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Depression and heavy alcohol use among adolescents: Concurrent and prospective relations

MICHAEL WINDLE[a] AND PATRICK T. DAVIES[b]
[a]*University of Alabama at Birmingham; and* [b]*University of Rochester*

Abstract
This study of over 1,000 adolescents focused on common and distinctive correlates of four subgroups—no problem, depressed only, heavy drinking only, and mixed (depressed and heavy drinking). Correlates were evaluated from the domains of personal dispositions (e.g., temperament), interpersonal relations (e.g., parent and peer), stressful life events, and other problem behaviors (e.g., delinquency, substance use). The no-problem subgroup differed from the other three subgroups in the direction of healthier functioning on almost all measures. The mixed subgroup reported the most pervasive, low levels of functioning, with the highest levels of childhood externalizing problems and stressful life events, the lowest levels of family social support, and high levels of delinquency and substance use. The depressed-only subgroup reported a more internalized pattern characterized by childhood avoidance problems, a difficult temperament (e.g., inflexibility, withdrawal, low task orientation), interpersonal stressors, and poor coping strategies. The heavy-drinking-only subgroup was characterized by higher drinking levels by primary caregivers and lower levels of family cohesion as reported by primary caregivers. The 1-year prospective findings were generally consistent with the concurrent findings in that variables that were associated with transitions toward and away from depression and heavy drinking were associated with specific transitions (e.g., childhood externalizing problems were associated with the transition from no problem to heavy drinking).

Adolescence is a phase in the life span characterized by numerous developmental changes across different systems, or levels, of analysis (e.g., biological, cognitive, social). For example, major biological changes include the onset and time course of puberty and significant changes in physical size. Major psychosocial changes include movement toward greater personal autonomy, renegotiating relationships with parents, and greater affiliation and involvement with peers. Perhaps as a consequence of the broad range of developmental transitions that occur during this time period, the number of stressful life events is arguably at its maximum during adolescence (e.g., Newcomb, Huba, & Bentler, 1981; Windle, 1992a).

Findings from epidemiological studies have indicated that the prevalence of a number of health-compromising behaviors and psychiatric disorders increase dramatically during adolescence. For instance, alcohol and other substance use onset and escalation commonly occur during adolescence (e.g., Johnston, O'Malley, & Bachman, 1998), as do marked increases in delinquent activity and sexual behaviors (e.g., Dryfoos, 1990; Farrington, 1995). Similarly, in adolescence there are substantial increases in the prevalence of several disorders, including schizophrenia, bipolar disorders, depressive disorders, anxiety disorders, and substance-abuse disorders (e.g., Merikangas & Angst, 1995). Given the emergence and relatively high rate of dysfunctional behaviors and frank psychiatric disorders in

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Address correspondence and reprint requests to: Michael Windle, UAB Department of Psychology, 415 Campbell Hall, Birmingham, AL 35294-1107.

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adolescence, there has also been an increase in the study of co-occurring problems and comorbidity (e.g., Bukstein, Brent, & Kaminer, 1989; Fergusson, Horwood, & Lynskey, 1993; Verhulst, van der Ende, Ferdinand, & Kasius, 1997).

Although adolescence constitutes a phase of heightened challenges associated with multiple changes and transitions, as well as a phase of increased psychiatric disorders and health-compromising behaviors, several critical issues exist in understanding developmental psychopathology during adolescence. One major issue pertains to distinguishing between age-normative behaviors (e.g., experimental use of alcohol) and serious involvement (e.g., frequent heavy alcohol use with adverse consequences) that may precede the expression of a disorder or an undesirable condition (e.g., teen pregnancy, sexually transmitted disease). A second issue relates to the distinctive expression of a disorder (e.g., alcohol disorder vs. depressive disorder) or condition, and patterns of comorbidity and problem co-occurrence. Whereas problem behavior theory (Jessor & Jessor, 1977) suggests a unitary syndrome of problem behaviors, recent research has provided substantial support for the etiologic distinctiveness of different forms of childhood and adolescent dysfunction (e.g., Lewinsohn, Gotlib, & Seeley, 1995; Loeber, Farrington, Stouthamer–Loeber, & Van Kammen, 1998; Zucker, Fitzgerald, & Moses, 1995). A third issue concerns a greater emphasis on common and unique predictors of given disorders or problem conditions, with an appreciation that some factors (e.g., family dysfunction, marital conflict) may generalize across a wide range of disorders or problem conditions, whereas others may be specific to particular disorders, syndromes, or problem conditions (e.g., Lewinsohn et al., 1995; Weiss, Süsser, & Catron, 1998). Yet a fourth issue is how to utilize information on the etiologic heterogeneity of adolescent disorders and problem conditions to guide the health community in providing a cost-effective and efficient service delivery system.

In this study, a developmental psychopathology perspective was used to address, to some extent, the four issues described above with regard to adolescent depressive symptoms and heavy alcohol use. More specifically, this study focused on the identification of antecedents and correlates of serious levels of depressive symptoms and heavy alcohol use that may be indicative of distinctive developmental pathways toward these behavior problem outcomes. The selection of potential risk and protective factors for the prediction of these outcomes was not exhaustive, but was representative of several important domains (e.g., Hawkins, Catalano, & Miller, 1992). To the extent that the risk and protective factors measured in this study distinguished subgroups (e.g., adolescents with serious depressive symptoms, adolescents engaged in heavy drinking) in a coherent and differential manner, support would be provided for distinctive developmental pathways; to the extent that these factors did not distinguish subgroups, a more common influence model would be supported (at least for this set of measured variables).

In addition to identifying distinctive antecedents and correlates for adolescents with serious depressive symptoms and with heavy alcohol use, 1-year prospective analyses were conducted to evaluate the stability and change of group status (e.g., heavy drinker) across time. The stability and change of intraindividual trajectories, or individual status in this application, and the predictors of change, are important components of a developmental psychopathology perspective (e.g., Cicchetti, 1993; Sroufe & Rutter, 1984). Beyond investigating the stability and change of individual status categorization across time (e.g., no problems at Time 1 but depressed at Time 2), two sets of predictive relations were studied. First, those risk factors most closely linked with, for example, heavy drinking were examined to evaluate if they were associated with change in status from no problems at Time 1 to heavy drinking at Time 2. In essence, these analyses evaluated the consistency of variables associated with individual status variables at Time 1 (e.g., childhood externalizing problems with heavy drinking), as well as associated with the transition to heavy drinking across the 1-year interval. Second, because of

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the importance of the interpersonal context during adolescence, changes in social relationship variables (with parents and peers) across time were evaluated in relation to changes in individual status. For example, were increases in the level of interpersonal stressors across time associated with a transition from no-problem to depressive status?

These prospective analyses therefore supplemented the cross-sectional subgroup comparisons in addressing issues about serious levels of depression and heavy drinking among adolescents. The risk and protective factors also provided useful information regarding potential distinctive concurrent and prospective antecedents and correlates of these emotional and behavioral problems. Collectively, this information may prove useful in contributing knowledge about the development of distinctive pathways toward and away from serious depressive symptoms and heavy drinking during adolescence.

