

ASSESSING THE RELATIONSHIP BETWEEN PROBLEMATIC EATING AND  
ALCOHOL USE BEHAVIORS AMONG NATIONAL EATING DISORDERS  
SCREENING PROGRAM PARTICIPANTS

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THESIS ABSTRACT

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Research has shown that college students have elevated rates of alcohol use and problematic eating behaviors. These behaviors show high rates of comorbidity. Further, research suggests that individuals with bulimia and the binge-purge subtype of anorexia show elevated levels of impulsivity and sensation seeking compared to individuals with restricting anorexia. The current study focused on the relationships between problematic eating behaviors, alcohol use, and impulsivity among a sample of undergraduates attending National Eating Disorder Screening Program. All participants (n=88, 80% female, average age 20.5) completed a packet of measure assessing substance use, eating behaviors, and impulsivity. Dieting was positively correlated to both alcohol-related problems and the frequency of binge drinking. Conversely, a scale measuring anorexic

like behaviors was negatively correlated with the frequency of alcohol consumption in the last 30 days. Contrary to hypotheses, the bulimia subscale was not correlated with any of the alcohol variables. Multiple regression analyses revealed that quantity of alcohol consumed and negative consequences related to alcohol use were predictive of the problematic eating behavior and dieting, and that impulsivity was significantly correlated with measures of alcohol related problems and the dieting. Though not all of our hypotheses were supported, the results of this study show that problematic eating behaviors (i.e., dieting) are associated with increased risk for alcohol use problems. The unexpected relationship between alcohol use and dieting may provide direction for future research.

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## INTRODUCTION

### *Disordered Eating Defined*

As obesity rates have increased over the past 30 years (Dae et al., 2002), the ideal body shape for females has become increasingly more emaciated. This has led to discontentment and the setting of unattainable goals among females regarding their body weight and shape. It is not surprising, then, to find that as obesity rates have risen, so also have rates of eating disorders (Chamay-Weber, Narring, & Michaud, 2005). The *Diagnostic and Statistical Manual of Mental Disorders, fourth edition, text revision* (DSM-IV-TR; American Psychiatric Association (APA), 2000) specifies four types of eating disorders: anorexia nervosa (AN), bulimia nervosa (BN), binge eating disorder, and eating disorder not otherwise specified. There is one shared characteristic in BN and AN patients: the individual's body shape or weight largely impacts his or her self-evaluation, or the way in which a person views oneself (APA, 2000).

The defining characteristic of anorexia nervosa is maintaining a body weight at least 15% below the average body weight for a person's sex, age, height, and body structure. Other diagnostic criteria, as outlined by the DSM-IV-TR, include fear of weight gain/becoming fat (despite maintaining below a minimal normal weight); disturbance in the way that body weight, size, or shape is experienced; and amenorrhea in females (absence of three or more consecutive menstrual cycles). There are two subtypes of AN: restricting type and binge-eating/purging type (APA, 2000). The lay public

commonly uses the word anorexia to refer to the restricting subtype, which is characterized by self-starvation only. However, the binge-eating/purging subtype is diagnosed when an individual regularly binges and purges while meeting all other criteria of AN (APA, 2000).

According to the DSM-IV-TR (APA, 2000), one diagnostic criterion for bulimia nervosa is repeated episodes of binge eating characterized by eating more than is considered normal during a two-hour period of time and lack of control during the episode. Other criteria include engaging in compensatory behaviors to prevent gaining weight (e.g., vomiting, excessive exercise, use of laxatives/diuretics, etc.) and the behaviors (binge eating and compensatory response) must occur an average of twice a week for three consecutive months. As with AN, there are two subtypes of BN: purging type and the nonpurging type (APA). The purging subtype is most common and includes vomiting and/or use of laxatives, diuretics, or enemas as the compensatory behaviors following a binge episode. The nonpurging subtype is applied when the compensatory behavior is excessive exercise.

Aside from full blown eating disorders, some researchers and clinicians recognize a population of individuals with subclinical eating disorders. These subclinical eating disorders are recognized when people do not meet the full criteria for AN or BN, but obviously have disordered eating patterns. Subclinical eating disorders are also known as eating disorder not otherwise specified, atypical eating disorder, partial eating disorder, sub-threshold eating disorder, problematic eating behaviors, or disordered eating (Chamay-Weber et al., 2005). The different names are partly due to preference and partly to how the subclinical eating disorder is defined. For example, eating disorder not

otherwise specified is a specific diagnosis in the DSM-IV-TR (APA, 2000); certain criteria must be met to receive this diagnosis. However, some researchers and clinicians recognize disordered eating patterns that do not meet the criteria for eating disorder not otherwise specified; therefore they use a different name. According to Chamay-Weber et al., some define these subclinical eating disorders based on an individual meeting a certain number of criteria (some even use the DSM-IV-TR criteria), but not as many criteria as necessary to receive a full diagnosis. Others define these disordered eating patterns by a specific score on an eating disorders screening tool (e.g., Eating Attitudes Test, Eating Disorder Inventory, etc.) that is elevated relative to the general population but lower than the score typically associated with a full eating disorder. Still others include dieting as a form of disordered eating. There is no agreed upon definition of a subclinical eating disorder, but it is agreed that these eating patterns are more common than full eating disorders, that there are significant negative health consequences related to these problematic eating behaviors, and that they oftentimes lead to a full eating disorder (Chamay-Weber et al.).

### *Prevalence of Disordered Eating*

There is much debate about the actual percentage of people with eating disorders. However, most research agrees that the prevalence of eating disorders in North America ranges from 0.1% to 2% in the general population, and even as high as 5% in high school and college populations (Garner & Desai, 2000; Polivy, Herman, & Boivin, 2005). Many speculate that the above percentages are an underestimate, as many sufferers go undiagnosed because of the social acceptability of dieting and fasting in the Western culture (Polivy et al.). The onset of eating disorders usually occurs between the ages of

eighteen and twenty, and is most often preceded by some life stressor or change (e.g., leaving for college); this age of onset and the role of stress and life transitions is what places college aged individuals at a higher risk for developing an eating disorder (Dunn, Larimer, & Neighbors, 2002).

Research shows that there are gender differences in the clinical populations of eating disordered individuals, with males accounting for only 5% to 10% of this population (Garner & Desai, 2000). A possible explanation for the unequal representation of males in the eating disordered population is differential cultural pressures for males and females. While females feel pressure to be thin, males are pressured to conform to muscular builds. Of the men in the eating disordered population, most are involved in activities that emphasize weight control (e.g., gymnastics, wrestling, dance, etc.; Garner & Desai).

In addition to individuals who meet the full criteria for an eating disorder, an even greater percentage experience problematic patterns of eating behaviors and body image disturbances (Chamay-Weber et al., 2005; Kurth, Krahn, Nairn, & Drownowski, 1995; Striegel-Moore, Silberstein, Frensch, & Rodin, 1989). As with full eating disorders, there is debate about the actual percentage of people with these subclinical cases. Kurth et al. reported that roughly 2% of freshman college females had BN, but another 16% met most of the criteria for BN (i.e., four out of the necessary five criteria). Striegel-Moor et al. assessed the eating behaviors of college freshmen at the beginning of the year and again at the end of their freshman year. They observed that though rates of BN did not change, there was an increase in rates of disordered eating (e.g., bingeing, purging, severe dieting, etc.). Chamay-Weber et al. reviewed the literature on subclinical eating disorders in

adolescence (it should be noted that the ages of participants in these studies ranged from middle school to college-aged). They found that the reported prevalence of subclinical eating disorders varied across studies and ranged from 0.8% to 14% in adolescent girls (Chamay-Weber et al.). Rates of purging behaviors alone in adolescent populations ranged from 5% to 16%. Chamay-Weber et al. stated that the large discrepancy in rates of problematic eating behaviors is due to several factors, including location of the study, age of participants in the study, assessment method, and criteria used to define a subclinical eating disorder.

### *Consequences of Disordered Eating*

Approximately 5% to 8.5% of eating disordered individuals eventually die from problems related to their disorder; death is more likely to occur with AN than with BN. Though this is the worst-case scenario, there are many non-fatal effects of eating disorders, and these effects differ between AN and BN. High blood pressure, lower metabolism, slower heart rate, and hypothermia are all common to AN patients as a result of starvation or inability to maintain a normal body weight. Bulimia Nervosa patients are more likely to experience weakness, constipation, edema, electrolyte imbalance, swollen salivary glands, muscle cramps, and abnormal heartbeats as a result of self-induced vomiting (Garner & Desai, 2000). Individuals with BN often experience more, though less-severe, negative health effects than those with AN.

