$, $p < .001$ and the Bulimia CEBRACS subscale significantly related to EDDS scores, $b = .23$, $t(197) = 3.50$, $p < .01$. The Alcohol Effects, $b = .05$, $p = .55$; Dietary Restraint and Exercise, $b = .15$, $p = .05$; and Restriction, $b = .10$, $p = .23$, subscales did not demonstrate significant main effects.

For males, the full model with all four subscales entered simultaneously was significant, $F(7, 221) = 10.56$, $p < .001$, accounting for 26% of the variance in EDDS total scores. Within the full model, BMI, $b = .31$, $p < .001$; quantity of alcohol consumption, $b = -.24$, $p < .01$; and the Dietary Restraint and Exercise subscale, $b = .17$, $p < .01$, significantly related to EDDS scores. The frequency of alcohol consumption, $b = .06$, $p = .44$; and the Alcohol Effects, $b = .07$, $p = .35$. 

23
p = .24; Bulimia, b = .13, p = .05; or Restriction, b = .11, p = .11, subscales did not have significant main effects.
## Table 1. Pearson Product Bivariate Correlations for Variables of Interest

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 BMI</td>
<td>-</td>
<td>.01</td>
<td>.00</td>
<td>.37**</td>
<td>.13</td>
<td>.08</td>
<td>.06</td>
<td>.10</td>
<td>.21**</td>
</tr>
<tr>
<td>2 Alcohol Frequency</td>
<td>-.17**</td>
<td>-</td>
<td>.58**</td>
<td>-.06</td>
<td>.09</td>
<td>.11</td>
<td>.06</td>
<td>.05</td>
<td>-.05</td>
</tr>
<tr>
<td>3 Alcohol Quantity</td>
<td>-.12</td>
<td>.62**</td>
<td>-</td>
<td>.12*</td>
<td>.14*</td>
<td>.10</td>
<td>.08</td>
<td>.10</td>
<td>.04</td>
</tr>
<tr>
<td>4 EDDS total</td>
<td>.22**</td>
<td>.16*</td>
<td>.12</td>
<td>-</td>
<td>.32**</td>
<td>.14*</td>
<td>.21**</td>
<td>.24**</td>
<td>.27**</td>
</tr>
<tr>
<td>5 CEBRACS total</td>
<td>-.09</td>
<td>.36**</td>
<td>.34**</td>
<td>.31**</td>
<td>-</td>
<td>.61**</td>
<td>.32**</td>
<td>.82**</td>
<td>.48**</td>
</tr>
<tr>
<td>6 Alcohol effects</td>
<td>-.09</td>
<td>.32**</td>
<td>.33**</td>
<td>.18**</td>
<td>.76**</td>
<td>-</td>
<td>.19**</td>
<td>.09</td>
<td>.31**</td>
</tr>
<tr>
<td>7 Bulimia</td>
<td>.02</td>
<td>.04</td>
<td>.14*</td>
<td>.24**</td>
<td>.21**</td>
<td>.08</td>
<td>-</td>
<td>.10</td>
<td>.42**</td>
</tr>
<tr>
<td>8 Dietary restraint/exercise</td>
<td>-.07</td>
<td>.28**</td>
<td>.23**</td>
<td>.27**</td>
<td>.87**</td>
<td>.35**</td>
<td>.10</td>
<td>-</td>
<td>.24**</td>
</tr>
<tr>
<td>9 Restriction</td>
<td>-.07</td>
<td>.28**</td>
<td>.26**</td>
<td>.26**</td>
<td>.65**</td>
<td>.47**</td>
<td>.30**</td>
<td>.46**</td>
<td>-</td>
</tr>
</tbody>
</table>

**Note:** Correlations for women are presented below the diagonal. **Significant at < .01. *Significant at < .05. EDDS (Eating Disorder Diagnostic Scale), Alcohol Frequency (value of 3) is 1-2 times per month; (value of 4) is 2-3 times per month. CEBRACS (Compensatory Eating Behavior in Response to Alcohol Consumption Scale. *Italicized variable = subscale of the CEBRACS.*
Table 2. Descriptive Statistics for Variables of Interest

