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Trajectories of Alcohol Use and Consequences in College Women with and without Depressed Mood

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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

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Contributors

Drs. Kenney and LaBrie collected the data used in the current manuscript (ABMRF; PI Kenney). Drs. Kenney, O'Brien, and Abar generated the design and analyses used in the current study. Dr. Kenney and Ms. Clarke conducted the literature review, and Dr. Kenney wrote the Introduction, Methods, and revised the final draft of the manuscript. Dr. Abar conducted statistical analyses and wrote the Results section with Ms. Clarke's assistance. Dr. O'Brien wrote the Discussion and reviewed drafts of the manuscript. Dr. LaBrie also reviewed and provided feedback on drafts of the manuscript. All authors contributed to and have approved the final manuscript.

Conflict of Interest

All other authors declare that they have no conflicts of interest.

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protective behaviors over time. Potential explanations and suggestions for future research are discussed.

Keywords

alcohol; depressed mood; college students; consequences

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 et al.'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 ($N = 1,463$) 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 et al. (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* was 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* 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 et al. 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 χ^2 , Comparative Fit Index CFI (Bentler 1990), and Root Mean Square Error of Approximation RMSEA (Steiger et al. 1980). Smaller (ideally non-significant) χ^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 et al. 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

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, $r = -0.24, p = 0.17$.

The unconditional model for alcohol consequences also provided excellent fit to the data, $\chi^2 (1) = 0.40, p = 0.53$; CFI = 1.00; RMSEA = 0.00. The average initial level of negative consequences (i.e., intercept) was a score of 4.67 ($p < 0.001$), and the average trajectory over time was also relatively flat ($-0.03, p = 0.55$). Initial negative consequence level was not associated with change over time, $r = 0.09, p = 0.75$.

3.3. Conditional Models

The conditional model for HED provided acceptable fit to the data, $\chi^2 (3) = 8.33, p = 0.04$; CFI = 0.97; RMSEA = 0.09. There was no association between either intervention condition

or depressed mood and initial level or change over time in HED (See Table 1). The interaction between treatment condition and depressed mood status was explored but was not a significant predictor of either the intercept or slope, so it was not retained in the final models.

The conditional model for alcohol consequences provided good fit to the data, $\chi^2(3) = 6.09$, $p = 0.11$; CFI = 0.98; RMSEA = 0.07. After accounting for the influence of treatment condition, there was a significant relationship between initial level of consequences and depressed mood ($n_{\text{depressed mood}} = 76$), such that depressed mood was associated with greater initial consequences (see Table 1). This effect was maintained when controlling for participant age, race, and ethnicity ($p = 0.002$). There was also a significant prediction of change in consequences over time by depressed mood (also maintained with the inclusion of demographic covariates, $p = 0.03$), such that participants with depressed mood declined in consequences at a greater rate than individuals without depressed mood. The interaction between treatment condition and depressed mood status was again explored and discarded due to lack of statistical significance.

3.4. Follow-up Analyses

In order to better understand the association between depressed mood and alcohol-related outcomes over time, we explored possible explanations for the current findings. We first sought to determine if depressed mood at baseline represented a consistent or relatively transient state. Among the 76 individuals with elevated depressed mood at baseline, only 16 (21%) endorsed depressed mood solely at baseline. The majority of individuals demonstrated depressed mood at all three assessments ($n = 40$, 53%) or at both baseline and the first follow-up ($n = 15$, 20%).

We then examined patterns of both drinking and use of protective behavioral strategies over time among individuals with depressed mood at baseline and found relatively consistent, flat levels of use. Mean (S.D.) levels of past month drinking at baseline, 1-month, and 6-months follow-up were: 1.64 (0.90), 1.59 (1.12), and 1.58 (1.08) average weekly drinking occasions; 3.13 (3.12), 2.82 (2.67), and 3.11 (2.87) HED occasions; and 8.00 (5.76), 7.16 (6.40), 7.76 (5.93) average weekly drinks. Mean (S.D.) levels of protective strategies did not demonstrate a consistent pattern over time: 60.65 (2.03), 63.78 (2.26), and 62.00 (2.52).

Altogether, these results indicate that the decline in consequences observed among depressed participants was likely not due to improvements in mood, reduced opportunities for negative alcohol-related consequences, or significant increases in protective strategies over time.