Subclinical cases of eating disorders can lead to a range of health problems, and likely place the individual at risk to develop an eating disorder in the future. For example, one study has shown that approximately 12.5% of adolescents with a subclinical eating disorder went on to be diagnosed with AN early on in adulthood; this

percentage is expected to be higher in adolescents experiencing subclinical symptoms of BN, as these symptoms are more prevalent (Chamay-Weber et al., 2005).

Gastrointestinal problems (e.g., constipation, abdominal pain, nausea, etc.) are the most reported result of practicing disordered eating behaviors. Other physical complaints include headaches, hypotension, irregular heartbeat, and problems with menstrual cycle (Chamay-Weber et al.). For example, in a population of college students with disordered eating behaviors, 93% to 100% reported a history of menstrual abnormalities (Kreipe, Strauss, Hodgman, & Ryan, 1989). In patients with AN, menstrual abnormalities are expected due to lack of body weight, however Kreipe et al. report that stress may also disrupt hormonal functioning, thus creating problems with menstruation unrelated to body-fat composition. Also similar to full eating disorders, individuals with subclinical eating disorders during adolescence may observe a loss of bone density in adulthood related to their eating behaviors (Chamay-Weber et al.).

As with subclinical eating disorders, dieting has been shown in research to be a precursor to the development of an eating disorder, especially in adolescent girls (Chamay-Weber et al., 2005; Daee et al., 2002; Kurth et al., 1995). Chamay-Weber et al. reported that 26% to 77% of American adolescent girls diet (again depending on location, assessment method, and definition of diet). Of those that diet, approximately 18% report unhealthy means of weight loss (e.g., liquid diet, low-calorie diet, skipping meals), while 5% resort to dangerous practices to lose weight (e.g., fasting, purging; Daee et al.). As a matter of fact, “74% of patients with bulimia attributed the development of their eating disorder to the inability to maintain a low-carbohydrate diet, leading to carbohydrate craving and subsequent cycles of bingeing and purging” (Daee et al., p. 1036). Kurth et al.



reported that in a population of female college students who admit to dieting, approximately 4% to 20% have some symptoms of BN. In addition to increasing the risk of an eating disorder, dieting can have many negative consequences, both psychological and physiological. The physical consequences include stunted growth, delay in onset of puberty, weight gain and obesity in adulthood (which is associated with many negative consequences), and lower metabolic rate. Psychological correlates of dieting include use of drugs (alcohol, marijuana, cigarettes, etc.), becoming sexually active at a younger age, less involvement with family, increased risk for suicide, and doing worse in school than the students that do not report dieting (Dae et al.).

### *Substance Use and Disordered Eating*

Recently, research has shown that a significant portion of people with eating disorders also meet criteria for other diagnoses. Loxton and Dawe (2001) reported a high comorbidity between alcohol use and eating disorders. It is unclear whether alcohol use is overrepresented in eating disordered individuals, or vice versa (Loxton & Dawe; Taylor, Peveler, Hibbert, & Fairburn, 1993). The majority of studies in this area report that eating disorders featuring binge eating (regardless of the diagnosis of BN or AN binge/purge subtype), but not AN restrictive subtype, are related to substance use (Lilenfeld & Kaye, 1996; O'Brien & Vincent, 2003). For example, in a review of over fifty studies reporting comorbidity between alcohol use and eating disorders, Lilenfeld and Kaye found that 0% to 6% of restricting AN reported comorbid alcohol use, while 14% to 49% of those with BN reported regular alcohol use.

Studies focusing on substance use and disordered eating behaviors among college students have produced mixed results. Researchers agree that college-aged women with

full or subclinical eating disorders report more negative consequences as a result of alcohol use than do non-disordered eaters (Anderson, Martens, & Cimini, 2005; Dunn et al., 2002). However, the conflicting results are evident in whether or not individuals with eating disorders, or symptoms of, report an increase in quantity and/or frequency of alcohol use. For example, among college-aged women, Chamay-Weber et al. (2005) reported that subclinical eating disorder symptoms are positively correlated with “increasing prevalence of alcohol, cigarette, and marijuana use, and with increasing frequency and intensity of alcohol use” (Chamay-Weber et al., p. 422). However, Dunn et al. found that while quantity and frequency of alcohol consumption was similar between college students with and without eating disorders, those meeting criteria for eating disorders experienced more negative consequences (as measured by the RAPI). Anderson et al. used a similar sample of college students (though all female), but instead of using a tool to diagnose eating disorders, they focused on the symptom of purging, which the researchers defined as a positive response to a single question regarding vomiting and/or laxative use in the last 30 days for the purpose of weight loss. Alcohol use was assessed by two questions: the number of days in the past month in which the individual binge drank, and the number of days in the past month in which alcohol was used. The questionnaire also contained an assessment of negative alcohol related consequences that may have occurred over the past month (Anderson et al.). This study reported that the students that reported purging during the past month also reported “more frequent alcohol use and more negative consequences of alcohol use than the comparison group” (Anderson et al., p. 65). Using only purging behaviors, instead of full eating disorder criteria could account for the differences in frequency of alcohol use between the

Anderson et al. study and the Dunn et al. study because purging is only one characteristic of an eating disorder, and is not present in all eating disorder cases. The current study was designed to further examine the relations between specific types of problematic eating behaviors and substance use in a sample of college undergraduates.

### *Impulsivity*

Several studies have found that a large percentage of individuals with eating disorders score higher on impulsivity measures than matched controls. These studies also report that the relationship between disordered eating and impulsivity is more common in BN than AN (Cassin & Ranson, 2005; Conason, Klomek, & Sher, 2006; Loxton & Dawe, 2001; Taylor et al., 1993). More specifically, impulsivity is most common in individuals who report symptoms of bingeing and/or purging (i.e., BN and bingeing/purging AN). In fact, individuals with characteristics of AN restricting type reported lower impulsivity scores than matched controls (even those without any disordered eating patterns). Cassin and Ranson conducted a review of the literature on eating disorders and personality characteristics and found support for the widely accepted notion that individuals with BN are characterized by impulsivity and sensation seeking; these same behaviors are low in AN. There is debate, however, regarding which was present first: eating disorder or impulsive personality traits (Ames-Frankel et al., 1992; Cassin & Ranson). When this relationship between BN and impulsivity was originally observed, many researchers and clinicians thought that the impulsive nature came first. Then, when an individual experienced dissatisfaction with their body weight and/or shape, they would use drastic measures, such as bingeing and purging as a quick solution. However, Ames-Frankel et al. reported that when individuals decreased episodes of bingeing and/or purging, their

impulsivity and sensation seeking scores decreased as well. They used this finding to support the idea that the impulsive nature of their disordered eating patterns resulted in the increase of other impulsive behaviors.

Le Grange et al. (2006) conducted a study comparing individuals with BN and individuals with a subclinical eating disorder featuring BN symptoms on a variety of measures. This study reported no differences between the two groups on measures of impulsivity. This finding supports the idea that individuals with subclinical eating disorders will similarly show increased levels of impulsivity as those with BN.

Research has also identified a link between impulsivity and alcohol/substance use (Conason et al., 2006; Dom, Hulstijn, & Sabbe, 2006; Wiederman & Pryor, 1996). Dom et al. conducted a study comparing early- versus late-onset alcoholics (alcohol dependence onset before age of 25 or after the age of 25, respectively). Both groups were given a variety of measures including measures of impulsivity and sensation seeking. Dom et al. observed that the early-onset alcoholics scored higher on these measures of impulsivity and sensation seeking. It should be noted that it is at the early-onset age in which most eating disorders begin, providing support for the idea that impulsivity could be the link between the high comorbidity between disordered eating and alcohol use. Dawe, Gullo, and Loxton (2004) reported that impulsivity is not just evident in people that are substance dependent; substance users in general score higher on measures of impulsivity and sensation seeking than non-substance users, at any age. Several studies have reported that adolescents, older adolescents, and young adults who use alcohol show higher rates of impulsivity (Baker & Yardley, 2002; Cloninger, Sigvardsson, & Bohman, 1988; Shillington & Clapp, 2002; Soloff, Lynch, & Moss, 2000). Though not one of

these studies was done specifically with college students, many of the participants were college-aged. The current study examined the potential effects of impulsivity on the relationship between problematic eating behaviors and substance use in a sample of undergraduates.

