Binge Drinking in Women at Risk for Developing Eating Disorders

Anna Khaylis, MS*
Mickey Trockel, PhD, MD
C. Barr Taylor, MD

ABSTRACT
Objective: To determine binge drinking rates in college-age women at risk for eating disorders and to examine factors related to binge drinking over time.

Method: Participants were 480 college-age women who were at high risk for developing an eating disorder (ED) and who had a body mass index (BMI) between 18 and 32. Participants were assessed annually for 4 years.

Results: Participants reported high rates of binge drinking and frequent binge drinking throughout college. Binge drinking was positively correlated with dietary restraint, coping using substances, coping using denial, and life events.

Discussion: The study's findings suggest that binge drinking is highly prevalent in women at high risk for developing eating disorders. Results also indicated that binge drinking was related to dieting and maladaptive coping patterns. Intervention for women with strong weight and shape concerns should also address problematic alcohol use.

Keywords: eating disorders; binge drinking; college-age women

Introduction
Binge drinking affects about 7% of American women aged 18–44 years. Young adults (18–25 years) have the highest rates of binge drinking. Undergraduates exhibit higher rates of heavy episodic drinking than same-age peers who are not attending a university. Results of a 1993–1994 survey involving 17,592 students from over 140 four-year colleges suggested that nearly half (44%) of college students binge drink, and nearly one fifth do so frequently (3 or more times in 2 weeks). A subsequent survey in 1997 demonstrated similar binge drinking rates.

Although men are nearly 3 times more likely to binge drink than women, recent research has shown that the gap in this trend is closing, with women increasing their frequency of being drunk, and drinking to get drunk. As women experience similar rates of the negative consequences of drinking as men (women after consuming 4 drinks in a row; men after consuming 5 drinks in a row), they are also likely to experience greater alcohol-related problems as their drinking rates increase, even though they do not drink as much as men. Supporting this idea are findings that women who drank 7–12 drinks at one time at least once during the past month were more likely than men to wake up shaking, experience academic problems, forget things, spend money, and regret things that they did after drinking. Women who experienced personal alcohol-related problems in the past year are also more likely than men to binge drink in the future. Furthermore, freshman women are significantly more likely to engage in heavy episodic drinking than sophomore, junior, or senior women, although the opposite trend is true for men, implying that women entering college are at high risk of heavy drinking and associated sequelae.

Recent literature has identified several psychosocial correlates of alcohol use and binge drinking. Reliance on emotion, avoidant coping strategies, and use of alcohol as a coping strategy are associated with greater severity of alcohol and drug use disorders. Attempting to decrease negative moods such as depression and anxiety and increase positive affect by drinking may also lead to greater alcohol consumption. Among college students, findings related to coping and alcohol use have been inconsistent. Evans and Dunn found that a reliance on avoidant coping and emotion-focused coping strategies were significantly related to increased consumption of alcohol and drinking-related problems. Conversely, Fromme and Rivet found that lower levels of emotion-focused and avoidant coping were associated with increased levels of consumption.
Negative mood and anxiety are also thought to be related to increased alcohol use.\textsuperscript{14,15} Data from epidemiological, community-based samples have shown consistently that individuals with alcohol abuse or dependence are 2–3 times more likely to experience anxiety or depression.\textsuperscript{16} However, the paucity of longitudinal studies makes temporal sequencing of co-morbidity difficult.

Among women, the comorbidity of eating disorders and substance use has been well documented.\textsuperscript{17} One meta-analysis estimates that rates of problematic drinking are 13% in restricting individuals with anorexia nervosa, 49% in patients with bulimia nervosa, and about 39% in women with some combination of bulimia nervosa (BN) and anorexia nervosa (AN).\textsuperscript{17} The across study median of alcohol abuse was 22.9% among patients with bulimia nervosa, 6.0% among restricting individuals with anorexia nervosa, and 26.0% among women with a combination of BN and AN.\textsuperscript{17} The review also found that among women with some form of substance use disorder, up to 41% have BN, and 10% suffer from AN. Other rate estimates for alcohol use disorders in treatment-seeking patients with bulimia nervosa range from 30% to 50%,\textsuperscript{18} suggesting that substance use disorders are highly prevalent in women with eating disorders, especially those who involve binge eating. However, studies included in the review used differing definitions of “problematic drinking” and different inclusion criteria; some studies included only those with alcohol abuse or dependence or inpatients in an alcohol rehabilitation program, whereas others questioned patients with eating disorders about drinking habits.