Depressive Symptoms and Depressive Disorders

Estimates of the prevalence of depressive disorders among adolescents has been highly variable due to a number of issues related to sampling (e.g., nonrepresentativeness, age restrictions) and methodology (e.g., different diagnostic instruments, parental vs. adolescent informants; e.g., Merikangas & Angst, 1995). Hence, there is no consensus on the number of adolescents with depressive disorders. Nevertheless, there is a general consensus on two issues regarding empirical findings on adolescent depression. First, beginning in early adolescence and continuing throughout adolescence there is a substantial increase in both the number of depressive symptoms expressed and the onset of depressive disorders (e.g., Kashani et al., 1987; McGee, Feehan, Williams, & Anderson, 1992). McGee et al. reported that depressive disorders were rare prior to age 11 years, but increased substantially after this and attained quite high levels by age 15 years. In one of the more comprehensive studies of adolescent depression in representative high school settings in western Oregon, Lewinsohn, Rohde, Seeley, and Hops (1991) reported a lifetime rate of major depression of 25.3%. Second, the empirical data are consistent in indicating an age-associated gender reversal in the prevalence of depressive disorders (e.g., Cicchetti & Toth, 1998). Prior to age 12 years, boys have higher rates of depression than girls; subsequent to age 12 years, girls have higher rates of depression than boys, with the ratio estimated at about 4 : 1 (McGee et al., 1992).

Other important issues in the literature on adolescent depression pertain to the heterogeneity of expression and the clinical significance of high levels of depressive symptoms on self-report measures of depression (even if diagnostic thresholds for major depressive disorder are not met). Harrington, Rutter, and Fombonne (1996) reviewed literature on this topic and presented follow-up data on studies conducted on childhood and adolescent depression. They concluded that depressive symptoms were common during this age interval and that depressive syndromes during childhood and adolescence were heterogeneous with regard to developmental stage at time of onset and pattern of comorbidity. With regard to comorbidity, Harrington et al. reported that adolescent onset of depression predicted adult major depressive disorder, whereas co-occurring adolescent depression and conduct disorder did not increase the prediction of adult major depressive disorder. Gottlib, Lewinsohn, and Seeley (1995) also reported that adolescents with high scores on the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977) who did not meet formal clinical diagnostic criteria did not differ from adolescents meeting formal diagnostic criteria on several measures of psychopathology and psychosocial dysfunction. The implication of these findings is that high levels of depressive symptoms (below the clinical threshold) among adolescents, as indicated on a self-report measure such as the CES-D, merit investigation with adolescent samples.

The occurrence of high levels of depressive symptomatology and the expression of depressive disorders during adolescence has been associated with several co-occurring problems and comorbid conditions (e.g., Fer-

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gusson et al., 1993; Merikangas & Angst, 1995; Miller–Johnson, Lochman, Coie, Terry, & Hyman, 1998). While much of the research on adolescent depression has focused on comorbid disruptive disorders or comorbid anxiety disorders, several studies have also identified significant co-occurrence with alcohol and substance abuse problems. For example, Deykin, Levy, and Wells (1987) reported that 23% of depressed adolescents had a lifetime alcohol or other substance abuse disorder. Similarly, findings by Rohde, Lewinsohn, and Seeley (1996) indicated that 19.9% of depressed adolescents had a lifetime alcohol or other substance abuse disorder. Thus, there is ample evidence that alcohol or other substance abuse disorders are highly represented among depressed adolescents.

Adolescent Alcohol Disorders and Alcohol Use

There have been a limited number of representative community-sample studies of alcohol disorders among adolescents. Based on the available evidence, the prevalence ranges from 3 to 32% contingent on the age of the sample assessed (e.g., Cohen et al., 1993; Reinherz, Giaconia, Lefkowitz, Pakiz, & Frost, 1993). For instance, a rate of 3–4% was reported by Cohen et al. for a subsample of adolescents aged 14–16 years; the prevalence for adolescents aged 17–20 years was 8.9% for girls and 20.3% for boys. Reinherz et al. studied primarily seniors in high school (mean age 17.9 years) and reported that 32.4% met DSM-III-R criteria for a lifetime alcohol disorder.

Whereas there has been a limited amount of research on adolescent alcohol disorders with community samples, there has been a relative abundance of survey research on alcohol use practices among adolescents (e.g., Johnston et al., 1998; Windle, 1999). Many of the survey questions on alcohol use practices in these surveys focus on age of initiation, frequency and quantity of use, attitudes of parents and peers about tolerance of use by adolescents, and alcohol-related consequences (e.g., getting in a fight while drinking, drinking and driving). Data on adolescent alcohol use practices have consistently indicated high rates of lifetime use among adolescents and patterns indicative of potential harm. For example, levels of binge drinking (i.e., 5 or more drinks in a single setting in the last week) were 13.9% among 8th graders and 32.3% among 12th graders (Johnston et al., 1998). Several investigators have also attempted to utilize information gathered on frequency and quantity of alcohol use and alcohol-related problems to investigate distinctions among problem and nonproblem drinkers (e.g., Donovan & Jessor, 1978; White & Labouvie, 1989; Windle, 1996). The findings of these studies are consistent in demonstrating significant variation and intergroup differences between problem and nonproblem drinkers. The level of overlap between heavy or problem drinkers identified via these survey methods have not been compared with findings based on clinical diagnostic criteria; hence, it is not known if these are highly overlapping populations.

Similar to findings on adolescent depression, adolescent alcohol disorders and heavier levels of alcohol consumption among adolescents have been associated with co-occurring problems and comorbid psychiatric conditions (e.g., Bukstein, 1995; Windle, 1999). Higher levels of alcohol use are associated with the three leading causes of mortality among youth: accidental deaths (e.g., fatal automobile and boat crashes), homicide, and suicide. In addition, higher levels of alcohol use are associated with other health-compromising behaviors, including unprotected sexual activity, with the attendant risks for teen pregnancy and sexually transmitted diseases. Alcohol use is also commonly conceptualized as a "gateway" substance preceding the use of marijuana and then other illicit substances (e.g., Kandel, 1975).

Risk and Protective Factors

Research on risk and protective factors of adolescent depression have identified a wide range of variables (e.g., family history of depression, biological markers, parental dysfunction, marital discord, stressful life events, hopelessness, cognitive biases, and attribu-

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tional styles) that vary in strength of association contingent on sample characteristics (e.g., community or treatment sample) and assessment protocols (e.g., multiple informants, structured interviews; for reviews, see Angold, 1988; Kovacs, 1989; Merikangas & Angst, 1995). Similarly, research on risk and protective factors of adolescent alcohol use has provided a wide range of influences across different levels (e.g., biogenetic to social–cultural) of analysis (for reviews, see Hawkins, Catalano, & Miller, 1992; Windle, 1999). Some of these risk and protective factors are distinct for adolescent depression (e.g., self-blame attributional style) and distinct for adolescent alcohol use (e.g., alcohol expectancies); however, other factors (e.g., temperament, stressful life events, low family support) appear to be common across these two problem areas. Few studies have assessed whether risk and protective factors differ for adolescents who are depressed only, heavy alcohol users only, or who are depressed and have a substance-related difficulty (e.g., Aseltine, Gore, & Colten, 1998; Rohde, Lewinsohn, & Seely, 1996).

Major Objectives of Study

This study had three major objectives. First, there was a focus on the prevalence of heavy alcohol consumption (only), serious depressive symptomatology (only), and the co-occurrence of heavy alcohol consumption and serious depressive symtomatology (i.e., mixed problems) for a community sample of middle-aged adolescents. Second, there was a focus on correlates from the domains of personal dispositions (e.g., childhood behavior problems, temperament), interpersonal relations (e.g., family and peers), stressful life events, and other problem behaviors (e.g., marijuana use) that may distinguish these distinctive conditions. The identification of common and unique antecedents, correlates, and consequences of different expressions of dysfunction in adolescence is a vital issue in developmental psychopathology, with implications not only for etiology but also for primary, secondary, and tertiary interventions. Third, prospective analyses were conducted (a) to evaluate the stability and change in the expression of dysfunction across time (a 1-year interval) and (b) to identify variables that predicted change in status across a 1-year interval (e.g., variables that predicted change from a no-problem status to a heavy-drinking status). For convenience, hereafter, serious depressive symptomatology is referred to as depression and heavy alcohol consumption is referred to as heavy drinking.

