# Trajectories of alcohol use and consequences in college women with and without depressed mood ☆

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## HIGHLIGHTS

- We examined women's trajectories of alcohol risk as a function of depressed mood.
- We examined alcohol-related trajectories during the first year of college.
- Depressed mood predicted increased alcohol risk during college, particular during college transitions.
- Depressed women exhibited steeper declines in consequences over time.
- Depressed women exhibited stable levels of mood, drinking and protective behaviors.

## ABSTRACT

College students with depressed mood face heightened risk for experiencing drinking-related negative consequences. However, few studies have examined prospective patterns of alcohol consequences among depressed students. In the present investigation, we assessed how first-year college women's trajectories of heavy episodic drinking (HED) and alcohol consequences differed as a function of depressed mood at college entry. Participants were 233 heavy drinking incoming first-year college females (61% White) at a mid-sized West Coast University. Participants completed an online baseline survey, attended a single brief group intervention session, and completed 1- and 6-month post-intervention follow-up surveys. Depressed mood, alcohol consumption, and alcohol consequences were assessed at each time point. We employed latent growth curve analyses. Females with depressed mood, versus without depressed mood, experienced greater levels of alcohol consequences overall, particularly during transitions to college. However, contrary to hypotheses, participants with depressed mood (vs. without) exhibited significantly steeper declining trends in consequences, controlling for treatment condition, age, race, and ethnicity, and despite stable drinking levels, depressed mood, and use of protective behaviors over time. Potential explanations and suggestions for future research are discussed.

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## 1. Introduction

Transitions to college are associated with substantial escalations in heavy alcohol use and related consequences (Schulenberg et al., 2001; Timberlake et al., 2007), and risky drinking patterns established early in college may persist and develop into more chronic problems (NIAAA, 2002). Therefore, gaining a better understanding of how known predictors of alcohol risk may influence drinking-related trajectories early in college is important to informing targeted intervention efforts.

### 1.1. Depressive symptoms and alcohol risk in college students

Research indicates growing prevalence rates of depression in college populations (Benton, Robertson, Tseng, Newton, & Benton, 2003; Gallagher, 2012), with up to one-third of students reporting at least mild depression (Ibrahim, Kelly, Adams, & Glazebrook, 2013). Students with depressive symptoms are significantly more likely to experience negative consequences as a result of alcohol use, even at similar levels

of drinking as peers (e.g., unsafe sex, overdosing, alcohol dependence; Dennhardt & Murphy, 2011; Kenney & LaBrie, 2013). Although Kenney, Jones, and Barnett's (2015) longitudinal study showed that depressive symptoms at college entry predicted greater experience of alcohol-related negative consequences during the first year of college, to our knowledge no study has examined how college students' drinking-related trajectories differ by depressive status.

Relative to male peers, college women are more likely to experience depressive symptoms (Silverman, 2004; Weitzman, 2004) and may experience greater interpersonal distress adjusting to college environments (Enochs & Roland, 2006). Moreover, depressed women are susceptible to drinking to manage depressive symptoms (Hussong, 2007; Patrick et al., 2011) and are more likely to experience alcohol consequences than same-sex peers or depressed men (Harrell & Karim, 2008; Weitzman, 2004). Therefore, demonstrating trends in risky alcohol use among women matriculating into college with depressed mood is a valuable endeavor.

### 1.2. The current study

In the present investigation, we assessed how trajectories of heavy episodic drinking (HED; consuming 4 + drinks in a two-hour period) and alcohol consequences early in college differed as a function of depressed mood at college entry. Although we expected no significant differences in drinking by depressive status, we hypothesized that women with depressed mood would exhibit greater levels of drinking-related consequences over time.

## 2. Method

### 2.1. Participants

This sample consisted of 233 heavy drinking incoming first-year female college students from the US West Coast (58% female population) who participated in a brief group intervention study. The mean age was 18.1 years ($SD = 0.6$), 61.4% self-identified as White, and 16.7% reported Hispanic ethnicity.