Few studies have looked at rates of eating disorder symptoms and substance use in community samples.\textsuperscript{18–20} An early survey of 1,728 10th graders found that nearly 20% of female purgers and non-purgers reported getting drunk at least once per month.\textsuperscript{19} However, female purgers exhibited higher rates of problematic drinking behaviors, such as drinking during the day or drinking before school.

A subsequent study involving 364 female first-year college students also found that there were high but similar rates of alcohol use among purgers and non-purgers (88.9% and 85.2%, respectively).\textsuperscript{20} Conversely, another study found that among a sample of 135 university undergraduates, high scores on an alcohol abuse scale were associated with high scores on several Eating Disorder Inventory (EDI) subscales, including Bulimia (B).\textsuperscript{21} None of these studies examined patterns of heavy episodic drinking.

Only one study to date has examined the relationship between negative affect, coping, and substance use in individuals with eating disorders.\textsuperscript{22} Results of this investigation suggest binge eaters are more likely to binge drink, and to report using alcohol to avoid or escape negative emotions.\textsuperscript{22} Coupled with previous research indicating that use of alcohol to avoid negative affect predicts problematic alcohol use,\textsuperscript{23} these results suggest that women with BN or Binge Eating Disorder (BED) are at an increased risk for alcohol use disorders.

The negative consequences of binge drinking in college, including lower GPA, physical illness, nausea, alcohol poisoning, “blacking out” or losing memory, being sexually assaulted or assaulting someone else, impaired driving, legal problems,\textsuperscript{24} and using substances such as tobacco, marijuana, cocaine, and other illegal drugs\textsuperscript{25} have been well documented. Similarly, the relationship between eating disorders and substance use disorders has been established. However, little is known about the prevalence and pattern of binge drinking over time in college-age women at risk for developing eating disorders.

The purpose of this study was to examine binge drinking rates over time, and correlates of binge drinking behavior in a sample of college-age women with high weight and shape concerns.

---

**Method**

**Participants**

Participants in the present study came from a larger study of an online eating disorder prevention program.\textsuperscript{26} Participants were female college-age women between 18 and 30 years of age who were at high risk for developing an ED, who had a BMI $\geq 18$ and $<32$, and resided in the San Diego and the San Francisco Bay areas. The Weight Concerns Scale (WCS) was used to determine whether potential participants were at high risk for developing an ED. The WCS consists of five questions that assess worry about weight and shape, fear of gaining 3 pounds, last time on a diet, importance of weight and feelings of fatness. The WCS has test–retest reliability of .85, and good predictive validity.\textsuperscript{27,28} A ROC analysis found that a WCS score $\geq 47$ had sensitivity of 79%, specificity of 67% and PPV value of 13% for identifying adolescents who developed partial or full syndrome EDs.\textsuperscript{29} Participants were considered potentially eligible for this study if they scored $\geq 50$ on the WCS, reported they were moderately or very afraid of gaining 3 pounds, or reported that their weight was the most important thing in their life.
**Measures and Procedures**

Taylor et al.\(^{26}\) provide a description of the screening, interview, and randomization procedures used in the larger study, along with a detailed overview of the Internet-based intervention for preventing eating disorders. Participants were assessed at baseline, as well as 6, 12, 24, and 36 months post intervention. Participants reported their age, year in school, ethnicity, and mother’s and father’s highest level of education. Participants completed a packet of self-report questionnaires further described in Taylor et al.\(^{26}\).

Participants were asked to report approximately how many times in the last week and month they consumed more than 4 drinks in one sitting, and how many drinks they typically consume in 1 week. Standard assessment of binge drinking in college populations typically assess frequency and amount of alcohol consumption through self-report measures,\(^{2,3}\) and 4 or more drinks in one sitting is an accepted definition of binge drinking for women.\(^5\) Standard drinks were defined as 4 ounces of wine, 12 ounces of beer, or a cocktail containing 1-ounce of 70 proof liquor, consistent with previous research.\(^{2,3,24}\)