Method

Subjects

The data used in this study were collected as part of a four-wave panel design (with 6-month intervals) focused on vulnerability factors and adolescent problem behaviors. The initial sample consisted of 975 high school sophomores (53%) and juniors (47%) recruited from three homogeneous suburban high schools in western New York. Fifty-two percent ($N = 517$) of the sample was female and 47% ($N = 458$) was male. The average age of the respondents at the first occasion of measurement was 15.54 years ($SD = .66$) and 98% were White. Seventy percent of the sample was Catholic, 18% Protestant, and 12% other. (Note that these were not Catholic high schools but rather reflected the religious composition of subjects in this community.) Ninety-six percent of the fathers and 43% of the mothers were employed full time outside the home (37% of mothers were employed part time outside the home). Fathers completed an average of 13.79 years of education ($SD = 2.39$) and mothers completed an average of 13.55 years ($SD = 2.01$). The average number of children per family was three. The median family income was about $40,000, with only 3% of the sample reporting family income less than $12,000. Eighty-eight percent of the adolescents' primary caregivers were currently married, 12% were divorced, and 1% were widowed. Approximately 76% of high school students eligible for the study participated (see Procedure section). At the second occasion of measurement (6 months later) the retention rate was 93%. Sample re-

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tention across waves of measurement was uniformly high, in excess of 90%.

A supplemental sample of 220 adolescents participated at the second, but not the first, occasion of measurement, and were eligible to participate at subsequent measurement occasions. These supplemental subjects were added to the study to increase the sample size for some relatively low base-rate variables (e.g., family history of alcoholism) of interest to the objectives of the larger federally funded project. Statistical comparisons on sociodemographic variables (e.g., parental education level, income) and adolescent problem behaviors (e.g., alcohol use, delinquent activity) indicated that the supplemental sample did not differ in any systematic way from those subjects who participated initially at the first measurement occasion. Because active informed-consent procedures were used in this study, information on nonparticipants was not available; hence, it is unclear how representative the participating sample was relative to the total eligible sample except on major sociodemographic variables (e.g., gender and ethnic group composition), which did not reflect participant bias. It has been determined, however, that the drinking and substance-use practices and rates of suicidal ideation and attempts among adolescents in this sample were highly similar to findings in national survey studies (see Reifman & Windle, 1995; Windle, 1996).

Data were collected from primary caregivers (90% mothers) via mail surveys. Approximately 60% of primary caregivers agreed to participate in the study and completed and returned mail-survey forms. For those primary caregivers not willing to complete the mail survey, some information (e.g., on sociodemographic variables) was provided via telephone contact on all but 12 primary caregivers. Comparative data analyses to evaluate bias for mail versus telephone participants indicated statistically nonsignificant or trivial group differences on sociodemographic variables (e.g., percentage employed full time, number of children in family) and prevalence of family history of alcoholism (for more details, see Domenico & Windle, 1993).

Data collected at the second and fourth occasions of measurement were used in this article, except for the measure of temperament, which was collected at the first occasion of measurement. For ease of presentation, the second and fourth occasions of measurement, separated by 1 year, are referred to as Time 1 and Time 2.

Measures

Depressive symptoms. Depressive symptoms were measured using the Center for Epidemiological Studies Depression Scale (CES-D), a 20-item self-report measure of current depressive symptomatology (Radloff, 1977). Serious depressive symptomatology was indicated by a criterion score of ≥23 (Roberts, Andrews, Lewinsohn, & Hops, 1990). For convenience, those who met or exceeded this criterion were classified as depressed. However, this shorthand for problematic depressive symptoms should not be misconstrued as isomorphic with clinical depression (Roberts et al., 1990). The internal consistency estimate for the CES-D with this sample was ≥.90 at each wave, and these alpha levels are consistent with prior research (e.g., Radloff, 1977; Roberts et al., 1990).

Alcohol consumption. Alcohol consumption was measured with a standard quantity–frequency index (QFI) assessing beer, wine, and hard liquor consumption in the last 30 days (Armor & Polich, 1982). Respondents were asked how often they usually had each beverage in the last 30 days (responses on a 7-point scale from *never* to *every day*) and, when they had the beverage, on average how much they usually drank (10-point scale from *none* to *more than 8* cans/bottles/glasses, etc., depending on the beverage). The QFI, based on all three beverages, provides a measure of the average number of ounces of ethanol consumed per day in the last month. Heavy drinkers were defined as those adolescents who consumed 45 drinks or more in the last 30 days (see Windle, 1996, for validity data relevant to the heavy-drinking cutoff score).

Childhood problems. Three scale scores (attentional deficit/hyperactivity disorder, oppo-

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sitional defiant disorder, and conduct disorder) from the Retrospective Childhood Problems (RETROPROB) measure (Windle, 1993) were used to assess, retrospectively, externalizing childhood behavior problems. Nineteen items on the RETROPROB are consistent with the diagnostic criteria of DSM-III-R (American Psychiatric Association, 1987) for attention deficit–hyperactivity disorder, oppositional disorder, and conduct disorder. Another six items assess symptoms of avoidant personality disorder. Each item was rated on a 3-point response scale with options of 1 ("not at all characteristic of me"), 2 ("somewhat characteristic of me"), and 3 ("highly characteristic of me") prior to age 12 years. Sample items for the externalizing dimension were "often was involved in fist fights with others," "had problems with stealing," and "could not tolerate delay." Sample items for the avoidance dimension were "was withdrawn" and "was unpopular with peers." Cronbach's alpha for these scales have exceeded .70, and parent–adolescent correlations for a subset of parent–child pairs were .32 for boys and .34 for girls (see Windle, 1993, for more details on the RETROPROB).

Temperament. The Revised Dimensions of Temperament Survey (DOTS-R; Windle & Lerner, 1986; Windle, 1992b) was used to assess temperament. The DOTS-R is a 54-item, factor analytically developed self-report instrument that measures 10 temperament attributes: General Activity Level, Approach–Withdrawal, Flexibility–Rigidity, Activity–Sleep, Positive Mood Quality, Rhythmicity Daily Habits, Rhythmicity Eating, Rhythmicity Sleeping, Persistence, and Distractibility. Cronbach's alpha for the 10 dimensions have been uniformly high and test–retest stability coefficients across a 6-week interval have ranged from .59 to .75 (Windle & Lerner, 1986). The correlations between parent–adolescent (interrater agreement) ratings of adolescent temperament among a clinical sample of girls ranged from .66 to .79 (Luby & Steiner, 1993). Second-order factor analysis indicated that the three rhythmicity dimensions could be combined into a general factor of Rhythmicity, and that Persistence and Distractibility could be combined into a Task Orientation factor (Windle, 1992b).

Perceived Social Support—Family (*PSS-Fa*). The perceived social support from family measure assessed the amount of perceived emotional support provided by family members (e.g., Procidano & Heller, 1983). The measure consists of 20-items with the four response options of "Generally FALSE," "More FALSE than TRUE," "More TRUE than FALSE," and "Generally TRUE." The response format of the PSS-Fa was modified to a four-response option format from the original dichotomous response format (plus a "Don't know" response option) proposed by Procidano and Heller (1983) in order to increase the discriminative utility of the measure (e.g., Windle & Miller–Tutzauer, 1992). The alpha coefficient for the PSS-Fa for this sample was .91.

