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Depressed Mood, Gender, and Problem Drinking in Youth

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Abstract

Background: Depressed mood and substance misuse are prevalent during adolescence, but rates differ between males and females. Little is known regarding how depressed mood influences response to substance use interventions and interacts with gender in connection with subsequent drinking. This study explores the relationship of depressed mood and gender to treatment response in adolescents admitted to an Emergency Department (ED) for alcohol-related incidents.

Methods: Adolescents treated at an ED were randomly assigned to a Motivational Interviewing condition or to standard hospital care. Participants (N = 268; ages 13 to 19) were followed for 6 months with detailed measures of alcohol involvement and depressed mood.

Results: Depressed mood at the time of the ED visit predicted less drinking at 6-month follow-up for 13 to 17 year-old girls, but predicted more follow-up drinking for 13 to 17 year-old boys and for 18 to 19 year-old females, above and beyond effects of baseline drinking. Depressed mood did not moderate the relationship between treatment condition and drinking outcome.

Conclusions: Depressed mood as reported at the time of an ED visit appears to motivate drinking reductions in early to mid-adolescent girls. Depressive symptoms may indicate an adaptive distress response to the event that precipitated the ED visit, which clinicians could capitalize on by heightening awareness of adverse risks and collaborating to set goals. In contrast, depression may be a liability in teenage boys and older teenage girls, and mood symptoms could be an additional target for intervention.

Key words: adolescence, brief intervention, motivational interviewing, depressed mood, alcohol use, emergency department.

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Depressed Mood, Gender, and Problem Drinking in Youth

Several sources of data illustrate the scope of youthful drinking. In a recent national high school survey, 50% of 12th graders reported consuming alcohol and 33% reported getting drunk in the past month (Johnston, O'Malley, & Bachman, 2001). Alcohol use disorders appear to affect significant numbers of youth. DSM-III-R (American Psychiatric Association, 1987) criteria for alcohol abuse or dependence were met by 6% of students in a U.S. high school sample (Rohde, Lewinsohn, & Seeley, 1996). The prevalence of lifetime DSM-IV (American Psychiatric Association, 1994) alcohol dependence diagnosis increases with age, at 14% for 18 to 24 year-old females and 25% for males of the same age (Grant, 1997). Motivational enhancement has emerged as a particularly useful intervention with substance use disordered youth. In this approach, the clinician works collaboratively with the teen to develop goals and strategies, thereby minimizing the resistance that is often problematic at this developmental stage (Wagner, Brown, Monti, Myers, & Waldron, 1999).

Depression symptoms as well as diagnoses are relatively prevalent in adolescence. In one sample of high school students, a surprising 25% met lifetime criteria for DSM-III-R major depressive disorder or dysthymia (Rohde et al., 1996). Recent significant depressive symptomatology has been found among about half of high school students (59% of girls and 46% of boys), rates higher than typically observed among adults (Roberts, Andrews, Lewinsohn, & Hops, 1990). Developmentally, the greatest numbers of new depression cases emerge between the ages of 15 to 18. At the same time, gender differences in depression prevalence become apparent, with 20% of girls versus 10% of boys emerging as a new depression case each year (Hankin et al., 1998).

Comorbidity between alcohol use disorders and depression is relatively common among youth. Among high school students with alcohol use disorders, 48% meet criteria for a mood disorder and the girls are roughly twice as likely to have comorbid internalizing disorders as the boys (69% versus 37%; Rohde et al., 1996). However, accurate diagnoses are complicated because substance use can induce depression symptoms in adolescents (Stewart & Brown, 1995). Similarly, depression is not observed more frequently in alcoholic males or females than in nonalcoholics if mood symptoms are clearly independent of substance involvement (Schuckit et al., 1997).

Substance use disorders that co-occur with other psychiatric diagnoses are associated with an earlier age of initiating alcohol or drug use, progression to problematic use (Rohde et al., 1996), academic failure, and an increased risk of suicide attempts (Lewinsohn, Rohde, & Seeley, 1995). Further, for youth with alcohol use disorders, depression may be associated with reduced self-efficacy to avoid alcohol (Moss, Kirisci, & Mezzich, 1994). However, depressive disorders and symptoms do not necessarily convey a poorer substance involvement prognosis. Teens with comorbid substance use and psychiatric disorders are more likely to receive treatment than youth with substance use disorders only (Rohde et al., 1996), though still less than 50% of comorbidly diagnosed youth receive treatment (Kessler et al., 1996). Among treated comorbid adolescent substance abusers, depressive disorders are associated with better rates of treatment completion (Kaminer, Bukstein, & Tarter, 1991). In addition, adolescents with more depressive symptoms evidence longer periods of cigarette abstinence following a brief smoking intervention, suggesting that depressed youth may be particularly responsive to individual attention targeting health behaviors (Colby et al., 1998).