Participants completed the Eating Disorder Examination-Self-Report Questionnaire Version (EDE-Q),\(^{30}\) a 41-item self-report version adapted from the EDE. The EDE-Q asks participants to report their eating behaviors over the past 28 days. The participants are asked to indicate frequency of ED behaviors on a 6-point Likert scale, with options ranging from “No Days” to “Every Day” regarding these behaviors. In addition, participants indicate severity of weight and shape concerns on a 6-point Likert scale, with options ranging from “Not at All” to “Markedly.” The EDE-Q targets behaviors consistent with DSM-IV ED diagnoses (binge eating, self-induced vomiting, laxative use, etc.) and yields four subscales: Restraint, Weight Concern, Shape Concern, and Eating Concern.\(^{29}\) The EDE-Q has demonstrated strong internal consistency (Restraint: \(r = .85\); Shape Concern: \(r = .93\); Weight Concern: \(r = .89\); Eating Concern: \(r = .81\)), and reliability of items measuring frequency and severity of bulimic behaviors (binge eating: \(r = .68\); self-induced vomiting: \(r = .92\)) in a college sample.\(^{31}\) Luce and Crowther have also demonstrated strong test–retest reliability over a 2-week time period for Restraint, Weight Concern, Shape Concern, and Eating Concern (\(r = .81, .94, .92, \) and .87, respectively).

Participants also completed the Bulimia subscale of the EDI,\(^{32}\) which assesses frequency and intensity of bingeing and purging behaviors. Participants are asked to indicate general frequency of these behaviors on a 6-point Likert scale, with options ranging from “Never” to “Always.” Similarly, the B subscale consists of 7 questions regarding bulimic behaviors, and participants are asked to indicate general frequency of these behaviors on a 6-point Likert scale, with options ranging from “No Days” to “Every Day” regarding bulimic behaviors, and participants are asked to indicate general frequency of these behaviors on a 6-point Likert scale, with options ranging from “Never” to “Always.” Similarly, the B subscale consists of 7 questions regarding bulimic behaviors, and participants are asked to indicate general frequency of these behaviors on a 6-point Likert scale, with options ranging from “No Days” to “Every Day” regarding bulimic behaviors, and participants are asked to indicate general frequency of these behaviors on a 6-point Likert scale, with options ranging from “No Days” to “Every Day.”

**Results**

Participants were recruited in three waves. Participants recruited during wave 1 (\(n = 159\)) were assessed annually for up to 3 years, participants recruited during wave 2 (\(n = 185\)) were assessed annually for up to 2 years, and participants recruited during wave 3 (\(n = 136\)) were assessed at 1 year. Overall, the sample included 480 participants. The sample in this study refers to participants with at least 1 year of follow-up data (\(n = 421\)). Ethnicity of the final sample was 60% Caucasian, 2% African-American, 10% Hispanic, 17% Asian, and 11% other/unknown. By year in school, the sample was 31% freshman, 20% sophomore, 22% junior, 18% senior, and 8% graduate student. The average age was 20.8 (range, 17–31; SD = 2.6).

The rates of binge drinking frequency by follow-up and by cohort are summarized in Table 1. These frequencies were reported only for participants who completed all follow-up assessments for their given cohort. A multivariate analysis of variance showed that rates of binge drinking frequency did not differ between the treatment or control group at baseline, \(F(1, 103) = .99, p = .32\), 1-year follow-up, \(F(1, 103) = .36, p = .55\), 2-year follow-up, \(F(1, 103) = 1.31, p = .26\), or 3-year follow-up, \(F(1, 103) = .68, p = .41\).

Frequent binge drinking was fairly prevalent in this sample. According to the definition by