### *National Eating Disorder Screening Program*

National Eating Disorder Screening Program (NEDSP) is a program sponsored by the Mental Health Screening Organization with the purpose of educating, screening, and providing help for at-risk college students (College Response). In 2004, the Mental Health Screening Organization sponsored an online version of an eating disorder screening. Of the over 16,000 students who participated in the online screening, 59.34% showed disordered eating symptoms, though it is unclear how they defined “disordered eating symptoms” (NEDSP Results). National Eating Disorder Screening Program has been an annual event on college campuses nationwide since 1996. During the first NEDSP in 1996, data was collected from nearly 10,000 students enrolled in one of over 400 participating colleges. Becker and colleagues (2003, 2004, 2005) have used this data to analyze the impact of NEDSP. They have looked more specifically at how participants’ weight and ethnicity may have impacted referral recommendations (Becker, Franko, Speck, Herzog, 2003; Becker, Thomas, Franko, & Herzog, 2005). However, to date, no research has been conducted with NEDSP participants that have looked beyond eating disorder symptoms. The current study took advantage of this event to look more closely at the relationship between disordered eating behaviors and substance use in a sample of undergraduate NEDSP participants.

### *Current Study*

The current study focused on disordered eating behaviors and substance use among a sample of undergraduates attending NEDSP. Similar to the studies conducted by Anderson et al. (2005) and Dunn et al. (2002), this study used a non-treatment seeking sample of college students; however, unlike Anderson et al. who used an all female sample, the current study used male and female college students. The investigator hoped to improve on the methodology used in the previous study by employing a psychometrically sound assessment battery. Anderson et al. used a single question to assess for purging (the only eating disorder symptoms assessed), two questions to assess frequency of alcohol use and binge episodes, and seven questions related to negative consequences. The current study used full measures to assess for symptoms of eating disorders, frequency of alcohol consumption and binge drinking episodes, and negative consequences associated with alcohol use.

In the current study, the author tried to address three primary hypotheses. First, we hypothesized that participants who show symptoms of eating disorders will report elevated levels of alcohol use and related problems. More specifically we hypothesized that symptoms associated with BN and AN binge/purging type will be predictive of elevated levels of alcohol use and related problems. Second, we hypothesized that participants who report symptoms of binge and/or purging will be more impulsive than participants who do not report these symptoms. Third, we hypothesized that participants who report problematic eating behaviors and elevated levels of substance use will be more impulsive than participants who report only problematic eating behaviors.

## METHOD

### *Participants*

The participants were Auburn University undergraduate students who participated in the National Eating Disorder Screening Program activities (n=88). Participants included females and males who were at least 19 years old (80% female, average age 20.5). After completion of normal NEDSP activities, students were handed a flyer indicating the opportunity to participate in the current research project. The flyer indicated the location of the study and that participants would be entered into a raffle to win one of two \$50 gift cards to Target for their participation.

### *Procedures*

Students who appeared were first given an informed consent letter to read. Upon completion of the informed consent letter, students were given a packet of surveys to complete. The screening packet included a demographics/information questionnaire, the Eating Attitudes Test-26 (EAT-26), the Alcohol Use Disorders Identification Test (AUDIT), the Daily Drinking Questionnaire (DDQ), the Rutgers Alcohol Problem Index (RAPI), a Substance Use Survey, and the Eysenck Impulsivity Scale (EPI). Once students completed the survey packet, they were placed in a box, as to limit the contact the research assistants had with the packets and to minimize the possibility of identification of participants to their packet. All participants were given a referral sheet, containing contact information for services in the community, should they

feel the need to talk to someone about their eating habits or substance use. There were also licensed psychologists on hand should someone need immediate assistance. After placing the survey packet in the box, participants wrote their name, email address, and phone number on a sheet of paper and placed it into a separate box for the raffle. There was no way to identify a participant's packet once packets were completed.

### *Self-Report Measures*

Demographics. The demographics/information questionnaire (see Appendix B) included questions regarding gender, age, completed education, membership with a Greek organization, ethnicity, race, and current residence. This information was used for descriptive purposes.

EAT-26. The Eating Attitudes Test-26 (EAT-26; see Appendix B) is a shortened version of the original 40 question Eating Attitudes Test (Garner, Olmstead, Bohr, & Garfinkel, 1982). The EAT-26 contains 26 statements and offers a 6 point Likert scale to answer (ranging from Always to Never). The three responses most indicative of ED symptoms receive a score of 3, 2, and 1, while the other three responses are scored 0. Scores can range from 0 to 78; a score of 20 or above is generally used as an indication of a potential eating disorder (Garner et al.). In addition to the total score, the EAT-26 yields three subscale scores: Dieting, Bulimia and Food Preoccupation, and Oral Control. The Dieting subscale is composed of thirteen questions related to the desire to be thinner and the avoidance of fattening foods. The Bulimia subscale is composed of six questions related to bingeing behaviors, vomiting thoughts and behaviors, and a preoccupation with food. The Oral Control subscale is composed of seven questions that relate to anorexic-like symptoms, including caloric restriction and feeling pressure from others to eat and



gain weight (Anderson, Simmons, Martens, Ferrier, & Sheehy, 2006). The EAT-26 has shown reliability and validity in use with undergraduate college students (Thome & Espilage, 2004). In the current study, the EAT-26 had an internal reliability coefficient of .85 for the full scale, a .86 for the dieting subscale, .79 for the bulimia subscale, and .40 for the oral control subscale. It is unclear why the oral control subscale internal reliability was so low in the current sample. Follow-up analyses revealed that removing items did not increase the internal reliability of this subscale.

AUDIT. The Alcohol Use Disorder Identification Test (AUDIT; see Appendix B) is a ten-question, self-report measure that inquires about behaviors commonly associated with risky drinking patterns. Studies have shown the AUDIT is reliable and valid in a college student sample (Fleming, Barry, & MacDonald, 1991; O'Hare, & Sherrer, 1999), and it was internally reliable in the current sample ( $\alpha = .86$ ).

DDQ. Portions of the Daily Drinking Questionnaire (DDQ; see Appendix B) were used to assess the average quantity of alcohol, as well as the maximum amount of alcohol, participants consumed for each day of the week during the past four weeks. The DDQ also inquires about the types of alcohol consumed (i.e., beer, wine, hard liquor, and mixed drink) and the number of episodes of binge drinking in the past 28 days. The DDQ has shown reliability and validity in use with undergraduate college students (Collins, Parks, & Marlatt, 1985).

RAPI. A modified version of the Rutgers Alcohol Problem Index (RAPI; see Appendix B) was used to assess negative consequences a participant has experienced as a result of alcohol use. The RAPI is a 23 item, self-report measure that requires participants to respond to statements based on how many times they have experienced a

particular problem in the past month. Responses are indicated using a five-point Likert scale (0=never, 1=1-2 times, 2=3-5 times, 3=6-10 times, 4=more than 10 times). The RAPI was designed for use with adolescents, ages 12-21, which makes it an acceptable measure for use with college students. Internal consistency has been found to be adequate in previous studies ( $r = .77-.82$ ; White & Labouvie, 1989). One month test-retest reliability was also found to be adequate in a college student sample ( $r = .72$ ; Borsari & Carey, 2000). The original RAPI measured the frequency of alcohol-related problems occurring in the previous three months. The present study used a modified version of the RAPI to specifically assess alcohol related problems during the previous 28 days. Internal reliability in the current study was .89.

Substance Use Survey. This survey (see Appendix B) was included to inquire about participants' recreational drug use. Participants indicated their age when they first used the drug, when they last used the drug, and the number of days they used the drug in the past 28 days for a list of fifteen different drugs. This survey includes the following drugs: cigarettes, cigars, chewing tobacco, pipe tobacco, alcohol, marijuana, cocaine, diet pills (prescription and OTC), non-prescription use of stimulants, amphetamines, or other opiates, heroine, hallucinogens, ecstasy, and inhalants.