In sum, both substance misuse and depressed mood are common during adolescence. However, it is unclear how mood may influence adolescents' response to substance-related interventions. It is possible that mood may influence decisions to start drinking and to keep drinking, but this relationship may be complex. Depressed mood as reported at the time of a "teachable moment" may motivate drinking reductions in early to mid-adolescent girls. Specifically, acute dysphoria, such as a response to traumatic events, may increase motivation to change behavior. Further, milder levels of depressive symptoms may be associated with favorable treatment response, while youth with more severe symptomatology may be less amenable to treatment. We hypothesized that depressed mood would influence adolescents' subsequent drinking behavior differently for males and females because adolescent females have higher levels of depression, may respond differently than males to depressive affect, and often show different treatment outcome than males (Rounsaville, Dolinsky, Babor, & Meyer, 1987). It was hypothesized that depressive symptomatology would moderate the relationship between gender and subsequent substance involvement, and that this relationship would be curvilinear, i.e., the best prognosis would be for those with mild symptomatology.

Method

Participants

Participants (N = 268) were 13 to 19 year-olds treated for injury or alcohol intoxication in a hospital Emergency Department (ED), with a positive blood alcohol level or self-reported alcohol use at time of the ED visit. Additional criteria required that adolescent participants: 1) passed a Mini-Mental Status Exam, 2) correctly summarized the informed consent, 3) were not admitted for a suicide attempt, 4) were not in police custody, and 5) spoke English fluently. Teen materials were all in English, but parent consents and assessments were also made

available in Spanish. The sample was composed of 126 13 to 17 year olds and 142 18 to 19 year old youth.

Measures

The measures used in the current study were part of a larger protocol described elsewhere (Monti et al., 1999; Monti, Barnett, O'Leary, & Colby, 2001).

Adolescent Drinking Questionnaire (ADQ). This measure consisted of four items from the adolescent Health Behavior Questionnaire (Donovan, 1996; Jessor, Donovan, & Costa, 1989) that assess the typical number of drinks per occasion (9-point scale), the frequency of drinking, the frequency of heavy episodic drinking (five or more drinks on an occasion), and the frequency of drunkenness. Frequency items were assessed on an 8-point scale. Heavy episodic drinking and drunkenness were not widespread, particularly among younger participants, so typical number of drinks and frequency of drinking were used as the dependent variables in this report.

Center for Epidemiologic Studies - Depression Scale (CES-D). The CES-D is a 20-item self-report measure developed by the NIMH for community surveys (Radloff, 1977). It assesses current depressive symptomatology with an emphasis on subjective mood state. Participants were asked to rate how frequently in the past week they experienced each of 20 symptoms from "rarely or none of the time" (0) to "most or all of the time" (3). Scores of 16 or greater indicate presence of significant depressive symptomatology (Radloff, 1977), and this has been determined a useful cutoff for adolescents (Roberts et al., 1990). Good psychometric properties of the CES-D have been demonstrated in adolescent samples (Radloff, 1991; Roberts et al., 1990). At baseline, 43% of participants demonstrated scores of 16 or greater on the CES-D.

Procedures

Adolescents (N = 268) were randomly assigned to a brief Motivational Interview (Miller & Rollnick, 1991) or to standard hospital care (Monti et al., 1999). Treatment outcome data and details of the intervention are provided in Monti et al., 1999 and Monti et al., 2001. Briefly, the Motivational Interview used a non-confrontational approach to provide youth with personalized feedback on alcohol use, heighten motivation for behavior change, and collaboratively establish goals. Assessments were completed during the ED visit after intoxication had sufficiently diminished so that participants could pass a mini-mental status exam and describe the key points in the consent form to the examiner. Follow-up assessments were completed 3 months and 6 months following the intervention in the ED. The present study utilizes drinking and mood data collected at baseline and drinking data obtained at the 6-month follow-up. Most (88%) participants initially assessed (n = 305) completed the 6-month follow-up, and there were no significant differences between those followed and those not followed on age, gender, ethnicity, mood, or drinking behavior. See Table 1 for demographic characteristics of the sample. We analyzed treatment effects separately for younger and older teens because the intervention for 13 to 17 year-olds involved parental participation.