<p>| TABLE 1. Percent of participants binge drinking at baseline and 1-year follow-up intervals |
|---------------------------------------------|-------|-------|-------|-------|</p>
<table>
<thead>
<tr>
<th>Binge Drinking Frequency</th>
<th>Baseline</th>
<th>1 Year</th>
<th>2 Years</th>
<th>3 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wave 1 (n = 104)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>38.5</td>
<td>38.5</td>
<td>34.6</td>
<td>33.7</td>
</tr>
<tr>
<td>1–2</td>
<td>30.8</td>
<td>38.5</td>
<td>46.1</td>
<td>49.1</td>
</tr>
<tr>
<td>3–4</td>
<td>15.4</td>
<td>13.5</td>
<td>15.4</td>
<td>11.5</td>
</tr>
<tr>
<td>5+</td>
<td>15.4</td>
<td>9.6</td>
<td>3.8</td>
<td>5.8</td>
</tr>
<tr>
<td>Wave 2 (n = 149)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>38.9</td>
<td>42.3</td>
<td>40.9</td>
<td></td>
</tr>
<tr>
<td>1–2</td>
<td>27.5</td>
<td>42.9</td>
<td>45.7</td>
<td></td>
</tr>
<tr>
<td>3–4</td>
<td>16.1</td>
<td>11.4</td>
<td>11.4</td>
<td></td>
</tr>
<tr>
<td>5+</td>
<td>17.4</td>
<td>3.4</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>Wave 3 (n = 116)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>43.1</td>
<td>35.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1–2</td>
<td>29.3</td>
<td>52.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3–4</td>
<td>13.8</td>
<td>8.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5+</td>
<td>13.7</td>
<td>3.4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Wechsler et al.\(^2\) as binge drinking 3 or more times in the last month, the frequency of frequent binge drinking at baseline depending on the cohort was 14–16%, decreased to 3–14% in the following year, increased slightly to 2–15% in the second year, and was 6–12% at the last yearly follow-up.

Table 2 shows the binge drinking rates for all students with data at baseline and 1 year later. There is a significant redistribution at 1 year \((X^2 (13, N = 410) = 182.88, p < .001)\) with significantly reduced rates of bingeing 3 or more times per month from baseline to 1 year. However, at baseline the correlation between age and bingeing frequency was not significant \((r = -.05, p = .31)\).

Binge drinking at any time during college was significantly more prevalent in white women than in minority women, \([F(1, 478) = 6.69, p = .01]\). About 30% of the students who were not bingeing at baseline began bingeing after baseline, and about 28% of students binge drinking at baseline stopped after baseline.

Frequency of baseline binge drinking was correlated with baseline eating and psychosocial variables (e.g., depression, social support). Spearman correlations are presented in Table 3. Dietary restraint, life events, and coping substance use were positively correlated with frequency of baseline binge drinking. Active coping was negatively correlated with frequency of baseline binge drinking. Frequency of binge drinking at 1 year was positively correlated with dietary restraint, coping denial, and coping substance use.

Baseline binge drinking status and all variables that were significantly correlated with frequency of binge drinking at either baseline or 1 year were entered into a binary logistic regression to predict binge drinking status (binge drinking or not binge drinking) after 1 year. As expected, baseline binge drinking was the strongest predictor of binge drinking status after 1 year \([\beta = 2.07, SE = 0.255, p < .001 (95\% CI = 4.83–13.11)]\). Coping denial also significantly predicted binge drinking status after 1 year \([\beta = 0.738, SE = 0.242, p = .002 (95\% CI = 1.30–3.36)]\) as well as coping substance use \([\beta = 0.814, SE = 0.297, p = .006 (95\% CI = 1.26–4.04)]\).

### Table 2. Binge drinking frequency for all students at baseline and 1 year

<table>
<thead>
<tr>
<th>Binge Drinking Frequency</th>
<th>Baseline, n (%)</th>
<th>1 Year, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>166 (40.5)</td>
<td>162 (39.5)</td>
</tr>
<tr>
<td>1–2</td>
<td>116 (28.3)</td>
<td>178 (43.4)</td>
</tr>
<tr>
<td>3–4</td>
<td>63 (15.4)</td>
<td>49 (12)</td>
</tr>
<tr>
<td>5+</td>
<td>65 (15.9)</td>
<td>21 (5.1)</td>
</tr>
</tbody>
</table>

**Table 3. Spearman correlations between baseline psychosocial variables and frequency of binge drinking at baseline and 1 year \((n = 410)\)**

<table>
<thead>
<tr>
<th>Frequency of Baseline Binge Drinking</th>
<th>Frequency of 1 Year Binge Drinking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight shape concerns</td>
<td>0.046</td>
</tr>
<tr>
<td>Dietary restraint</td>
<td>0.140**</td>
</tr>
<tr>
<td>Bulimia</td>
<td>0.076</td>
</tr>
<tr>
<td>Self-esteem</td>
<td>0.043</td>
</tr>
<tr>
<td>Depression</td>
<td>0.084</td>
</tr>
<tr>
<td>Motivation</td>
<td>0.001</td>
</tr>
<tr>
<td>Life events</td>
<td>0.146**</td>
</tr>
<tr>
<td>Social support family</td>
<td>0.053</td>
</tr>
<tr>
<td>Social support friends</td>
<td>0.054</td>
</tr>
<tr>
<td>Coping active</td>
<td>-0.102*</td>
</tr>
<tr>
<td>Coping denial</td>
<td>-0.016</td>
</tr>
<tr>
<td>Coping substance use</td>
<td>0.509**</td>
</tr>
</tbody>
</table>

* \(p < .05\) (2 tailed).
** \(p < .01\) (2 tailed).