EPI. The Eysenck Impulsivity Scale (see Appendix B) is a 19 question, self-report measure that was used to assess impulsivity. This scale used a forced choice, yes-no response format that assessed how well participants control their behavior. Reliability coefficients exceed .80 for men and women in previous studies (Eysenck, Pearson, Easting, & Allsopp, 1985,  $\alpha = .82$ ), and was similar in the current study ( $\alpha = .84$ ).

## RESULTS

The descriptive data (i.e., mean, standard deviation, minimum, and maximum) for all variables used in the analyses are presented in Table 1 (Appendix A). Of our sample, 21.6% of participants reported engaging in binge eating episodes in the past 6 months; 12.5% reported making themselves sick (i.e., self-induced vomiting) to control their weight or shape; 12.5% reported using laxatives, diet pills, or diuretics to control their weight or shape. Only 2.3% reported that they had received treatment for an eating disorder in the past.

### *Inter-Correlations among Variables*

Inter-correlations among the eating variable are presented in Table 2 (Appendix A). The Oral Control subscale of the EAT-26 was the only eating variable that was not correlated with any other variable. The Dieting and Bulimia subscales were highly correlated with one another and with the EAT-26 full-scale score. Inter-correlations among the drinking variables are presented in Table 3 (Appendix A). All drinking variables were inter-correlated, with coefficients indicative of moderate (.67) to strong (.85) relationships.

### *Correlations Between Eating and Alcohol Variables*

All correlations between the eating and drinking variables are presented in Table 4 (Appendix A). The correlation between the EAT-26 total score and the RAPI was significant,  $r(84) = .27, p < .05$ . Dieting was positively correlated with the RAPI,  $r(84) =$

.32,  $p < .05$ , the AUDIT,  $r(85) = .22$ ,  $p < .05$ , and binge drinking,  $r(85) = .22$ ,  $p < .05$ .

The Oral Control subscale was negatively correlated with alcohol days,  $r(66) = -.31$ ,  $p < .05$ . The Bulimia subscale was not significantly related to any of the substance use variables.

#### *Regressions for each of the Eating DV's*

A series of regression analyses was conducted to determine if variables assessing alcohol use and alcohol-related problems were predictive of scores on the EAT-26 total score and subscales. In the first regression, the EAT-26 total score was regressed on RAPI scores, DDQ total, alcohol days, and binge drinking. These four predictors accounted for nearly twenty percent of the variance in the EAT-26 total score ( $R^2 = .195$ ) and produced a significant model,  $F(4, 65) = 3.702$ ,  $p = .009$ . Both the RAPI score ( $\beta = .568$ ,  $p = .015$ ) and the DDQ total ( $\beta = -.338$ ,  $p = .030$ ) were significant predictors of EAT-26 total scores.

A second linear regression analysis was conducted to evaluate the prediction of the Dieting subscale score from the alcohol variables. These four predictors accounted for nearly 23% of the variance in the Dieting score ( $R^2 = .229$ ) and produced a significant model,  $F(4, 65) = 4.542$ ,  $p = .003$ . As with the EAT-26 total score model, the RAPI score ( $\beta = .473$ ,  $p = .010$ ) and the DDQ total ( $\beta = -.313$ ,  $p = .011$ ) emerged as significant predictors of Dieting subscale scores.

A third regression analysis was conducted with the Oral Control subscale scores. The four alcohol predictors accounted for nearly fifteen percent of the variance in the Oral Control subscale score ( $R^2 = .147$ ) and produced a significant model,  $F(4, 65) = 2.627$ ,  $p < .05$ . However, none of the predictors emerged as statistically significant.

A fourth and final linear regression analysis was conducted to predict the Bulimia subscale scores from the four drinking variables. However, the Bulimia model was not significant,  $F(4, 65) = 2.139, p > .05$ .

#### *Correlations and Regressions for the EPI*

Correlations between the EPI and the substance use variables revealed that impulsivity was significantly related to the AUDIT ( $r(84) = .35, p < .05$ ), the RAPI ( $r(83) = .49, p < .05$ ); the EPI was also marginally related to the frequency of alcohol consumption ( $r(66) = .21, p = .092$ ) and the frequency of binge drinking ( $r(84) = .21, p = .055$ ). The EPI was also significantly related to the Dieting subscale from the EAT-26 ( $r(85) = .24, p < .05$ ).

A series of regression analyses was conducted to determine if variables assessing eating behaviors, alcohol use, and alcohol-related problems were predictive of scores on the EPI. In the first regression, the EPI total score was regressed on alcohol days, DDQ total, binge drinking, RAPI scores, and AUDIT scores. These five predictors accounted for nearly twenty-six percent of the variance in the EPI total score ( $R^2 = .259$ ) and produced a significant model,  $F(5, 64) = 4.133, p = .003$ . However, the RAPI score ( $\beta = .469, p < .05$ ) was the only significant predictor of EPI scores in the model.

A second linear regression analysis was conducted to evaluate the prediction of the EPI score from the three subscales of the EAT-26 (Dieting, Bulimia, and Oral Control subscales). These three predictors only accounted for eight percent of the variance in the EPI score ( $R^2 = .081$ ) and did not produce a significant model.

A third linear regression analysis was conducted to determine the EPI score when regressed on all of the drinking and eating variables from the previous two regression

analyses. These eight predictors accounted for over thirty percent of the variance in the EPI score ( $R^2 = .309$ ) and produced a significant model. Among the eight predictors, only the RAPI score emerged as a significant predictor. However, both the Dieting ( $p = .08$ ) and Bulimia ( $p = .07$ ) subscales approached significance

## DISCUSSION

It has been well documented that eating disorders often co-occur with alcohol use disorders (Anderson et al., 2006; Bulik et al., 2004; Holderness, Brooks-Gunn, & Warren, 1994; Lundholm, 1989). College students are at an increased risk for both full-criterion and subclinical eating disorders and substance-use disorders. These disorders can have serious consequences; thus it is important to try to learn more about the overlap between these two behaviors. The goals of the current study were to assess the relationships between problematic eating, alcohol use, and impulsivity among a sample of college students attending NEDSP. This section will discuss the results of the current study in the context of the literature in the areas of oral control, bulimia, dieting, and impulsivity. A discussion of the clinical implications of disordered eating and alcohol use follows. This section ends with a discussion of the limitations of the current study and potential future directions of research in this area.

### *Oral Control*

As stated previously, the Oral Control subscale measures symptoms most clearly associated with anorexia nervosa. Unlike previous studies that have used the EAT-26, in the current study, this subscale had low internal reliability; therefore, results including this subscale should be interpreted with caution. The results of the current study showed that the Oral Control subscale was negatively correlated with the number of days alcohol was consumed in the past month; the more anorexic-like symptoms participants

endorsed, the fewer the number of days the participant reported drinking in the past month. This finding is similar to what is reported in literature. For example, Bulik et al. (2004) conducted a study to investigate the prevalence of alcohol use disorders (i.e., comorbid diagnoses of alcohol abuse or alcohol dependence) among individuals with various eating disorders. The results of their study indicate that alcohol use disorders are much less common in individuals with anorexia than in individuals with bulimia or with bulimia and anorexia (Bulik et al.). The results are also consistent with clinical observations that individuals who are limiting what they eat usually ensure that when they do eat, that they eat foods that are nutrient dense; these individuals likely view alcohol as empty calories (Francis, Stewart, & Hounsell, 1997; Knight & Boland, 1989). Individuals diagnosed with the restricting subtype of anorexia, unlike those with binge-purge anorexia and bulimia, do not engage in any compensatory behaviors after eating. Thus, individuals with restricting anorexia tend to be more careful about what they eat. Individuals with binge-purge anorexia and bulimia, on the other hand, are less likely to limit caloric intake, because they will engage in some compensatory behavior to get rid of the extra calories (e.g., vomiting, laxatives, excessive exercise, etc.).

While the current study did find a negative correlation between oral control and the frequency of alcohol consumption, expected relationships between oral control and other measures of alcohol use (e.g., quantity of alcohol consumed, binge drinking, alcohol-related problems) were not found. At least one other recent study (Anderson et al., 2006) reportedly failed to find a relationship between the Oral Control subscale and alcohol-related problems in a sample of undergraduates. These results suggest that symptoms of anorexia may be linked to the frequency of alcohol consumption, but are



not necessarily related to the amount consumed on drinking occasions or the likelihood of engaging in higher risk drinking behavior. In other words, students with high levels of oral control may limit the frequency of drinking occasions, but their alcohol consumption during drinking occasions and associated negative consequences is similar to that of other students.