### 2.2. Design and procedure

All incoming first-year college women ($N = 1463$) were invited via email to participate in a study "regarding health and wellness issues" during their first few weeks on campus. A majority of invited students ($N = 828$, 57%) provided electronic consent and completed a screening survey. Women meeting the eligibility criteria (i.e., past month HED) were invited to participate in the larger study by completing an additional 15-minute baseline survey, attending one 45-minute group intervention session—participants were randomized to an alcohol treatment or study skills control condition—and completing follow-up surveys 1 and 6 months post-session. A total of 374 (45%) met eligibility criteria; 247 (66%) attended a group session; and 126 (92%) completed both follow-up surveys. Nominal incentives were provided. Recruitment and enrollment procedures for the larger study are detailed in Kenney, Napper, LaBrie, and Martens (2014).

### 2.3. Measures

#### 2.3.1. Alcohol use

The Daily Drinking Questionnaire (DDQ; Collins, Parks, & Marlatt, 1985; Dimeff, Baer, Kivlahan, & Marlatt, 1999) was used to measure typical weekly drinks in the past month. Past month HED occasions, maximum drinks consumed on any one occasion, and number of drinking occasions were also assessed.

#### 2.3.2. Alcohol-related negative consequences

Alcohol-related negative consequences were assessed using the 23-item Rutgers Alcohol Problem Index (RAPI; White & Labouvie, 1989). Response options ranged from 0 (*never*) to 4 (*10 or more times*) in the past month, and items were summed to form composite scores: baseline ($\alpha = .82$), 1-month ($\alpha = .88$), and 6-month ($\alpha = .84$).

#### 2.3.3. Depressed mood

The 20-item Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977) ($\alpha = .90$) measured depressed mood in the past week using a four-point scale ranging from 0 (*Rarely or none of the time* [*less than 1 day*]) to 3 (*Most or all of the time* [*5–7 days*]). Based on standard cutoffs, we dichotomized summed scores to indicate clinical levels (16 +) or subclinical levels (0–15) of depressed mood.

#### 2.3.4. Protective behavioral strategies

Protective behavioral strategies used before or while drinking in the past month was assessed using the 15-item Protective Behavioral Strategy Survey (PBSS; Martens et al., 2005; e.g., "drink slowly rather than gulp/chug") and seven items from the 21-item Strategy Questionnaire (Sugarman & Carey, 2007). Response options ranged from 0 (*never*) to 5 (*always*), and items were summed to form composite scores: baseline ($\alpha = .89$), 1-month ($\alpha = .91$), and 6-month ($\alpha = .93$).

### 2.4. Plan of analysis

We used independent samples t-tests to examine mean differences in drinking behaviors: HED, weekly drinks, and alcohol consequences. Next, latent growth curve (LGC) analyses of HED and alcohol-related consequences were performed in a structural equation modeling framework (Duncan, Duncan, & Strycker, 2006). Fixed chronometric factor loadings from the manifest measures were used to represent latent intercepts (1, 1, 1) and linear slopes (0, 1, 6). The overall trajectories of use and consequences were first demonstrated using unconditional LGC models. The fits of the models to the observed data were evaluated using the model $\chi^2$, Comparative Fit Index CFI (Bentler, 1990), and Root Mean Square Error of Approximation RMSEA (Steiger and Lind, 1980). Smaller (ideally non-significant) $\chi^2$ and RMSEA values and greater CFI values (CFI > 0.95) indicate better model fit.

We then performed conditional LGCs using intervention condition (i.e., control = 0, treatment = 1) and depressed mood status (i.e., CES-D score 0–15 = 0, CES-D score 16 + = 1) as predictors. Associations between predictors and growth outcomes are presented using unstandardized beta weights ($b$).

All analyses were performed using Mplus 6.0 (Muthén and Muthén, 1998-2010) with a full information maximum likelihood estimator robust to non-normality to account for missing data over time.

## 3. Results

### 3.1. Independent samples T-tests

As shown in Table 1, although we found no significant mean differences in HED or weekly drinks by baseline depressive status (non-depressed vs. depressed) at any time point, depressed women experienced greater levels of alcohol consequences at baseline ($p < 0.001$) and at 1-month follow-up ($p = 0.046$).

### 3.2. Unconditional models

The unconditional model for HED provided excellent fit to the data, $\chi^2(1) = 0.35$, $p = 0.67$; CFI = 1.00; RMSEA = 0.00. The average initial level of HED (i.e., intercept) was 3.22 episodes ($p < 0.001$), and the average trajectory over time was relatively flat as indicated by the non-significant slope value ($-0.01$, $p = 0.78$). Greater initial HED level was associated with a greater decline over time, $r = -0.24$, $p = 0.17$.