4. Discussion

Co-occurring depressed mood and alcohol problems is prevalent among college students and increases the likelihood for enduring alcohol dependence. Therefore, gaining insight into how depressed mood impacts trajectories of alcohol behaviors and consequences during college may inform prevention efforts. In the current study, we found that incoming college women with (versus without) depressed mood experienced greater alcohol-related

consequences overall but steeper declining trends in consequences during the first year of college. Further, drinking, depressed mood, and use of protective behaviors were stable over time, thus indicating that declining levels of consequences were likely not due to reductions in consumption patterns, improvement in mood, or increased utilization of strategies that minimize consequences.

Although it is well established that college transitions are associated with college student alcohol misuse, the current findings highlight that students matriculating into college with depressive symptoms are especially vulnerable to alcohol risk during this period. Despite similar drinking levels, students with depressive symptoms report substantially greater levels of alcohol-related consequences than non-depressed peers early in college. Surprisingly however, depressed students' experience of consequences converged with their non-depressed peers by 6-month follow-up, or mid-way through the Spring semester. Depressed women's reductions in consequences during the first year of college are consistent with the self-medication hypothesis (e.g., Khantzian 1997), such that consuming alcohol to ameliorate negative affective states or forget problems may result in short-term reductions in drinking-related negative consequences. Given that women with depressed mood are highly susceptible to drinking to cope with negative mood (Kuntsche, Knibbe, Gmel, & Engels, 2005) and coping motivated drinking in college may influence continued problematic drinking after college (Littlefield, Sher, & Wood, 2010), it is important to assess depressed women's motivations for drinking and follow drinking-related trajectories over a longer timeframe to better understand longer-term risk patterns. It is also possible that college women with depressed mood may increasingly underreport negative consequences. Over time, depressed women may view their consequences as less salient, perhaps resulting from consequences being subsumed into a negative schema making it difficult for them to differentiate alcohol consequences from their general state of negative affective symptoms. Alternatively, depressed women may come to view their drinking-related experiences as riskier than their normative perceptions of peers' experiences and in turn underreport their consequences to adhere to normative behaviors.

Future research employing larger, more diverse samples of college students is needed to examine if similar declines in consequences emerge as a function of depressive symptoms and potentially explicate underlying reasons for such trends. Examining if similar findings emerge in first year college males, for example, is particularly important given that the relationship between depressive symptoms and alcohol-related behaviors appears to differ as a function of gender (e.g., Kenney et al., 2015). Still, even after accounting for declining trends, these results support and extend existing research by highlighting that women entering college with depressed mood face substantial risk for alcohol consequences, particularly during transitions to college. While it is important for practitioners working with depressed women to screen and treat for risky drinking behaviors, these efforts will be greatly enhanced by elucidating alcohol-related trends and reasons for changes in alcohol-related consequences in this at-risk subgroup.

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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.

Table 1

Mean Differences on Drinking Variables by Depressive Status

Measures	Non-Depressed	Depressed
	(<i>n</i> = 157)	(<i>n</i> = 76)
	Mean (<i>SD</i>)	Mean (<i>SD</i>)
Heavy Episodic Drinking		
Baseline	3.36 (3.67)	3.13 (3.12)
1-month FU	3.32 (3.55)	2.82 (2.67)
6-month FU ^a	3.21 (3.27)	3.11 (2.86)
Typical Drinking		
Baseline	8.10 (6.79)	8.00 (85.76)
1-month FU	7.59 (6.55)	7.16 (6.40)
6-month FU ^a	7.48 (7.49)	7.76 (5.93)
Alcohol Consequences		
Baseline	3.77 (4.37)	6.20 (5.83)**
1-month FU	4.30 (4.27)	5.64 (5.77)*
6-month FU ^a	4.29 (5.00)	4.97 (5.64)

* $p < .05$.** $p < .001$ ^a non-depressed (*n* = 154), depressed (*n* = 74).

Table 2

Unstandardized b Coefficients and (Standard Errors) of Predictors on HED and Negative Consequences Growth Parameters

	Heavy Episodic Drinking		Negative Consequences	
	Intercept	Linear Slope	Intercept	Linear Slope
Intervention Condition (0 = Control; 1 = Intervention)	-0.05 (0.43)	-0.05 (0.07)	0.64 (0.55)	-0.13 (0.10)
Depressed Mood (0 = Non-depressed Mood; 1 = Depressed Mood)	-0.40 (0.40)	0.05 (0.08)	2.07** (0.67)	-0.24* (0.12)

*
 $p < 0.05$,

**
 $p < 0.01$

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