Additional potential explanations for why the expected relationships between Oral Control and measures of substance use quantity and related problems include a low sample size and an even lower number of participants endorsing anorexic-like symptoms. The Oral Control subscale is a subset of seven questions from the EAT-26. Each question is scored from 0-3, the scale ranges from 0-21, and higher scores are indicative of greater severity of anorexia-like symptoms. Table 1 in Appendix A shows that the average score on the Oral Control subscale was 1.16 (SD=1.54). Thus the level of Oral Control reported by our sample is low, especially when compared to the level of Dieting (M=6.40, SD=6.72). The low scores and relative lack of variability may have hindered the studies ability to detect potential relationships.

### *Bulimia*

The investigator hypothesized that the Bulimia subscale would be positively related with many of the alcohol variables (e.g., quantity and frequency of alcohol use, binge drinking episodes, and negative consequences related to alcohol consumption). However, when both bivariate correlation and multiple regression equations were computed, no such relationships were observed in the current data set. Aside from being contrary to hypotheses, these results are also contrary to literature in the field. Anderson et al. (2006) conducted a study on drinking motives and eating disorders in college-aged

women. Like the current study, Anderson et al. used the EAT-26 to measure disordered eating and the RAPI to assess negative consequences related to alcohol consumption. The results showed that the bulimia subscale was positively correlated to the RAPI scores (Anderson et al.) The participants in the Anderson et al. study were a general sample of female college students; this difference in participants could explain some of the differences in results between this study and the current study. Adams and Araas (2006) found similar results in their study on purging behaviors and alcohol-related effects in college women. Their results indicated that college women who report engaging in purging behaviors also report higher quantities of alcohol consumption and more negative consequences as a result of their drinking (Adams & Araas). The Adams and Araas study had over 27,000 participants from colleges all over the United States, and, like Anderson et al., used an all female sample. Thus, their large sample could account for the differences observed between their study and the current study. However, Adams and Araas used the participants' response to one question to define purging (i.e., a response of "yes" or "no" to the question "Within the last 30 days, did you vomit or take laxatives to lose weight?"), one question for frequency of alcohol use, one question for frequency of binge drinking, and seven items to measure negative consequences related to alcohol use, whereas the current study used a variety of more thorough and psychometrically validated measures to look at all of these variables. Thus, it may be that differences in assessment strategies account for the different finding across studies.

As with the Oral Control subscale, possible explanations for the lack of results with the Bulimia subscale include the small sample size or the even smaller sample of participants reporting bulimic-like symptoms. While 22% of the sample reported

engaging in binge eating episodes at some point, only 12% of these individuals reported engaging in any compensatory behavior to control weight (e.g., vomiting, use of laxatives, diuretics, or diet pills). The Bulimia subscale is made up of a subset of six questions from the EAT-26. With each question ranging in score from 0-3, depending on symptom severity, subscale scores range from 0-18. The mean score for the Bulimia subscale in the current study was 1.11 (SD=2.49). These numbers show the low endorsement rate of bulimic-like behaviors in the current sample.

### *Dieting*

The EAT-26 was chosen because it is a short and reliable measure of disordered eating that separated bulimic-like symptoms and anorexic-like symptoms. Although the Dieting subscale was included in the current study, the original hypotheses did not predict a strong relationship between the Dieting subscale and alcohol use. However, when analyzing the data the Dieting subscale emerged as the most significantly correlated with the alcohol variables; the Dieting subscale was significantly correlated with both measures of negative consequences related to alcohol use (RAPI and AUDIT), and the number of binge drinking episodes in the past month. The alcohol variables also provided better predictions of dieting behaviors than either anorexic-like or bulimic-like behaviors and suggest that dieting behavior could be partially predicted based on quantity of alcohol consumed (DDQ) and negative consequences associated with alcohol use (RAPI). At least one very recent study (Anderson et al., 2006) also found that RAPI was more strongly related to the EAT-26 Dieting subscale than to either the Oral Control or Bulimia subscales.

It has been well established that eating disorders and alcohol problems co-occur at high rates. The dysregulation hypothesis suggests that the comorbidity between eating disorders and alcohol use is the result of an overall dysfunction in an individual's behavioral regulation (Stewart, Angelopoulos, Baker, & Boland, 2000). This hypothesis is supported by a study that showed that the more dysfunctional the dieting behavior an individual engages in, the more likely they are to engage in risky alcohol use (Krahn, Kurth, Gomberg, & Drewnowski, 2005). Researchers have investigated the role of restraint in both dieting and alcohol use. Dietary restraint is the tendency for an individual to diet, out of a desire to lose weight and a concern over body shape (Stewart et al.). The Stewart et al. study gave college females alcohol measures (quantity and frequency), and used the Restrain Scale as the measure of dietary restraint (instances of food restriction and weight fluctuations). Just like the results of the current study, their results showed that quantity of alcohol used was positively correlated with dietary restraint, but that frequency of alcohol consumption was not. Therefore, dieters are not drinking more often, but are drinking more per occasion. Dietary restraint was also highly correlated with binge drinking, again suggesting that when dieters do permit themselves to drink, they tend to consume excessive amounts.

Related to restraint is the notion that dieters often 'cheat' on their diets and eat something unhealthy. Dieters respond to this violation by feeling guilty and distressed, and oftentimes eat more of the unhealthy item. For example, Polivy and Herman (1985) reported that individuals who attempt to limit caloric intake (i.e., dieters) are more likely to engage in a binge eating episode. A similar phenomenon has also been observed in social drinkers (Muraven, Collins, Morsheimer, Shiffman, & Paty, 2005). Muraven et al.

asked participants to carry a handheld computer device to keep track of alcohol consumption and feelings associated with the use. Muraven et al. observed that individuals who set a limit on alcohol consumption and did not abide by that limit reported feeling guilty and distressed. If the limit was exceeded, these individuals reported thinking that it was too late to limit their intake and then continued to consume alcohol. Though research has been conducted on dieters and on social drinkers, no research to see if these phenomena are related has been reported. More research is needed in this area to determine if hypotheses related to dysregulation and violation of limits can explain the high comorbidity between dieting and drinking behaviors.

### *Impulsivity*

The current study hypothesized that those participants who reported a high frequency and quantity of alcohol, who reported more binge drinking episodes, and/or who reported more negative consequences resultant of alcohol use would score more highly on the impulsivity measure (i.e., EPI). Several of the alcohol variables were significantly related to the EPI. However, when the alcohol variables were regressed on the total EPI score, the RAPI was the only significant predictor.

Previous research has also suggested that individuals engaging in anorexic behaviors differ from individuals engaging in bulimic behaviors on several personality traits. For example, studies have found that individuals with bulimia (or bulimic-like symptoms) show higher rates of impulsivity (Diaz-Marsa, Carrasco, & Saiz, 2000; Wonderlich & Mitchell, 2001). The current study also hypothesized that bulimic-like behaviors would be more predictive of impulsivity scores than other problematic eating behaviors. Both the bivariate correlations and the regression analysis failed to find

significant relationships between the eating measures (i.e., the total score or the subscale scores) and the impulsivity scores.

The lack of significant relationships between the impulsivity score and problematic eating behavior could be due to a number of factors. First, the sample could have been too small to detect differences. Second, the use of a non-clinical sample may have limited variability in terms of problematic eating behavior and impulsivity. Diaz-Marsa et al. (2000), like the current study, used the EPI as a measure of impulsivity. However, unlike the current study, Diaz-Marsa et al. used a clinical sample of patients with eating disorders, which could explain the differences between this study and the current study.

Third, it may be that the EPI is not the best measure for detecting relationships between impulsivity and eating behaviors in non-clinical samples. Problematic eating behaviors are typically viewed as impulsive (e.g., binge eating and purging), although the person engaging in the behaviors may not view themselves as generally impulsive. Therefore a behavioral measure of impulsivity, as opposed as self-report measure of impulsive personality traits, may be the best means of measurement for problematic eating behaviors. A commonly used behavioral measure of impulsivity is a delayed discounting task. Delayed discounting is a phenomenon in which an immediate reinforcer is seen as preferable to a delayed, but perhaps larger, reinforcer (Bickel & Marsch, 2001). In terms of eating disorders, the individuals see the immediate reinforcer of weight reduction or control as preferable to the long term reinforcer of good health. This task may be a better means of assessing the level of impulsivity in an individual with

an eating disorder or a subclinical eating disorder, because it focuses on decision making and not global assessments of personality.