Results

Male and female participants were similar on demographic variables (i.e., age, socioeconomic status, ethnicity, years of education, school status, and living arrangement). However, male youth tended to drink more than females. Specifically, 13 to 17 year-old boys drank more drinks per occasion than female peers at baseline ($p < .005$), and 18 to 19 year-old males typically consumed more drinks per occasion ($p < .05$) at follow-up than their female counterparts (see Table 2). Drinking frequency and frequency of heavy episodic drinking were

similar between males and females. Females demonstrated CES-D total scores that indicated greater depressive symptomatology than males. Differences were most marked in the 13 to 17 year age range, particularly at baseline (see Table 2). Of note, over half of 13 to 17 year-old females scored at or above the cutoff of 16 on the CES-D total at baseline. In the 13 to 17 year-old age group, baseline frequency of drinking was significantly correlated with the baseline CES-D total scores ($r = .19$, $p < .05$). In the 18 to 19 year-old age group, follow-up frequency of drinking was correlated with the follow-up CES-D total score ($r = .22$, $p < .05$). The 18 to 19 year-old group reported significantly more frequent drinking and more frequent heavy episodic drinking than 13 to 17 year-olds at baseline and at follow-up. No age differences were found for typical number of drinks per occasion or for CES-D scores.

Two moderator models were examined. The first model evaluated the extent to which baseline CES-D scores influenced the relationship between treatment condition and follow-up drinking in both age groups using hierarchical regressions (Aiken & West, 1991). The baseline frequency of drinking was entered on step 1, CES-D total score and treatment condition (Motivational Interviewing versus standard care) were entered on step 2, the interaction between CES-D total scores and treatment assignment was the third step, and follow-up frequency of drinking was the dependent variable. The second model examined the influence of CES-D scores on the relationship between gender and follow-up drinking for 13 to 17 year-olds and 18 to 19 year-olds. Baseline frequency of drinking was the first step, CES-D total and gender were entered on step 2, the CES-D total x gender interaction was entered on the last step, and the dependent variable was follow-up frequency of drinking. These two models were repeated to predict 6-month typical number of drinks per occasion, controlling for baseline typical number of drinks per occasion.

The CES-D total score did not interact with treatment condition to predict follow-up frequency of drinking or typical number of drinks per occasion for either age group, contrary to our hypothesis. However, CES-D total scores significantly interacted with gender to predict follow-up drinking in both age groups. The interaction of CES-D with gender significantly predicted follow-up typical number of drinks per occasion for 13 to 17 year-olds, above and beyond the effects accounted for by baseline typical number of drinks per occasion or main effects of gender or CES-D ($F(4,117) = 6.90$, $p < .001$; $\beta = .16$, $R^2\Delta = 2\%$, $p < .05$). The regression slopes for males and for females suggested that greater baseline CES-D scores predicted fewer drinks per occasion for girls and more drinks per occasion for boys at follow-up (see Table 3). Neither CES-D scores nor the interaction of CES-D with gender predicted follow-up frequency of drinking for 13 to 17 year-old teens. The plot for CES-D scores and typical number of drinks per occasion for 13 to 17 year-old boys was linear and positive, but for females it was U-shaped indicating the greatest drinking for girls at either extreme of CES-D scores.

For 18 to 19 year-old adolescents, CES-D scores interacted with gender to predict follow-up frequency of drinking ($F(4,135 = 7.47$, $p < .001$; $\beta = -.16$, $R^2\Delta = 3\%$, $p < .05$). Greater CES-D scores predicted more frequent drinking at follow-up for 18 to 19 year-old females but had no bearing on 18 to 19 year-old males' follow-up drinking (see Table 3). Follow-up typical alcohol quantities were not predicted by CES-D total scores or their interaction with gender for 18 to 19 year-old patients. Plotting CES-D scores and frequency of drinking for 18 to 19 year-old females revealed that drinking increased as CES-D scores increased but the slope was steeper for lower levels of depression then tapered off for CES-D scores above the median.