Close-friend characteristics. We used a 15-item scale developed by Windle (1994) that was based on the writings of Youniss and Smollar (1985). The items referred to events involving the adolescent and his or her (same sex) closest adolescent friend, and tapped the dimensions of reciprocity (four items; e.g., did not help a friend who helped me), overt hostility (four items; e.g., argued with close friend), covert hostility (three items; e.g., believed a rumor about close friend), and self-disclosure (four items; e.g., close friend told me a secret). Response options were *never happened*, *happened once*, *happened twice*, and *happened more than twice*. Confirmatory factor analyses showed adequate fit for the four-factor model (Windle, 1994). Internal consistency coefficients calculated separately for boys and girls ranged from $\alpha = .66$ to $\alpha = .85$ for the four subscales.

Stressful life events. The list of life events was adopted from the Adolescent Life Change Scales (ALCES) of Yeaworth, York, Hussey, Ingle, and Goodwin (1980). Adolescents evaluated a total of 29 events for their occurrence–nonoccurrence within the past 6 months. The majority of events selected for inclusion in the study are typically classifiable

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as negative or undesirable (Vinokur & Selzer, 1975). Examples of events are death of a parent; failing one or more subjects; going to a new school; a change in appearance, such as glasses or braces; breaking up with boyfriend or girlfriend; having a problem with acne; and being overweight or underweight. Participants were requested to report whether or not each life event had occurred during the last 6 months.

In addition to deriving a composite, or aggregate, measure of stressful life events across the 29 events, four disaggregated scores, based on domain of occurrence, were derived. These four disaggregated scores were family events, school events, interpersonal events, and intrapersonal events. Windle (1987) provided data on high interrater agreement and concurrent validity for the four disaggregated scores.

Motives for drinking. Eight items were used to assess coping motives for drinking. The items were consistent with prior coping motives for drinking scales (Cooper, Russell, Skinner, & Windle, 1992), but the content was tailored for the adolescent age range. Sample items were "I drink because it helps me to escape problems with my family" and "I drink to help with dating–intimacy problems." Items were rated on a 4-point Likert scale ranging from 1, *never*, to 4, *always or almost always*. The internal consistency estimate for this scale with this sample was .91.

Coping Inventory for Stressful Situations (*CISS*). The Emotion-Focused scale of the Coping Inventory for Stressful Situations was used to measure individual variation in emotion-based coping (e.g., blame myself for not knowing what to do; Endler & Parker, 1990, 1994). This scale consists of 16 items to which subjects respond to each item on a 5-point Likert scale ranging from 1, *not at all*, to 5, *very much*. The stem question requests individuals to rate how much they engage in each of the activities (16 items) when they encounter a difficult, stressful, or upsetting situation. Internal consistency estimates for this scale have exceeded .80 across different samples (Endler & Parker, 1994). In this study, the internal consistency estimate for the Emotion-Focused scale was $\alpha = .89$.

Other substance use. Measurements for the use of other substances included the self-reported frequency of using marijuana or hashish and nonprescribed hard drugs (e.g., cocaine, stimulants, barbiturates, hallucinogens) during the last 6 months using 7-point Likert scales that ranged from *never used* to *used every day*. The validity of self-reports of substance use have been supported in numerous research studies (e.g., Oetting & Beauvais, 1990; Winters, Stinchfield, Henly, & Schwartz, 1991). Separate indexes were derived for marijuana use and illicit, nonprescribed hard drugs.

Delinquent activity. Delinquent activity was measured with 16 items adopted from prior research on adolescent delinquency (e.g., Elliott, Huizinga, & Menard, 1989). A 6-point Likert scale (*never, once, 2–3 times, 4–5 times, 6–9 times, 10 or more times*) was used for each item in reference to the last 6 months. The number of times the adolescent reported engaging in the various activities was then summed to obtain a composite delinquency score. Alpha coefficients for the 16 items have exceeded .80, and test–retest stability coefficients across a 6-month interval have exceeded .58. Items varied in terms of severity of offense and included skipped school, hit teacher or parent, stole something that was valued at more than $20, beat up someone, destroyed public property, was suspended from school, and so forth.

Grade point average (*GPA*). The single item, "What grades do you usually get in school?", was used with a 7-point Likert response format ranging from "mostly A's" to "mostly D's and F's." For a subset of subjects on which official school record data were available, the Pearson correlation between adolescents' reports of GPA and official school records (which used a somewhat different measurement scale) was .78, hence supporting the validity of the self-report method. Dornbusch, Mont–Reynaud, Ritter, Chen, and Steinberg (1991) also reported a correlation of

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.79 between self- and school-reported GPA for a sample of approximately 5,000 students.

Percentage of friends who use alcohol and who use drugs. Adolescents were requested to indicate the number of adolescents that they considered friends. Over 99% of adolescents reported at least one friend, with most reporting five or more. Adolescents were then requested to indicate how many of these friends consumed alcohol. Percentage scores were calculated by dividing the number of alcohol using friends by the total number of friends and multiplying the dividend by 100, with a possible range of 0–100%. An identical procedure was used to derive the percentage of friends using illicit drugs (e.g., cocaine, heroin).

Family Cohesion. Primary caregiver reports on the Family Cohesion scale of the Family Adaptability and Cohesion Evaluation Scales—III (FACES-III; Olson, Portner, & Lavee, 1985) were used to assess family emotional bonding and support. The Family Cohesion scale consists of 10 items, each with five response alternatives ranging from "Almost never" to "Almost always." The Family Cohesion scale has been shown to have high internal consistency ($\alpha = .77$), and support for construct validity has been shown in its ability to discriminate between clinic and nonclinic families (Olson et al., 1985).

Parental Role Distress. Primary caregivers completed the Parental Role Stress questionnaire (Pearlin & Schooler, 1978). The Parental Role Stress measure consists of seven items that tap the emotional toll of stress in the parenting domain (e.g., frustration, worry, emotionally worn out). Each item is rated along a 4-point Likert scale of intensity. Pearlin and Schooler (1978) have reported adequate reliability and validity data for this measure. In the present sample, the measure yielded high internal consistency ($\alpha = .90$) and test–retest reliability over a 6-month interval ($r = .74$, $p < .001$).

Procedure

Subsequent to receiving approval from school administrators to conduct the study, schools provided a mailing list of the addresses of 10th and 11th graders. A packet of materials, including a letter of introduction by the principal, a description of the study, and informed consent forms, was mailed to adolescents and their parents. Those individuals willing to participate in the study were requested to sign the informed-consent form (both adolescent and one parent) and return it to the investigator in a self-addressed, stamped envelope. Confidentiality was also assured with a Department of Health and Human Services Certificate of Confidentiality. Teachers made announcements about the study in home classrooms. Adolescents completed survey materials in large groups (e.g., 40–50 students) in their high school setting. A trained survey research team administered the survey to adolescents and neither teachers nor school administrators were in the room during the time the students completed the surveys. The survey took about 45–50 min to complete and subjects received $10.00 for their participation. A makeup date for testing was arranged for participants who were absent or unable to participate on the regularly scheduled day of testing. A similar procedure was used at each wave of measurement. Survey testing occurred in October and April of successive years.

Results

The prevalence of depression, heavy drinking, and their co-occurrence is provided in Table 1. Consistent with previous findings, girls had a higher prevalence of depression and boys a higher prevalence of heavy drinking at each time of measurement (e.g., Cohen et al., 1993; McGee et al., 1992). Of further note, approximately 38% of adolescents had one, or both, of these problems at each measurement occasion. Parenthetically, the no-problem subgroup was defined in reference to not meeting the criteria for depression or heavy drinking; they were not a "superhealthy" control group.