### *Clinical Implications*

National Eating Disorder Screening Program is just one of the four screening day programs conducted on college campuses across the United States each year. The Mental Health Screening Organization also sponsors National Depression Screening Day, National Anxiety Screening Day, and National Alcohol Screening Day (College Response). These screening days are conducted as if the disorders are separate, unique entities. However, there are high rates of comorbidity between disordered eating behaviors and alcohol use (Anderson et al., 2006; Bulik et al., 2004; Holderness et al., 1994; Lundholm, 1989), and Steiger and Seguin (1999) report that eating disorders commonly co-occur with mood disorders (25-50%), anxiety disorders (20-70%), substance abuse disorders (10-55%), and personality disorders (30-90%), suggesting that it is likely that an individual with an eating disorder will have a comorbid psychological disorder. Perhaps the Mental Health Screening Organization should take this into account with the development of their programs. For example, in addition to diagnosis-specific screening events, and Mental Health Screening Organization might be in a better position to adequately address comorbid conditions. Alternatively, screening day organizers and clinicians at diagnosis-specific screening events should be prepared to discuss and screen for conditions that commonly co-occur with the target diagnosis.

In cases of comorbid disorders, treatment options are always an issue. Clinicians question whether they should prioritize and treat one disorder at a time, treat both at the same time, or treat the combination of disorders as a completely new entity (Baigent,

2005; Daniels, Masheb, Berman, Mickley, & Grilo, 1999; Mitchell, Spencer, & Edmonson, 1997). Daniels et al. state that despite the high comorbidity between eating disorders and alcohol use disorders, there is a scarcity of information on treatment. Aside from the little information available on treating these comorbid disorders, most studies on treatment of eating disorders or substance use disorders alone exclude people who have a comorbid condition (Grilo, Sinha, O'Malley, 2002). Grilo et al. suggest that the first step in treating a client for alcohol problems is to assess for a comorbid disorder, including an eating disorder. Baigent adds that it is not only important to assess for comorbid disorders that meet full diagnostic criteria, but assessing for subclinical conditions is important, as just the presence of other symptoms could be important for treatment considerations. Grilo et al. also suggests considering pharmacological treatments, as some studies have shown antidepressants to be effective in preventing relapse in eating disorders, especially bulimia, and opioid antagonists to be effective in "reducing alcohol use and relapse, and increasing abstinence rates," (pp. 156). Grilo et al. goes on to suggest that since cognitive-behavioral therapy has been shown effective in the treatment of eating disorders alone and alcohol use disorders alone, that it is likely the best method of treatment when these conditions are comorbid. Baigent, on the other hand, argues that when multiple disorders are present, a new treatment should be generated specifically for the client. Future research will be needed to determine how to best conceptualize and deliver treatments for individuals that display symptoms of both disordered eating and problematic drinking.



### *Limitations and Future Directions*

As stated throughout the discussion section, there were several limitations to the current study. First, there were 88 participants, which is a fairly small sample size and could have limited the study's power. Future studies should increase sample size as to increase the power of the analysis and confidence in the findings. Second, the scores on the Bulimia and Oral Control subscales were generally low and displayed limited variability. Also, the Oral Control subscale showed a low internal reliability in the current study. Similarly, there was not a wide range of scores on the EPI, which could explain the lack of results with this measure as well. While a larger sample size could help address this concern, more specific measures might also lead to a greater range of ED symptoms being reported. In other words, while the EAT-26 subscales have been identified as clinically useful, reliable and relatively brief measures of anorexia, bulimia, and dieting, specific and more detailed measures could be used for each of these problematic eating behaviors. For example, the Bulimia Test – Revised (BULIT-R; Thelen, Farmer, Wonderlich, & Smith, 1991) or the Bulimic Investigatory Test (BITE; Henderson & Freeman, 1987) could be used to assess bulimic behaviors, the Multifactorial Assessment of Eating Disorders Symptoms (MAEDS; Anderson, Williamson, Duchmann, Gleaves, & Barbin, 1999) or the Stirling Eating Disorder Scales (SEDS; Williams et al., 1994) could be used to assess anorexic behaviors, and the Weight Loss Behavior Scale could be used to assess dieting behaviors (WLBS; Smith, Williamson, Womble, Johnson, & Burke, 2000). Each of these measures has the potential to more specifically measure both clinical and subclinical cases of eating disorders. Also, an impulsivity measure could be selected that assesses for impulsivity

that is more specific to substance abuse and bulimic-like behaviors. As stated previously, perhaps instead of using a paper-pencil measure of impulsivity, a behavioral task, such as a delayed discounting task, could be used as a measure of impulsivity. Using a behavioral task may make the measure of impulsivity more applicable to the behaviors of problematic drinking and eating.

Third, though the current study provided a unique sample by using NEDSP participants, this was a self-selected sample. Not only did the participants select to attend the screening day, those participants further selected to participate in the current study. Individuals who are aware that they are engaging in risky eating behaviors may self-select out of such an event as to not be identified. Thus, it may be that our sampling strategy was not effective in terms of collecting data from students with a wide range of eating behaviors, resulting in low ED severity and relative lack of variability. Fourth, the sample was homogeneous (mostly Caucasian females), which could affect the generalizability of the results. Future research in this area should try to obtain information from a more diverse group. However, there are pros to using a homogeneous sample. For example, eating disorders are most common in Caucasian females, thus using such a sample may provide more specific information to be applied to this at-risk group and can increase the power to conduct hypothesis testing and detect relationships.

Given the high rates of comorbidity between eating disorders and substance use disorders, general practitioners and clinicians should assess for comorbidity when a client presents with one of these disorders. Clinicians should be sensitive to the notion that clients presenting with subclinical forms of either disorder are at risk for a variety of negative consequences. Further research is needed to explore the relationship among

eating disorders, substance use disorders, and impulsivity. The high prevalence of dieting behaviors, and the relationship between dieting and substance use, suggest that additional research in this area is also warranted. Finally, future research should focus on developing and testing treatments for clients with symptoms of both problematic alcohol use and disordered eating behaviors.

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## APPENDICES

APPENDIX A: TABLES

Table 1  
*Summary of Descriptive Data for Sample*

	N	Minimum	Maximum	Mean	SD
Eating variables					
EAT-26 Total	88	0	40	9.02	8.68
Dieting	88	0	27	6.40	6.72
Bulimia	88	0	12	1.11	2.49
Oral	88	0	6	1.16	1.54
Drinking variables					
DDQ Total	88	0	62	8.08	10.85
RAPI Total	86	0	29	4.10	6.24
AUDIT Total	87	0	25	6.39	6.39
Binge drinking	87	0	20	3.00	4.26
Alcohol days	68	0	20	6.23	5.31
EPI Total	87	1	18	7.18	4.41

*Note. Total n=88*

*EAT-26 Total: Eating Attitudes Test-26*

*Dieting: Dieting Subscale of the EAT-26*

*Bulimia: Bulimia Subscale of the EAT-26*

*Oral: Oral Control Subscale of the EAT-26*

*DDQ Total: Daily Drinking Questionnaire, number of drinks per week*

*RAPI Total: Rutgers Alcohol Problem Index*

*AUDIT Total: Alcohol Use Disorder Identification Test*

*Binge drinking: number of days in the past month participant binge drank*

*Alcohol Days: number of days in past month participant used alcohol*

*EPI Total: Eyesnck Personality Inventory, Impulsivity scale*

Table 2  
*Inter-correlations among eating variables*

	EAT-26 Total	Dieting	Bulimia	Oral
EAT-26 Total	-			
Dieting	.96***	-		
Bulimia	.82***	.74***	-	
Oral	.06	-.12	-.15	-