<table>
<thead>
<tr>
<th></th>
<th>Range</th>
<th>M(SD)</th>
<th>Skewness (SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol Frequency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>1 - 6</td>
<td>3.33 (.90)</td>
<td>.11 (.15)</td>
</tr>
<tr>
<td>Men</td>
<td>1 - 6</td>
<td>3.67 (.96)</td>
<td>-.13 (.15)</td>
</tr>
<tr>
<td>Alcohol Quantity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>1 - 26</td>
<td>5.77 (3.44)</td>
<td>1.86 (.15)</td>
</tr>
<tr>
<td>Men</td>
<td>1 - 21</td>
<td>8.66 (4.34)</td>
<td>.35 (.15)</td>
</tr>
<tr>
<td>EDDS Total</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>0 - 48</td>
<td>16.44 (11.10)</td>
<td>.71 (.16)</td>
</tr>
<tr>
<td>Men</td>
<td>0 - 58</td>
<td>9.81 (9.97)</td>
<td>1.75 (.15)</td>
</tr>
<tr>
<td>CEBRACS Total</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>21 - 49</td>
<td>26.27 (5.94)</td>
<td>1.47 (.16)</td>
</tr>
<tr>
<td>Men</td>
<td>21 - 45</td>
<td>26.07 (4.59)</td>
<td>.99 (.15)</td>
</tr>
<tr>
<td>Alcohol Effects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>7 - 21</td>
<td>8.71 (2.79)</td>
<td>2.21 (.16)</td>
</tr>
<tr>
<td>Men</td>
<td>7 - 19</td>
<td>8.34 (2.28)</td>
<td>2.20 (.15)</td>
</tr>
<tr>
<td>Bulimia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>6 - 9</td>
<td>6.11 (.38)</td>
<td>4.30 (.16)</td>
</tr>
<tr>
<td>Men</td>
<td>6 - 11</td>
<td>6.13 (.47)</td>
<td>5.73 (.15)</td>
</tr>
<tr>
<td>Dietary Restraint/Exercise</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>6 - 24</td>
<td>9.17 (3.77)</td>
<td>1.29 (.16)</td>
</tr>
<tr>
<td>Men</td>
<td>6 - 19</td>
<td>9.43 (3.47)</td>
<td>.74 (.15)</td>
</tr>
<tr>
<td>Restriction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>2 - 5</td>
<td>2.28 (.65)</td>
<td>2.41 (.15)</td>
</tr>
<tr>
<td>Men</td>
<td>2 - 5</td>
<td>2.17 (.49)</td>
<td>3.54 (.15)</td>
</tr>
</tbody>
</table>

Discussion

Within a large sample of college undergraduates, BMI and frequency of alcohol consumption were significantly related to higher scores on a measure of eating disorder pathology. Supported by prior work, elevated eating disorder scores were reported by women, as compared to men. Given associated weight concerns that are a consequence of increased alcohol use, binge drinking - rather than frequency of alcohol consumption - is more commonly identified in relation to eating disorder symptoms. The current study
findings may be an artifact of the way in which alcohol use was described in the survey; frequency and quantity of alcohol consumption were both reported in reference to the past month, which may have been difficult to recall. However, the current study findings may also reflect a different conception of motives for alcohol use, as women who are drinking frequently might be doing so as a means to distract from negative affect that derives from body dissatisfaction, or negative self-appraisal related to weight and shape.

Both frequency of alcohol consumption, and quantity of alcohol consumption were significantly associated with higher scores on a measure of compensatory behaviors associated with alcohol use. While the current study cannot assess these factors in a directional manner, it is conceivable that those who are drinking more frequently, and in greater volume, would also experience more motivation to compensate for the alcohol-related calories. As hypothesized, and perhaps as a reflection of greater relative weight concern, women reported elevated use of compensatory behaviors, as compared to men. Notably, the relation of both frequency and quantity of alcohol consumption with the use of compensatory behaviors remained significant, regardless of weight status.