A summary of the findings for dispositional characteristics comparing the four subgroups of no problem, depression only, heavy drinking only, and mixed depression and heavy drinking is presented in Table 2. A MANOVA model for these eight variables

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Table 1. *Prevalence (%) of depression, heavy drinking, and co-occurring problems by gender at Times 1 and 2*

	No Problem	Depression Only	Heavy Drinking Only	Depression and Heavy Drinking	Test Statistic
Time 1					
Boys ($n = 533$)	64.7	10.1	20.1	5.1	
Girls ($n = 561$)	60.4	25.1	9.6	4.8	$\chi^2(3) = 55.64$***
Time 2					
Boys ($n = 533$)	58.6	9.9	25.6	5.8	
Girls ($n = 561$)	65.4	18.9	11.5	4.3	$\chi^2(3) = 46.03$***

***$p < .001$.

was conducted and the F statistic was statistically significant at $p < .001$. The univariate breakdowns were of more substantive interest and are focused on subsequently. For externalizing childhood problems, the no-problem group had the lowest levels and differed significantly from the other three subgroups. Furthermore, the mixed subgroup had the highest levels of externalizing childhood problems and differed significantly from the other three subgroups. The lowest levels of avoidance problems in childhood were reported by the heavy-drinking-only group and the no-problem group; hence, aspects of negative affect were retrospectively reported to be higher among those in the depressed-only and mixed subgroups. For the temperament characteristics, the depressed-only subgroup differed significantly from the no-problem and heavy-drinking-only subgroups with regard to greater arhythmicity, lower positive mood quality, greater inflexibility, and a more withdrawn behavioral style.

In Table 3 the four subgroups were compared on interpersonal aspects of functioning. A MANOVA model yielded a statistically significant F ratio with $p < .001$; univariate breakdowns were focused on subsequently. The no-problem subgroup reported the highest levels of perceived family social support and the mixed subgroup reported the lowest levels. All three problem subgroups reported higher levels of overt and covert hostility with closest friend compared to the no-problem subgroup; the depressed-only subgroup reported higher self-disclosure and lower reciprocity with closest friend than the no-problem subgroup. It thus appears that the three problem subgroups have difficulties in their interpersonal aspects of functioning, with depressed-only and mixed subgroups reporting the most difficulties. The primary-caregiver data indicate higher levels of alcohol use by the primary caregiver of the heavy-drinking subgroup in relation to the no-problem subgroup, and lower levels of family cohesion.

The findings summarized in Table 4 indicate that the mixed subgroup reported the largest number of stressful life events and the most pervasively high levels across the disaggregated subscales of events. The mixed subgroup also reported high levels of coping motives for drinking and emotion-focused coping. The depressed-only subgroup also reported high levels of interpersonal events and high levels of emotion-focused coping and coping motives for drinking. The latter finding is of interest, because even though the depressed-only subgroup consumed substantially less alcohol than the heavy-drinking-only subgroup, when they did drink they were more likely to drink to cope with stressors. The negative regulatory cycle between depression, stressful life events, and poor coping was supported for the depressed-only and mixed subgroups; this pattern did not characterize either the heavy-drinking-only or no-problem subgroups.

Table 5 presents findings for subgroup comparisons on substance use and delinquency variables and on GPA. A MANOVA model yielded a statistically significant F ratio with $p < .001$; univariate breakdowns were focused on subsequently. The highest rate of

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Table 2. *Means* (*standard deviations*) *of childhood problems and adolescent temperament by heavy-drinker and depressed subgroups*

Variable	No Problem ($n = 569$)	Depression Only ($n = 155$)	Heavy Drinking Only ($n = 122$)	Depression and Heavy Drinking ($n = 40$)	F Ratio (df)	Scheffe's Post Hoc Comparisons
Childhood problems						
Externalizing[a]	27.87 (5.79)	31.50 (6.42)	32.84 (6.93)	35.78 (7.00)	55.30 (3, 1052)***	1 : 2, 3, 4; 2, 3 : 4
Avoidance[a]	9.96 (2.46)	11.59 (2.90)	9.14 (2.14)	11.32 (2.63)	34.01 (3, 1052)***	1 : 2, 3, 4; 3 : 2, 4
Adolescent temperament						
General activity level	18.66 (4.37)	20.82 (4.45)	20.60 (4.87)	21.17 (3.71)	15.63 (3, 882)***	1 : 2, 3, 4
Withdrawal–Approach	19.90 (3.31)	19.14 (3.97)	20.61 (3.54)	19.65 (3.61)	4.19 (3, 882)**	2 : 3
Flexibility	15.27 (2.53)	13.78 (2.97)	14.72 (2.67)	13.52 (3.19)	16.46 (3, 882)***	1 : 2, 4; 2 : 3
Positive mood quality	24.48 (3.79)	22.16 (5.29)	24.09 (3.71)	23.49 (4.72)	13.01 (3, 881)***	2 : 1, 3
General rhythmicity	41.52 (7.76)	37.42 (7.90)	41.34 (7.73)	38.72 (6.43)	12.56 (3, 878)***	2 : 1, 3
Task orientation	20.14 (4.40)	18.33 (4.96)	19.46 (4.32)	19.57 (3.99)	6.82 (3, 871)***	1 : 2

[a]Sample size for these variables for the successive subgroups was 660, 191, 153, and 52.
**$p < .01$. ***$p < .001$.

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Table 3. *Means* (*standard deviations*) *of primary caregiver and best friend interpersonal relationship variables and primary caregiver alcohol use by heavy-drinker and depressed subgroups*

Variable	No Problem ($n = 469$)	Depression Only ($n = 148$)	Heavy Drinking Only ($n = 107$)	Depression and Heavy Drinking ($n = 36$)	*F* Ratio (*df*)	Scheffe's Post Hoc Comparisons
Adolescent report						
Social support family[a]	59.43 (12.47)	50.85 (15.51)	53.44 (12.77)	47.13 (11.92)	38.91 (3, 1082)***	1 : 2, 3, 4; 3 : 4
Best friend						
Overt hostility	5.98 (3.66)	7.36 (3.47)	7.31 (3.59)	7.81 (3.50)	9.49 (3, 756)***	1 : 2, 3, 4
Covert hostility	5.60 (1.97)	6.38 (2.08)	6.51 (2.32)	7.43 (2.48)	15.25 (3, 753)***	1 : 2, 3, 4
Self-disclosure	13.63 (3.34)	14.74 (2.61)	13.70 (3.15)	14.25 (2.73)	4.96 (3, 756)**	1 : 2
Reciprocity	14.58 (2.17)	13.82 (2.64)	14.43 (2.15)	13.97 (2.59)	4.53 (3, 756)**	1 : 2
Primary caregiver[b]						
Alcohol consumption	2.57 (.37)	2.63 (.48)	2.78 (.56)	2.59 (.32)	6.58 (3, 697)***	1 : 3
Family cohesion	38.29 (5.26)	36.22 (5.76)	35.02 (7.08)	36.47 (6.10)	4.27 (3, 696)**	1 : 3
Parental role distress[c]	13.21 (4.12)	14.26 (4.38)	14.68 (4.40)	14.43 (4.59)	3.11 (3, 455)*	—

[a]Sample size for this variable for the successive subgroups was 684, 195, 161, and 54.
[b]Sample size for these variables for the successive subgroups was 447, 116, 103, and 35.
[c]This form completed by primary caregivers at only two of three participating schools at this occasion of measurement.
*$p < .05$. **$p < .01$. ***$p < .001$.