Follow-up analyses were conducted to test the hypothesis that milder levels of depression may be associated with preferable treatment response, while more severe symptomatology may

be associated with poorer treatment outcome. To see if the relationship between the baseline CES-D x gender interaction and follow-up drinking was curvilinear for the two significant models above, quadratic interaction terms were created by multiplying the dichotomous code for gender (1 = male, -1 = female) with the square of the baseline CES-D total score. The first follow-up analysis tested a quadratic model in predicting follow-up typical number of drinks per occasion for 13 to 17 year-old teens. The hierarchical regression had baseline typical number of drinks per occasion as the first step, CES-D total on step 2, the CES-D x gender interaction on step 3, and the quadratic interaction term as the last step. The interaction between gender and the quadratic term for baseline CES-D total significantly predicted follow-up typical number of drinks per occasion over and above variance accounted for by the first-order CES-D x gender interaction, CES-D total scores, and baseline drinking ($\underline{F}(4,135) = 7.72$, $\underline{p} < .001$; $\beta = .29$, $R^2\Delta = 4\%$, $\underline{p} < .02$). The quadratic term was negatively related to drinking for girls but not related for boys, confirming the curvilinearity observed in the U-shaped plot for girls and linearity for boys.

The second follow-up analysis explored the relationship between a gender x CES-D interaction and follow-up frequency of drinking in 18 to 19 year-old youth using a quadratic model as above. The interaction between gender and the quadratic of baseline CES-D total predicted follow-up frequency of drinking above and beyond variability accounted for by the linear gender x CES-D interaction, CES-D scores, and baseline drinking ($\underline{F}(4,117) = 12.90$, $\underline{p} < .001$; $\beta = .33$, $R^2\Delta = 3\%$, $\underline{p} < .03$). The quadratic term was negatively related to drinking for females and positively related for males, supporting a curvilinear relationship between depression and drinking frequency for 18 to 19 year-old females.

Discussion

This study evaluated the relationship between depressed mood and gender on subsequent alcohol use among teens who visited an ED for an alcohol-related incident. For girls, reports of depressed mood symptoms at the time of an alcohol-related hospital visit were more predictive of drinking outcome six months later than the type of intervention administered. It is possible that these self-reports of depressive symptoms may indicate an adaptive distress response to the event that precipitated the ED visit, given that the CES-D asks only about affect during the past week. Clinicians could capitalize on this motivating distress response by heightening the teen patient's awareness of the problem and drinking-related precipitants. If the teen is motivated to make behavioral changes, the clinician can next work with the teen to develop goals and manage barriers. However, high CES-D scores may reflect a composite of current stressors and long-standing dysphoria. Reports of depressed affect may additionally suggest social withdrawal, which may be associated with fewer social opportunities in which to use alcohol.

In contrast, depressed mood appeared to be prognostic of poorer outcome for late-adolescent females. The relationship between mood and drinking may differ for younger and older females for several reasons. First, since rates of depressive disorders are higher in females over 18 (Hankin et al., 1998), self-reports on mood measures may be more likely to reflect long standing mood disturbances in late adolescent females while elevations may indicate temporary distress in mid-adolescent girls. Second, as girls attain more autonomy (e.g., live away from home, drive a car), increased options for socializing and drinking may supercede the tendency for depression to limit activities. In contrast, social opportunities for younger girls may require more proactive efforts that could be hampered by symptoms of depression, thus limiting exposure and access to alcohol. Additionally, alcohol may be used more frequently by depressed

females who have access in order to relieve depressive symptoms, consistent with a study on adolescent smoking, which found that depressed mood was linked to increased smoking and drinking but only for females (Whalen, Jamner, Henker, & Delfino, 2001). Finally, the relationship between depressed mood and increased drinking in 18 to 19 year-old females may be apparent because a frequent drinking pattern is causing depressed mood (Brown & Schuckit, 1988), although few 13 to 17 year-old girls in this sample reported drinking quantities sufficient to induce mood disturbances.

Depressed mood had less of an influence on drinking behaviors among adolescent males in this ED sample. While increased levels of depression at baseline predicted more drinking at follow-up for teen boys, older adolescent males showed no relationship between scores on a self-report mood measure at the time of an ED visit and follow-up drinking. Keeping in mind that depressed mood was lower and drinking was higher among the males, it may be that a depressed mood state does not deter boys from drinking as it may with girls. Perhaps boys can more easily engage in social activities that may involve drinking opportunities despite experiencing negative affect.