For both men and women, the contribution of compensatory behaviors accounted for a comparable amount of variance in eating disorder pathology scores. These findings suggest that in the context of behaviors related to alcohol use, both men and women demonstrated higher scores on measures of eating disorder symptoms. This relation appears to function differently, however, according to sex. For women, elevated BMI, and elevated scores on the Bulimia subscale of the CEBRACS were associated with higher scores of eating pathology. In contrast, for men, elevated BMI, quantity of alcohol consumption, and the Dietary Restraint and Exercise CEBRACS subscale indicated
higher scores of eating pathology. For both sexes, elevated BMI may be a risk factor for more problematic use of compensatory behaviors to offset the calories in alcohol; this relation might be particularly meaningful for men who are more likely to binge drink. Women who endorse bulimic behaviors may be similar to men who engage in exercise for compensatory reasons, as both categories of behavior function in a purging manner.

This study clearly indicates that the term “drunkorexia” should include a broader definition of problematic behavior, above and beyond pre-drinking caloric restriction. The inconsistency of definitions of drunkorexia across investigations has contributed to a general lack of consensus as to which categories of compensatory behavior warrant further study, and may provide the greatest risk. Caloric restriction prior to drinking may be hazardous, especially given sex differences in alcohol metabolism. However, the current study reveals that it might be more nuanced evaluations of certain types of behavior that are relevant for men and women individually. For women, increases in bulimic behavior may be more problematic whereas for men, increases in compensatory exercise may provide the greatest risk for a combination of maladaptive eating and drinking behaviors.

Limitations and Future Considerations

The current study has several limitations that should be noted. First, the nature of the study design is cross-sectional, as well as comprised of self-report recall. Longitudinal work might identify more mediational influence in the etiology of eating and drinking related behaviors. Future work might also be improved by the use of measures that do not rely on memory, and allow for behavioral assessment of drunkorexia in real time. Second, the measure of drunkorexia included in this study has
motives listed that are related to weight control and alcohol effects, but does not include money-saving or other possible motives that might be influencing compensatory behavior. A more comprehensive view of what may be motivating individuals—males, in particular—to account for caloric consumption is limited by the current measure. Third, the current study did not inquire whether participants lived at home, or on campus. As drunkorexia is likely a more prevalent problem in undergraduate living arrangements, further study would be improved by the ability to control for the effects of living circumstances. Additionally, the current study did not assess for overall substance use (e.g., marijuana, stimulants). Future work should identify problematic compensatory behaviors that are specific to other types of substance use, above and beyond alcohol consumption.

More generally, the lack of standardization of the definition of drunkorexia limits the current scope of research of this phenomenon. There are domains of behavior (i.e., self-induced vomiting) that are distinct from calorie restriction, and should be included in any evaluation of compensatory eating behaviors related to alcohol use. Additionally, future work should improve upon operationalizing measures of relevant compensatory behaviors, as there is currently little agreement in language use across assessment methods.

**Conclusions**

Past research has focused on compensatory weight loss behaviors related to alcohol use more generally; the patterns evidenced in this study indicate that for specific motives in compensatory behavior, sex may be relevant. In the current study, excessive exercise to compensate for the calories in alcohol was significantly more common among
men, than among women. These findings suggest that behavioral adjustments for alcohol calories may be different, depending on sex differences. Future work might identify a more nuanced profile of drunkorexia, with attention to which sets of behaviors may be more problematic for men, or for women.
References


doi:10.1080/07448481.2011.587487


from 4 Harvard School of Public Health College Alcohol Study surveys: 1993–

Wolfe, W. L., & Maisto, S. A. (2000). The relationship between eating disorders and
substance use: moving beyond co-prevalence research. *Clinical Psychology

Zimmerman, M., Ruggero, C. J., Chelminski, I., Young, D., Posternak, M. A., Friedman,
M., ... & Attiullah, N. (2006). Developing brief scales for use in clinical practice:
the reliability and validity of single-item self-report measures of depression
symptom severity, psychosocial impairment due to depression, and quality of life.
*Journal of Clinical Psychiatry.*