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Table 4. *Means* (*standard deviations*) *of stressful life events, coping drinking motives, and emotion-focused coping by heavy-drinker and depressed subgroups*

Variable	No Problem ($n = 670$)	Depression Only ($n = 193$)	Heavy Drinking Only ($n = 156$)	Depression and Heavy Drinking ($n = 54$)	F Ratio (df)	Scheffe's Post Hoc Comparisons
Stressful life events						
Intrapersonal events	1.00 (1.05)	1.45 (1.06)	1.38 (1.16)	2.17 (1.41)	26.50 (3, 1067)***	1 : 2, 3, 4; 4 : 2, 3
Interpersonal events	1.67 (1.44)	2.96 (1.51)	2.23 (1.62)	3.07 (1.74)	47.73 (3, 1061)***	1 : 2, 3, 4; 3 : 2, 4
Family events	1.90 (1.32)	2.31 (1.23)	2.16 (1.35)	2.61 (1.39)	9.18 (3, 1059)***	1 : 2, 4
School events	0.71 (0.98)	1.20 (1.11)	1.39 (1.24)	1.92 (1.18)	39.06 (3, 1069)***	1 : 2, 3, 4; 4 : 2, 3
Total # events	5.33 (3.39)	7.98 (3.36)	7.46 (4.29)	9.78 (4.00)	54.18 (3, 1084)***	1 : 2, 3, 4; 4 : 2, 3
Coping styles[a]						
Coping drinking motives	9.93 (3.07)	13.54 (5.27)	11.80 (3.78)	16.90 (5.57)	79.75 (3, 944)***	1 : 2, 3, 4; 2 : 3, 4; 3 : 4
Emotion-focused coping	41.72 (11.68)	54.21 (10.10)	41.39 (10.71)	50.13 (10.55)	43.15 (3, 722)***	1 : 2, 4; 2 : 3; 3 : 4

[a]Data collected at Time 4 and subgroups formed with Time 4 data.
***$p < .001$.

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Table 5. *Means* (*standard deviations*) *of substance-related variables, delinquency, and grade point average* (*GPA*) *by heavy-drinker and depressed subgroups*

Variable	No Problem ($n = 684$)	Depression Only ($n = 195$)	Heavy Drinking Only ($n = 161$)	Depression and Heavy Drinking ($n = 54$)	*F* Ratio (*df*)	Scheffe's Post Hoc Comparisons
Cigarette use	2.39 (.24)	2.50 (.33)	2.69 (.47)	2.80 (.54)	57.76 (3, 1090)***	1, 2 : 3, 4; 3 : 4
Marijuana use	2.32 (.11)	2.34 (.15)	2.52 (.36)	2.61 (.44)	68.33 (3, 1090)***	1, 2 : 3, 4; 3 : 4
Illicit drug use	2.31 (.03)	2.34 (.18)	2.42 (.27)	2.49 (.41)	37.44 (3, 1090)***	1, 2 : 3, 4; 3 : 4
Delinquent Activity	4.40 (7.82)	9.59 (12.90)	19.76 (21.48)	28.31 (26.50)	104.53 (3, 1090)***	1 : 2, 3, 4; 2 : 3, 4; 3 : 4
Grade Point Average	5.07 (1.42)	4.65 (1.45)	4.22 (1.59)	3.69 (1.66)	27.22 (3, 1089)***	1 : 2, 3, 4; 2 : 4
Percentage of friends[a] use alcohol	52.89 (39.56)	59.01 (37.93)	92.42 (19.01)	79.30 (31.37)	35.53 (3, 749)***	1, 2 : 3, 4
Percentage of friends[a] use drugs	8.23 (20.36)	12.89 (26.45)	38.92 (38.54)	37.75 (39.46)	50.07 (3, 752)***	1, 2 : 3, 4

[a]Sample size for these analyses was reduced to ($n = 753$) because the survey form with these questions was administered at this occasion of measurement for only two of the three school districts. Sample size for each of the successive subgroups was 468, 147, 102, and 36.
***$p < .001$.

Table 6. *Cross-tabulation of depression, heavy drinking, and co-occurring problems at Time 1 and Time 2*

	Time 2 Status				
Time 1 Status	No Problem	Depression Only	Heavy Drinking Only	Depression and Heavy Drinking	Row Total
No problem	79.0	9.1	10.5	1.5	63.6 (618)
Depression only	44.3	40.7	7.2	7.8	17.2 (167)
Heavy drinking only	29.8	4.3	57.4	8.5	14.5 (141)
Depression and heavy drinking	20.0	26.7	33.3	20.0	4.6 (45)
Column totals	63.1 (613)	14.6 (142)	17.8 (173)	4.4 (43)	100.0 (971)

Note: Values are percentages. Entries sum to 100% across rows. Column and row totals are percentaged by the total sample N (with N's in each category presented in parenthesis). $\chi^2(9) = 383.63$, $p < .001$.

substance use and delinquency was for the mixed subgroup, and the second highest was for the heavy-drinking subgroup. Similarly, the percentage of friends using alcohol and using drugs was the highest for the heavy-drinking-only and mixed subgroups. GPA was highest in the no-problem subgroup and lowest in the mixed subgroup.

Across time stability and change

The results of cross-classifying adolescents at Time 1 and Time 2 (1 year apart) for the subgroups used in this article are provided in Table 6. The highest rate of stability was for the no-problem subgroup (79%), and the lowest rate of stability was for the mixed subgroup (20%). For the depression-only and heavy-drinking-only subgroups, the largest percentage change was toward the no-problem status at Time 2; changes for the mixed subgroup at Time 1 were distributed across all four subgroups at Time 2.

Transition from no problem to depression only and heavy drinking only

Two separate analyses were conducted to evaluate variables associated with transitions from the no-problem subgroup to either the depression-only or heavy-drinking-only subgroups (the mixed subgroup was excluded from these analyses because the cell size was too small). First, two MANOVA models were evaluated for a set of dependent variables representing individual behavioral characteristics (viz., temperament and childhood problems) and social characteristics (viz., perceived family social support, overt conflict with best friend, and interpersonal stressors). The independent variable in these analyses was group membership across time for the no-problem subgroup (i.e., no problem at Time 1 and Time 2, no problem at Time 1 and depressed only at Time 2, and no problem at Time 1 and heavy drinking only at Time 2). These analyses were designed to evaluate whether individual and social characteristics that cross-sectionally (i.e., at Time 1) distinguished subgroups were also useful in predicting who would make the transition to a specific subgroup. For example, would childhood externalizing problems and higher activity levels differ significantly between those no-problem adolescents at Time 1 who made the transition to heavy drinking at Time 2 relative to the stable, no-problem adolescents? These analyses provide a method of evaluating the consistency of these individual and social characteristics in predicting specific problem outcomes (e.g., heavy drinking only, depression only).

Second, in order to analyze the impact of change in subgroup membership across time for the no-problem subgroup, repeated-measures MANOVA models were conducted with several variables that were assessed at both

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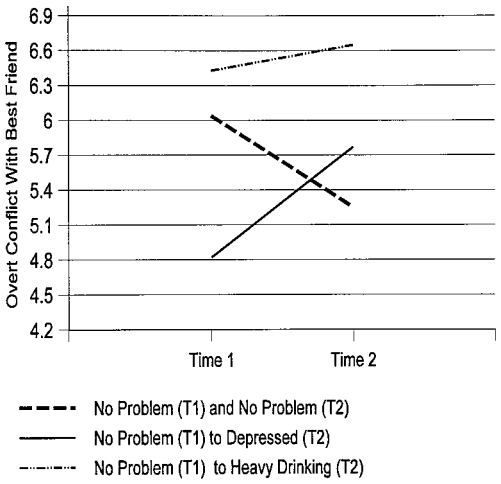


Figure 1. Overt conflict with best friend by stable no-problem and transition groups across time.