*Note. Total n=88*

*EAT-26 Total: Eating Attitudes Test-26*

*Dieting: Dieting Subscale of the EAT-26*

*Bulimia: Bulimia Subscale of the EAT-26*

*Oral: Oral Control Subscale of the EAT-26*

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

Table 3  
*Inter-correlations among alcohol variables*

	DDQ	RAPI	AUDIT	Binge drinking	Alcohol Days
DDQ	-				
RAPI	.57***	-			
AUDIT	.78***	.75***	-		
Binge drinking	.84***	.71***	.83***	-	
Alcohol Days	.67***	.67***	.79***	.78***	-

*Note.* Total  $n=88$

*DDQ: Daily Drinking Questionnaire, number of drinks per week*

*RAPI: Rutgers' Alcohol Problem Index*

*AUDIT: Alcohol Use Disorder Identification Test*

*Binge drinking: number of days in the past month participant binge drank*

*Alcohol Days: number of days in past month participant used alcohol*

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

Table 4  
*Correlations between eating and alcohol variables*

	DDQ	RAPI	AUDIT	Binge drinking	Alcohol Days
EAT-26	.02	.27**	.20	.17	.05
Dieting	.03	.32**	.22*	.22*	.12
Bulimia	-.00	.18	.10	.10	.02
Oral	-.01	-.18	-.09	-.12	-.31**

*Note.* Total  $n=88$

*DDQ: Daily Drinking Questionnaire, number of drinks per week*

*RAPI: Rutger's Alcohol Problem Index*

*AUDIT: Alcohol Use Disorder Identification Test*

*Binge drinking: number of days in the past month participant binge drank*

*Alcohol Days: number of days in past month participant used alcohol*

*EAT-26 Total: Eating Attitudes Test-26*

*Dieting: Dieting Subscale of the EAT-26*

*Bulimia: Bulimia Subscale of the EAT-26*

*Oral: Oral Control Subscale of the EAT-26*

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

Table 5  
*Summary of Regression Analyses for Eating Variables*

Variable	$\beta$	SE $\beta$	B	<i>t</i>	<i>p</i>	<i>R</i> <sup>2</sup>
EAT-26					.009	.195
RAPI	.568	.228	.403	2.496	.015	
DDQ	-.338	.152	-.443	-2.220	.030	
Alcohol days	-.469	.325	-.284	-1.443	.154	
Binge drinking	.911	.487	.471	1.870	.066	
Dieting					.003	.229
RAPI	.473	.179	.418	2.648	.010	
DDQ	-.313	.119	-.511	-2.617	.011	
Alcohol days	-.223	.255	-.169	-.876	.384	
Binge drinking	.725	.382	.468	1.898	.062	
Oral					.043	.147
RAPI	-.034	.041	-.137	-.827	.412	
DDQ	.048	.027	.360	1.751	.085	
Alcohol days	-.110	.059	-.381	-1.882	.065	
Binge drinking	-.027	.088	-.081	-.312	.756	
Bulimia					.087	.123
RAPI	.144	.067	.363	2.153	.035	
DDQ	-.060	.045	-.279	-1.338	.186	
Alcohol days	-.125	.096	-.268	-1.305	.197	
Binge drinking	.170	.143	.312	1.185	.240	

*Note.* Total *n*=88

*DDQ: Daily Drinking Questionnaire*

*RAPI: Rutger's Alcohol Problem Index*

*Binge drinking: number of days in the past month participant binge drank*

*Alcohol Days: number of days in past month participant used alcohol*

*Dieting: Dieting Subscale of the EAT-26*

*Bulimia: Bulimia Subscale of the EAT-26*

*Oral: Oral Control Subscale of the EAT-26*

Table 6  
*Summary of Regression Analyses for the EPI*

Variable	$\beta$	SE $\beta$	B	<i>t</i>	<i>p</i>	<i>R</i> <sup>2</sup>
EPI					.003	.259
Alcohol days	-.123	.173	-.144	-.712	.479	
DDQ	.079	.081	.200	.971	.336	
Binge drinking	-.300	.246	-.301	-1.221	.227	
RAPI	.469	.120	.645	3.921	.000	
AUDIT	.007	.169	.010	.044	.965	
EPI					.071	.081
Dieting	.255	.102	.391	2.512	.014	
Bulimia	-.367	.276	-.208	-1.332	.187	
Oral	-.149	.304	-.052	-.491	.624	
EPI					.005	.309
Alcohol days	-.148	.185	-.173	-.802	.426	
DDQ	.113	.087	.288	1.305	.197	
Binge drinking	-.354	.249	-.355	-1.418	.162	
RAPI	.450	.123	.619	3.641	.001	
AUDIT	-.006	.174	-.007	-.032	.975	
Dieting	.204	.110	.317	1.854	.069	
Bulimia	-.526	.293	-.289	-1.794	.078	
Oral	-.034	.363	-.012	-.094	.925	

*Note.* Total *n*=88



APPENDIX B: MEASURES

Date: \_\_\_\_\_

Subject ID#: \_\_\_\_\_

**General Information Questionnaire**

1. Please indicate your gender: \_\_\_\_\_ Male (1) \_\_\_\_\_ Female (2)
2. How old are you? \_\_\_\_\_ years.
3. How many years of school have you completed (e.g., graduated from high school = 12 years)? \_\_\_\_\_ years.
4. Are you a member of a fraternity or sorority? \_\_\_\_\_ Yes (1) \_\_\_\_\_ No (2)
5. Please check one of the following Ethnic categories:  
\_\_\_\_\_ Hispanic or Latino (1)  
\_\_\_\_\_ Not Hispanic or Latino (2)
6. Please check as many of the following Racial categories that apply to you:  
\_\_\_\_\_ American Indian or Alaska Native  
\_\_\_\_\_ Asian  
\_\_\_\_\_ Black or African American  
\_\_\_\_\_ Native Hawaiian or Other Pacific Islander  
\_\_\_\_\_ White
7. Where do you currently reside?  
\_\_\_\_ Off campus house or apartment (1)      \_\_\_\_ home with parents/guardians (2)  
\_\_\_\_ Fraternity House (3)                      \_\_\_\_ Campus dormitory (4)  
\_\_\_\_ Sorority House (5)                        \_\_\_\_ Other : \_\_\_\_\_ (6)

Date: \_\_\_\_\_

Subject: \_\_\_\_\_

EAT-26

In order to take this inventory you will first need to make a print-out.

Height \_\_\_\_\_

Current Weight \_\_\_\_\_

Highest Weight (excluding pregnancy) \_\_\_\_\_

Lowest Adult Weight \_\_\_\_\_

Do you participate in athletics at any of the following level:

- Intramural
- Inter-Collegiate
- Recreational
- High School teams

**Please fill in the circle to indicate the most accurate response for each of the following statements:**

	<b>Always</b>	<b>Usually</b>	<b>Often</b>	<b>Sometimes</b>	<b>Rarely</b>	<b>Never</b>
1. Am terrified about being overweight	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Avoid eating when I am hungry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Find myself preoccupied with food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Have gone on eating binges where I feel that I may not be able to stop	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Cut my food into small pieces	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Aware of the calorie content of foods that I eat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Particularly avoid food with a high carbohydrate content (i.e. bread, rice, potatoes, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Feel that others would prefer if I ate more	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Vomit after I have eaten	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Feel extremely guilty after	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

eating

- |  |                       |                       |                       |                       |                       |                       |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 11. Am preoccupied with a desire to be thinner               | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 12. Think about burning up calories when I exercise          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 13. Other people think that I am too thin                    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 14. Am preoccupied with the thought of having fat on my body | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 15. Take longer than others to eat my meals                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 16. Avoid foods with sugar in them                           | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 17. Eat diet foods   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 18. Feel that food controls my life                          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 19. Display self-control around food                         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 20. Feel that others pressure me to eat                      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 21. Give too much time and thought to food                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 22. Feel uncomfortable after eating sweets                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 23. Engage in dieting behavior                               | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 24. Like my stomach to be empty                              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 25. Enjoy trying new rich foods                              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 26. Have the impulse to vomit after meals                    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Total Score (see below for scoring instructions)

\_\_\_\_\_

Please respond to each of the following questions:

1) Have you gone on eating binges where you feel that you may not be able to stop? (Eating much more than most people would eat under the same circumstances)

No  Yes  ➔ How many times in the last 6 months? \_\_\_\_\_

2) Have you ever made yourself sick (vomited) to control your weight or shape?

No  Yes  ➡ How many times in the last 6 months? \_\_\_\_\_

3) Have you ever used laxatives, diet pills or diuretics (water pills) to control your weight or shape?