After controlling for baseline binge drinking, dietary restraint no longer significantly predicted binge drinking status after 1 year.

### Discussion

The main finding of this study was the high rate of binge drinking (4 or more drinks at one time) among college-age women at risk of eating disorder. At baseline, 67% of the sample was engaging in binge drinking at least once in the previous month. Furthermore, about 30% of students were engaging in frequent binge drinking, defined as 3 or more binge episodes per month.\(^5\) While the prevalence of frequent binge drinking dropped over time, the overall prevalence of any binge drinking in the previous month remained stable. Results from this study also suggest that most women at risk for eating disorders who do not binge drink at the beginning of college eventually engage in the behavior. These high and stable rates of binge drinking suggest that most of the women in this study, at some point in their college career, placed themselves at risk to the many negative consequences associated with binge drinking discussed in Introduction.

At baseline, we found that avoidance coping (the opposite of active coping) and using substances to cope were associated with higher rates of binge drinking. Other studies have found significant associations between heavy drinking and avoidant coping,\(^7,13,35,36\) and using alcohol to relieve stress,\(^37\) to cope with tension\(^36\) and to avoid negative emotions.\(^22\) Of note, using “substances” to cope also predicted binge drinking frequency at 1 year.
Dietary restraint was positively associated with binge drinking at both baseline and 1 year, although it did not emerge as a significant predictor at 1 year after controlling for baseline binge drinking status. While it is difficult to determine causal relationships from correlational data, one possible interpretation of our findings is that there is a modest association between dietary restraint and binge drinking over time. However, controlling for baseline binge drinking status masks the association between dietary restraint and bingeing at 1 year.

The association between dietary restraint and binge drinking has been reported previously. Earlier reports suggest that undergraduate women endorsing higher levels of dietary restraint drink more often,36 drink to inebriation more frequently,36 and report more maladaptive alcohol use.39–41 The current study adds to these previous findings, by demonstrating that severity of dietary restraint correlates with frequency of binge drinking, and that this relationship remains stable over time.

There are important limitations of this study. An examination of binge drinking was not the primary purpose of the original study, and binge drinking was assessed twice (at baseline and after 1 year) by overall frequency of consuming 4 or more drinks in the past month. Future research should examine quantity and frequency of binge drinking weekly over an extended period of time, including days and times that this behavior is most likely to occur, in order to obtain an accurate sense of students’ patterns of alcohol consumption. Perhaps a diary method would be useful in facilitating increased reliability and accuracy of the data. Additionally, it was not possible to ascertain casual relationships among binge drinking and disordered eating variables, and subsequent research should examine temporal precedence and casual links in women at risk for eating disorders. Furthermore, the findings from this study are limited to college-age women in California, and this sample may not be representative of students elsewhere. Future studies involving people of diverse geographic locations, ages, ethnicities, and levels of education could clarify the relationship between eating disorders and alcohol use across populations.

**Clinical Implications**

Despite the limitations, previous research has not examined binge drinking over time in women at risk for eating disorders. The findings from this study demonstrate high rates of heavy drinking among college women at risk for eating disorders and highlight the need for alcohol abuse prevention and education among this population. Effective interventions should target women with symptoms of disordered eating or weight concerns regardless of their current drinking behavior, as a large percentage who do not binge drink when they enter college eventually do so. These interventions may include education on the negative effects of heavy episodic drinking, as well as strategies to teach healthy coping skills. It is also possible that social pressures and the stress of college contribute to binge drinking, and should be targeted by these interventions as well. In addition to primary prevention efforts, women who exhibit high levels of weight and shape concerns without meeting criteria for an eating disorder should be carefully assessed for substance misuse, including heavy episodic drinking. Finally, interventions aimed at women with disordered eating patterns should also address problematic substance use.

**References**