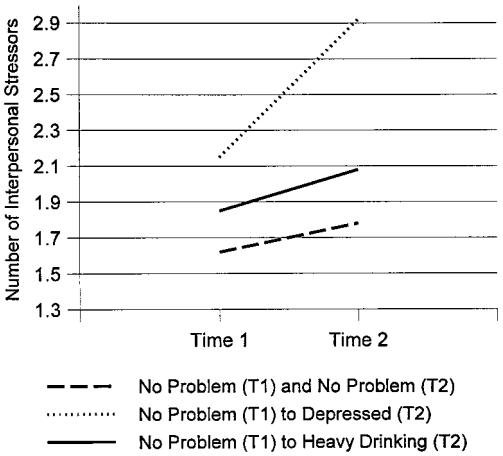


Figure 2. Number of interpersonal stressors by stable no-problem and transition groups across time.

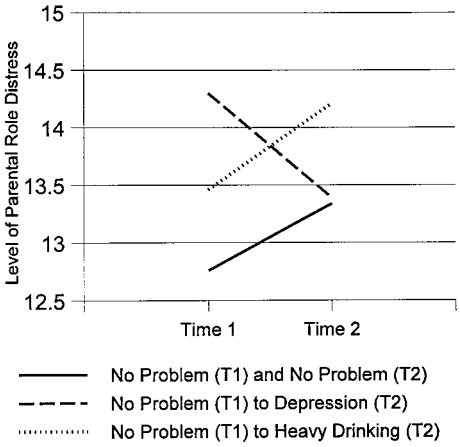


Figure 3. Level of parental distress by stable no-problem and transition groups across time.

Time 1 and Time 2 (i.e., stressful life events, close friendship characteristics, perceived family social support, parental role stress). For the repeated-measures MANOVA models, time was specified as the within-subjects factor and subgroup status was specified as the between-subjects factor. Subgroup status consisted of three levels: Level 1, which represented the no-problem (Time 1)–no-problem (Time 2) subgroup; Level 2, which represented the no-problem (Time 1)–depression-only (Time 2) subgroup; and Level 3, which represented the no-problem (Time 1)–heavy-drinking-only (Time 2) subgroup.

The major substantive effect of interest in the repeated-measures MANOVA models was the Subgroup Status × Time interaction. The omnibus F statistic was typically significant ($p < .01$) for these MANOVA models, as were main effects for subgroup status. Several of the statistically significant interaction effects are portrayed in Figures 1–3. In Figure 1, the level of overt hostility with best friend increased slightly across time for those adolescents who made the transition to heavy drinking; the level of increase for those adolescents who made the transition to depression was substantial, as their levels of overt hostility increased significantly. For the stably classified no-problem adolescents (at Times 1 and 2), level of overt hostility with best friend significantly decreased across time. In Figure 2, both the stably classified no-problem adolescents and the transition-to-heavy-drinking adolescents reported slight increases in the number of interpersonal stressors; adolescents who made the transition to depression reported substantially greater increases in interpersonal stressors. In Figure 3, the level of parental role distress as reported by primary caregivers increased across time for the stably classified no-problem adolescents and the transition-to-heavy-drinking adolescents; the level of parental role distress *decreased* for the transition-to-depression adolescents. This latter finding may indicate that adolescents

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who begin manifesting more serious levels of depressive symptoms may be more withdrawn socially from peers and associated peer activities (e.g., parties); primary caregivers may view this positively and as reducing parental demands, while simultaneously not detecting this withdrawal pattern as depressive symptomatology.

Transition from depression only and heavy drinking only to no problem

Analogous MANOVA and repeated-measures MANOVA models were conducted for the temperament and childhood behavior problems and interpersonal dimensions, respectively, for those adolescents who made the transition from the depression and heavy-drinking subgroups to the no-problem subgroup. With regard to those adolescents who made the transition from depression only to no problem, they reported significantly higher levels of behavioral flexibility and lower levels of childhood avoidant symptoms. Furthermore, the prospective analyses indicated a significant increase in perceived family social support for those transitioning to the no-problem subgroup relative to those who were stably depressed. For those heavy-drinking adolescents who made the transition to the no-problem subgroup, having lower levels of childhood externalizing problems was the only statistically significant factor; neither features of temperament nor prospective changes in interpersonal domains was statistically significant for these analyses.

Discussion

The descriptive epidemiologic findings of this study are consistent with previous research in two ways. First, the prevalence of depression, as defined in this study via a cut point on the CES-D, indicated a significant gender difference, with a ratio of approximately 2.5 : 1 for girls relative to boys. McGee et al. (1992) reported a somewhat higher ratio (4 : 1) for gender differences in depressive disorders, but the results of this study are consistent with the general finding of adolescent gender differences in the prevalence of depression (or higher depressive symptomatology), with girls more highly represented. Similarly, consistent with the prior literature (e.g., White & Labouvie, 1989; Windle, 1996), boys had a higher prevalence of heavy drinking than girls, with a ratio of approximately 2 : 1. Thus, these findings indicate some gender-related specificity with regard to the manifestation of depression and heavy drinking during adolescence. Nevertheless, the prevalence of co-occurring depression and heavy drinking was similar across gender groups.

A second consistent finding with previous epidemiologic research on adolescent disturbances was the relative rate of co-occurring problems—in this instance, co-occurring depression and heavy drinking. The data of Deykin et al. (1987) indicated that 23% of depressed adolescents had a lifetime alcohol or other substance abuse disorder. In this study, between 24 and 27% (for Time 1 and Time 2) of adolescents identified as depressed also met the criterion for heavy drinking; between 23 and 27% of adolescents identified as heavy drinking also met the criterion for depression. There were gender differences in these rates, as between 33 and 37% of boys identified as depressed also met the criterion for heavy drinking, relative to between 16 and 18.5% for girls. Likewise, between 27 and 33% of girls who were heavy drinkers also met the criterion for depression, relative to between 18 and 20% for boys. The rates of co-occurring problems among boys and girls do support the literature on the high prevalence of co-occurring conditions among community samples of adolescents (e.g., Deykin et al., 1987; Merikangas & Angst, 1995), and rates are even higher among adolescents in treatment settings (e.g., Bukstein, 1995).

Comparisons among the no-problem, depression-only, heavy-drinking-only, and mixed (depression and heavy drinking) subgroups on correlates of group status yielded interesting findings on common and distinctive features. A broad range of variables were analyzed, spanning the domains of personal dispositions (e.g., temperament, childhood behavior problems), interpersonal relations (family and peer), stressful life events, coping characteristics, and other problem behaviors (e.g., other

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substance use, delinquency). This discussion focuses on the broader subgroup findings rather than a detailed, domain-by-domain description of subgroup comparisons. For a majority of the variables measured, the *no problem subgroup* differed from the other three subgroups in reporting, for example, lower levels of childhood behavior problems, lower current substance use and delinquency, fewer stressful life events, higher levels of family social support, and a higher GPA.

Whereas (predictably) the no-problem subgroup reported the highest levels of healthy functioning, the lowest levels of healthy functioning (or at least the most pervasive pattern of multiple problems) were indicated for the *mixed subgroup*. The adolescents in the mixed subgroup had the highest levels of childhood externalizing problems, high levels of childhood avoidance problems, were temperamentally inflexible (i.e., reported difficulties adapting to changes in environment), had the lowest levels of perceived family support, had the highest levels of stressful life events, high levels of substance use and delinquency, and the lowest GPA. The pervasiveness of the difficulties reported suggested that this co-occurring pattern of depression and heavy drinking among adolescents represents a distinctive pattern from the depression-only and heavy-drinking-only subgroups. This mixed subgroup appears to have had long-term patterns of internalizing and externalizing problems (e.g., childhood behavior problems) that have been exacerbated across time and are manifest currently via high levels of stressful life events and dysregulated person–environment relations. Harrington et al. (1996) suggested that comorbid depression and conduct disorder in childhood and adolescence was not as predictive of adult depression as was depression only. Longer term prospective data are required to address this issue for the co-occurrence of depression and heavy drinking, but the findings in this study support the potential importance of investigating this research question (also see Windle & Windle, 1993; Zoccolillo, 1992).