No  Yes  ➡ How many times in the last 6 months? \_\_\_\_\_

4) Have you ever been treated for an eating disorder?

No  Yes  ➡ When? \_\_\_\_\_

5) Have you recently thought of or attempted suicide?

No  Yes  ➡ When? \_\_\_\_\_

# AUDIT

PLEASE CIRCLE THE MOST ACCURATE SELECTION

- 1.) How often do you have a drink containing alcohol?  
0 = Never                      1 = Monthly or less                      2 = 2-4 times a month  
3 = 2-3 days a week                      4 = 4, 5, 6, or 7 days a week

- 2.) How many drinks containing alcohol do you have on a typical day when you are drinking?  
0 = 0, 1, or 2 drinks      1 = 3 or 4 drinks                      2 = 5 or 6 drinks  
3 = 7, 8, or 9 drinks                      4 = 10 drinks and above

*For questions 3 – 8 use these selections:*

- 0 = Never                      1 = Less than monthly                      2 = Monthly  
3 = Weekly                      4 = Daily or almost daily

- 3.) For women: How often do you have 4 or more drinks a day?    0   1   2   3   4  
For men:      How often do you have 5 or more drinks a day?    0   1   2   3   4

- 4.) How often during the last year have you found that you were not able to stop drinking once you started?                      0      1      2      3      4

- 5.) How often during the last year have you failed to do what was normally expected from you because of drinking?                      0      1      2      3      4

- 6.) How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?                      0      1      2      3      4

- 7.) How often during the last year have you had a feeling of guilt or remorse after drinking?                      0      1      2      3      4

- 8.) How often during the last year have you been unable to remember what happened the night before because you had been drinking?                      0      1      2      3      4

*For questions 9 and 10 use these selections:*

- 0 = No      2 = Yes, but not in the last year      4 = Yes, during the last year

- 9.) Have you or has someone else been injured as a result of your drinking?                      0      2      4

- 10.) Has a relative, friend, doctor, or other health worker been concerned about your drinking or suggested you cut down?                      0      2      4

Date: \_\_\_\_\_

Subject ID#: \_\_\_\_\_

### Alcohol Survey

Please use the charts below to describe your recent drinking patterns. Please report your drinking in standard drinks, where 1 standard drink equals 12 ounces of beer, 4 ounces of wine, and or a 1 ounce shot of hard liquor.

For the **past month** fill in for each calendar day the number of standard drinks you **usually drink** on that day.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

Now fill in for the **past month** the **maximum number** of standard drinks you had on each calendar day.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

- 1) During the last 28 days, on how many days did you drink beer? \_\_\_\_\_
- 2) During the last 28 days, on how many days did you drink wine? \_\_\_\_\_
- 3) During the last 28 days, on how many days did you drink a shot of hard liquor? \_\_\_\_\_
- 4). During the last 28 days, on how many days did you drink a mixed-drink? \_\_\_\_\_
- 5) During the last 28 days, on how many days have you been drunk? \_\_\_\_\_
- 6)     **MALE ONLY:** During the last 28 days, on how many days did you have 5 or more standard drinks? \_\_\_\_\_
- FEMALES ONLY:** During the last 28 days, on how many days did you have 4 or more standard drinks? \_\_\_\_\_
- 7) During the last 28 days, what is the largest number of standard drinks you consumed in one night? \_\_\_\_\_
- 8) Approximately how many hours did it take you to finish the largest number of drinks mentioned in #7? \_\_\_\_\_
- 9) How much do you weigh? \_\_\_\_\_
- 10) How tall are you? \_\_\_\_\_

Date: \_\_\_\_\_

Subject ID#: \_\_\_\_\_

RAPI

Instructions: Indicate if any of the following have happened during the last 28 days while you were using alcohol, or because of your alcohol use. When marking your answers, use the following code:

0 = never      1 = 1-2 times      2 = 3-5 times      3 = 6-10 times      4 = more than 10 times

1. Not able to do your homework or study for a test	0 1 2 3 4
2. Got into fights, acted bad or did mean things	0 1 2 3 4
3. Missed out on other things because you spent too much money on alcohol	0 1 2 3 4
4. Went to work or school drunk	0 1 2 3 4
5. Caused shame or embarrassment to someone	0 1 2 3 4
6. Neglected your responsibilities	0 1 2 3 4
7. Relative avoided you	0 1 2 3 4
8. Felt that you needed MORE alcohol than you used to use in order to get the same effect	0 1 2 3 4
9. Tried to control your drinking by trying to use only at certain times of the day or certain places	0 1 2 3 4
10. Had withdrawal symptoms, that is felt sick because you stopped or cut down drinking	0 1 2 3 4
11. Noticed a change in you personality	0 1 2 3 4
12. Felt you had a problem with alcohol	0 1 2 3 4
13. Missed a day (or part of a day) of school or work	0 1 2 3 4
14. Tried to cut down or quit drinking	0 1 2 3 4
15. Suddenly found yourself in a place you could not remember getting to	0 1 2 3 4
16. Passed out or fainted suddenly	0 1 2 3 4
17. Had a fight, argument, or bad feeling with a friend	0 1 2 3 4
18. Had a fight, argument, or bad feeling with a family member	0 1 2 3 4
19. Kept drinking when you promised yourself not to	0 1 2 3 4
20. Felt you were going crazy	0 1 2 3 4
21. Had a bad time	0 1 2 3 4
22. Felt physically or psychologically dependent on alcohol	0 1 2 3 4
23. Was told by a friend or neighbor to cut down on drinking	0 1 2 3 4

Date: \_\_\_\_\_

Subject ID#: \_\_\_\_\_

Substance Use Survey

	<b>Did you ever use this substance? (Circle Yes or No)</b>	<b>How old were you when you first used this substance?</b>	<b>How old were you when you last used this substance (write current age if still using)?</b>	<b>On how many days did you use this substance in the last 28 days? (Write 0-28)</b>
Cigarettes	YES NO			
Cigars	YES NO			
Chewing Tobacco	YES NO			
Pipe Tobacco	YES NO			
Alcohol	YES NO			
Marijuana	YES NO			
Cocaine	YES NO			
Use of prescription diet pills	YES NO			
Use of non-prescription (over the counter) diet pills	YES NO			
Non-prescription use of Stimulants, Amphetamines or Methamphetamines	YES NO			
Heroin	YES NO			
Non-prescription use of other Opiates (e.g., OxyContin/Oxycodone or other pain killers)	YES NO			
Hallucinogens (LSD, mushrooms)	YES NO			
Ecstasy	YES NO			
Inhalents	YES NO			



Date: \_\_\_\_\_

Subject: \_\_\_\_\_

### EPI

Please answer each question by indicating yes or no. There are no right or wrong answers, and no trick questions. Work quickly and do not think too long about the exact meaning of the question.

- |   |     |    |
|---|-----|----|
| 1. Do you often buy things on impulse?  | YES | NO |
| 2. Do you generally do and say things without stopping to think?                                      | YES | NO |
| 3. Do you often get into a jam because you do things without thinking?                                | YES | NO |
| 4. Are you an impulsive person?   | YES | NO |
| 5. Do you usually think carefully before doing anything?  | YES | NO |
| 6. Do you often buy things on the spur of the moment?   | YES | NO |
| 7. Do you mostly speak before thinking things out?  | YES | NO |
| 8. Do you often get involved with things you later wish you could get out of?                         | YES | NO |
| 9. Do you ever get so carried away by new and exciting ideas that you never think of possible snags?  | YES | NO |
| 10. Do you need to use a lot of self control to keep out of trouble?                                  | YES | NO |
| 11. Would you agree that almost everything enjoyable is either illegal or immoral?                    | YES | NO |
| 12. Are you often surprised at peoples reactions to what you do or say?                               | YES | NO |
| 13. Do you think an evening out is more successful if it is unplanned or arranged at the last minute? | YES | NO |
| 14. Do you usually work quickly without bothering to check?   | YES | NO |
| 15. Do you often change your interests?   | YES | NO |
| 16. Before making up your mind do you consider all the advantages and disadvantages?                  | YES | NO |
| 17. Do you prefer to sleep on it before making decisions?   | YES | NO |
| 18. When people shout at you do you shout back?   | YES | NO |
| 19. Do you usually make up your mind quickly?   | YES | NO |