The current study is limited somewhat by sample size. Developmental issues in the interplay between depressed mood, substance use, and intervention response are suggested, but sample size precludes a detailed investigation of how these factors operate for each stage of adolescence. Because our measure of depression is a state scale, we cannot separate long-standing depressive disorders from transient mood changes. An additional limitation in testing the hypotheses was the relatively restricted range of alcohol involvement in the sample. Finally, although hypotheses were supported by statistically significant results, the clinical significance may be modest.

In summary, this study suggests that for 13 to 17 year-old females, a moderately elevated degree of depressed mood symptoms in response to an adverse life event may herald a decrease in drinking quantities. Clinicians can capitalize on this distress by accentuating the risks of heavy drinking, working cooperatively with the teen to set goals, and providing support to help her reach that goal. In contrast, depressed mood symptoms may indicate or heighten the risk for increases in drinking for early- to mid-adolescent boys and for late-adolescent females. This study suggests that clinicians might target intervention efforts toward depressed youth in these demographic groups.

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Table 1

Sample Characteristics at Baseline for Teens Admitted to Emergency Department

	13 to 17 year-olds n = 126 M (SD) or %	18 to 19 year-olds n = 142 M (SD) or %
Age	15.64 (1.22)	18.39 (0.49)
% Female	36%	39%
Hollingshead socioeconomic status	4.84 (2.54)	6.67 (1.51)
Ethnicity		
Caucasian	73%	80%
Latino	17%	6%
African-American	6%	9%
Asian/Pacific Islander	2%	3%
Other	2%	2%
Years of education	9.07 (1.37)	11.67 (1.16)
School status		
Junior high or high school student	87%	11%
Dropped out or expelled	9%	19%
High school graduate, not in college	3%	16%
College student	1%	54%
Living arrangement		
Parent(s)	93%	53%
Other relatives	5%	4%
Friends/roommates/partners	1%	37%
Alone	1%	6%
Reason for admission		
Alcohol toxicity	51%	47%
Motor vehicle crash	20%	26%
Fall	11%	6%
Assault	10%	13%
Other injury or illness	8%	8%

Table 2

Drinking and Depressive Symptoms of Teens Admitted to Emergency Department

	Baseline				6-month follow-up			
	13 to 17 year-olds		18 to 19 year-olds		13 to 17 year-olds		18 to 19 year-olds	
	Male (n=81)	Female (n=45)	Male(n=87)	Female (n=55)	Male (n=81)	Female (n=45)	Male(n=87)	Female (n=55)
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Drinking days per month	2.56(1.68)†	2.78(1.70)	4.14(1.56)	3.80(1.71)	2.68(1.98)†	2.04(1.85)†	3.92(1.79)	3.33(1.94)
Typical # of drinks per occasion	5.09(2.13)	3.89(1.90)*	5.68(1.70)	4.91(1.92)	3.62(2.90)	2.62(2.51)	4.79(2.43)	3.93(2.39)*
≥ 5 drinks/occasion per month	2.58(2.26)†	1.96(1.91)†	4.24(2.10)	3.60(2.28)	2.20(2.57)†	1.51(2.26)†	3.83(2.64)	3.43(2.66)*
CES-D Total	13.91(9.70)	20.73(14.73)*	14.45(11.83)	21.09(16.03)*	12.58(8.64)	16.13(12.48)*	11.72(9.66)	15.33(11.81)
% over CES-D cutoff (≥ 16)	34%	58%*	37%	51%	21%	38%*	27%	39%

Gender difference: * $p < .05$

Age difference: † $p < .05$

Table 3

Moderator Model for Influence of Depressed Mood and Gender on Follow-up Drinking

	R^2	$R^2\Delta$	β
13 to 17-year-olds: DV = Follow-up typical number of drinks per occasion			
Step 1:	.16	.16**	
Baseline drinks/occasion			.40**
Step 2:	.17	.01	
Gender			.08
CES-D Total score			.04
Step 3:	.19	.02*	
CES-D Total score x Gender			.16*
Males			+.18
Females			-.12
18 to 19-year-olds; DV = Follow-up frequency of drinking			
Step 1:	.12	.12**	
Baseline frequency of drinking			.36**
Step 2:	.15	.03	
Gender			.15
CES-D Total score			.12
Step 3:	.18	.03*	
CES-D Total score x Gender			-.16*
Males			-.05
Females			+.30

* $\underline{p} < .05$, ** $\underline{p} < .001$