There were also distinctive features of the *depressed-only subgroup* that support a more internalized pattern of intrapersonal and interpersonal dysfunction. The depressed-only subgroup had a high rate of childhood avoidance problems and a temperament pattern characterized by biological arhythmicity (e.g., traitlike irregularity of eating and sleeping habits), behavioral inflexibility, low positive mood quality, withdrawal, and low task orientation (e.g., poor concentration). In addition, the depression-only subgroup had high rates of interpersonal stressful life events and utilized coping strategies in confronting stress that are generally considered less effective. They reported the highest levels of emotion-focused coping and high rates of using alcohol to cope with stressful life events. This latter finding is of significance because the depressed-only subgroup reported more frequently drinking to cope with stress than did the heavy-drinking-only subgroup, even though the heavy-drinking subgroup consumed alcohol more frequently and at higher levels. A primary reliance on emotion-focused and avoidance (e.g., drinking to cope) coping strategies is typically not viewed as adaptive because they do not directly address the stressor or its source via more task- or problem-focused coping strategies (e.g., Lazarus & Folkman, 1984; Windle & Windle, 1996). On the positive side, but distinctive for this problem subgroup, the levels of substance use, delinquency, and involvement in deviant peer networks did not differ from the no-problem subgroup and were significantly lower than the mixed and heavy-drinking-only subgroups.

The distinctiveness of the *heavy-drinking-only subgroup* is, in part, defined in relation to the depressed-only and mixed subgroups. Relative to the depressed-only subgroup, the heavy-drinking subgroup had significantly lower levels of childhood avoidance problems and a temperament pattern characterized by more behavioral flexibility, more of an approach (vs. withdrawal) orientation toward new persons, objects, or situations, higher levels of positive mood quality, and higher biological rhythmicity. These heavy-drinking adolescents were also less reliant upon emotion-focused coping strategies than the depressed-only subgroup. Hence, dispositional characteristics (e.g., childhood avoidance,

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temperament, coping) were central in distinguishing the heavy-drinking-only and depressed-only subgroups.

The heavy-drinking-only subgroup was also distinguished from the mixed subgroup with regard to reporting significantly fewer stressful life events, relying less on emotion-focused and avoidance coping strategies, and indicating lower levels of substance use and delinquency. Thus, while engaged in relatively high levels of alcohol use, the heavy-drinking-only subgroup was not as pervasively impaired as the mixed subgroup. In addition, the primary caregivers of the heavy-drinking-only subgroup reported higher levels of personal alcohol consumption and lower levels of family cohesion relative to the primary caregivers of the no-problem subgroup.

The short-term (1-year interval) prospective findings were, in general, consistent with the subgroup comparisons. For instance, higher levels of childhood externalizing problems and higher general activity level were associated with adolescents who made the transition from the no-problem subgroup at Time 1 to the heavy-drinking subgroup at Time 2. Conversely, lower levels of childhood externalizing problems were associated with adolescents who made the transition from heavy drinking at Time 1 to no problem at Time 2. Similarly, higher levels of childhood avoidance problems and arhythmicity were associated with adolescents who made the transition from the no-problem subgroup at Time 1 to the depressed subgroup at Time 2, and lower levels of childhood avoidance problems and greater behavioral flexibility were associated with adolescents who made the transition from depressed at Time 1 to no problem at Time 2. This latter transition, from depressed to no problem, was also associated with an increase in perceived family social support. Significant prospective findings were also indicated, with those making the transition from no problem to depressed reporting more interpersonal stressors and higher levels of overt conflict with their best friend. Interestingly, parental role stress *decreased* as these adolescents made the transition from no problem to depressed. The withdrawal, nonanimated behavioral style associated with depressive symptoms by adolescents may have been perceived as less demanding by parents, and possibly have reduced conflicts (e.g., curfews were not violated because adolescents were not out with friends).

In sum, the findings of this study support the distinctiveness of correlates associated with the four identified adolescent subgroups of no problem, depressed only, heavy drinking only, and mixed (depressed and heavy drinking). The correlates were broadly selected from the existing literature on risk and protective factors (e.g., Hawkins et al., 1992). Consistent with previous research (e.g., Lewinsohn et al., 1995), there was support for unique risks conferred for specific subgroups or outcomes. Temperament, childhood avoidance problems, and coping strategies (specifically emotion-focused and drinking motives) were especially significant and distinguishing for the depressed-only subgroup. Childhood externalizing problems, stressful life events, higher levels of current substance use, and higher levels of delinquency were especially significant and distinguishing for the mixed subgroup. The heavy-drinking subgroup was not characterized by the distinctive features of either the depressed-only or mixed subgroups but nevertheless differed significantly from the no-problem subgroup on most of the variables assessed and had higher levels of primary caregiver alcohol consumption and lower family cohesion.

There are several implications for interventions based on these findings. First, universal primary prevention programs for adolescents that focus on a single health problem, or a single feature of behavior (e.g., peer resistance skills), are not likely to be successful because different adolescents have different problems, and the identified risk factors for these different problems are not necessarily the same. Second, although there were some changes in subgroup status across the 1-year interval, there was also relatively high stability for the expression of depression or heavy drinking. Assuming that these adolescents are not receiving any treatment, the findings suggest an increased need for secondary interventions to prevent the escalation to more serious problems (e.g., suicide) or to psychiatric or

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substance-abuse disorders. Third, the mixed subgroup, while the smallest and least stable across across time, had a pervasive pattern of difficulties that may merit tertiary interventions. This constellation of both inhibitory and disinhibitory dysfunction may pose particularly high risk for lifelong problems in multiple spheres of life (e.g., Windle & Windle, 1993). The early identification and treatment of serious multiproblem adolescents may ameliorate or eliminate problems among those adolescents at highest risk for lifelong dysfunction.

The findings of this study are limited by several features. The sample consisted principally of White, middle-class students, and hence generalizability may be restricted. The methods of assessment relied largely on adolescent self-report. While reliability and validity of self-report measures have been supported for many of the measures used in this study, additional raters (e.g., parents, peers, teachers) and methods of assessment (e.g., behavioral observation) would have enhanced the value of the contribution. Additionally, the study defined depression in terms of cutoff scores on the CES-D and heavy drinking in terms of an arbitrary (though substantively meaningful) cut point (see Windle, 1996); it would have been advantageous to have also collected data on clinical diagnoses of affective and substance-abuse disorders via structured diagnostic interviews. This was not possible given the large-sample, survey method of data collection used in this study, but this issue does merit attention in subsequent research applications. Despite these limitations, the findings of this study support distinctive correlates of depression-only, heavy-drinking-only, and mixed adolescent subgroups. Subsequent priorities in this research area include the replication and generalization of these findings, prospective outcomes in young adulthood (e.g., alcohol and major depressive disorders), and the implications of these findings for prevention and treatment. The distinctiveness and heterogeneity of expression for depression and heavy drinking in this community adolescent sample highlight the limitations of universal preventive intervention programs and the need to consider more seriously targeted secondary and tertiary interventions.

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