Published in final edited form as:

J Consult Clin Psychol. 2012 October ; 80(5): 887–896. doi:10.1037/a0028959.

Maternal Depressive Symptoms as a Predictor of Alcohol Use Onset and Heavy Episodic Drinking in Youth

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Abstract

Objective—The current study addressed a gap in the literature by investigating the association between maternal depressive symptoms and subsequent timing of their children's alcohol use onset and heavy episodic drinking (HED). Childhood depression/dysthymia symptoms, harsh discipline, and parental positive regard were examined as potential mediators of this relation.

Method—Longitudinal self- and parent-report data were collected annually from a community sample of 754 youth (50% male; 43% African American) from kindergarten to Grade 11 (ages 5–18). The measures administered were the Things That You Have Done Scale and Tobacco, Alcohol, and Drugs measure which assessed alcohol use behaviors, Center for Epidemiological Studies-Depression Scale, Diagnostic Interview Schedule for Children, and the Parental Discipline Scale.

Results—Maternal depressive symptoms significantly predicted an earlier onset of alcohol use and HED in youth. Harsh parental discipline mediated the relation between maternal depressive symptoms and alcohol use onset as hypothesized; however, childhood depressive/dysthymia symptoms and parental positive regard did not. In the parallel analyses testing the three potential mediating variables in the prediction of HED, no significant mediation was found.

Conclusions—These findings suggest the importance of intervening to prevent early and risky alcohol use among youth who have been identified as having a mother who is clinically depressed or is experiencing depressive symptoms; part of this intervention effort could involve working with depressed mothers to reduce their use of harsh discipline. These improved intervention and prevention strategies could have important implications for reducing the occurrence and early initiation of alcohol use and HED among at-risk youth.

Keywords

maternal depressive symptoms; alcohol use onset; parenting practices; depression; heavy episodic drinking

Offspring of mothers diagnosed with major depressive disorder (MDD) often exhibit poor developmental outcomes including depression and substance use (Beardslee, Versage, & Gladstone, 1998; Downey & Coyne, 1990; Goodman & Gotlib, 2002; Lewinsohn, Olino, & Klein, 2005). Youth alcohol use is an outcome of particular interest given that approximately 40% of adolescents age 12 to 17 report having at least one drink of alcohol in their lifetime and 21% report past month alcohol use (Fryar, Merino, Hirsch, & Porter, 2009; Substance Abuse and Mental Health Services Administration [SAMHSA], 2009). Furthermore, depression is one of the most common psychiatric disorders and is particularly prevalent among women who have children (i.e., maternal depression) with estimates ranging from 10% for past year depression to 20% for lifetime depression (Boyd, Joe, Michalopoulos, Davis, & Jackson, 2011; Ertel, Rich-Edwards, & Koenen, 2011; Horwitz, Briggs-Gowan, Storfer-Isser, & Carter, 2007) as compared to the national prevalence rates of 6% for past year diagnoses of depression and 17% for lifetime depression among women in the general population (Blazer, Kessler, McGonagle, & Swartz, 1994; Kessler et al., 2003; Hasin, Goodwin, Stinson, & Grant, 2005). Moreover, approximately 25% of women have a new episode of depression within 1 month of giving birth, and depressive symptoms appear to persist into the child's early years and often longer (Wang, Wu, Anderson, & Florence, 2011).

Research in this area has demonstrated that offspring of mothers who are experiencing symptoms of depression are at an increased risk for alcohol use, abuse, and dependence in early adolescence to early adulthood (Kendler, Davis, & Kessler, 1997; Mowbray & Oyserman, 2003; Su, Hoffmann, Gerstein, & Johnson, 1997; Weissman et al., 2006). Research with prospective longitudinal designs has shown that maternal depression significantly predicts later alcohol use in adolescents (e.g., Lieb et al., 2002). For example, in a 10-year follow-up study, Weissman, Warner, Wickramaratne, Moreau, and Olfson (1997) found that offspring of depressed parents were five times more likely than offspring of parents without depression to develop alcohol dependence during their adolescent and young adult years. Similarly, Cortes, Fleming, Mason, and Catalano (2009) demonstrated that maternal depressed mood was positively and significantly related to the initiation of alcohol use in the seventh grade; however, maternal depression did not predict subsequent escalation in adolescent alcohol use as measured through eleventh grade. An important question is through what underlying mechanisms maternal depressive symptoms may lead to adolescents' subsequent alcohol use.

A likely mediator is childhood depression and dysthymia symptoms. Research has consistently shown that maternal depression is associated with increased negative mood in youth (Beardslee et al., 1998; Joormann, Eugene, & Gotlib, 2009; Tompson et al., 2010). Indeed, children and adolescents with a depressed parent are three to four times more likely to develop depression prior to adulthood (Beardslee et al., 1998; Weissman et al., 1997), with close to half having an episode of major depression by late adolescence (Beardslee et al., 1998; Hammen, 2000). Moreover, several studies (e.g., Fleming, Mason, Mazza, Abbot, & Catalano, 2008; Katon et al., 2010; Kumpulainen, 2000; White, Xie, Thompson, Loeber, & Stouthamer-Loeber, 2001) have found depressive symptoms to be associated with future alcohol use among adolescents. In a recent review, O'Neil, Conner, and Kendall (2011) concluded that the majority of evidence supports a unidirectional risk model in which internalizing disorders (e.g., depression) increase the risk for later alcohol and substance use disorders in youth. Taken together, these results suggest that childhood depressive and dysthymia symptomatology may mediate the link between maternal depressive symptoms and youth alcohol use.

Parenting practices – in particular, mothers' harsh discipline and positive regard of the child – may also mediate the relation between maternal depressive symptoms and children's

alcohol use. Previous research has demonstrated that depressed mothers engage in a number of potentially problematic parenting behaviors (Letourneau, Salmani, & Duffett-Leger, 2010; Lovejoy, Graczyk, O'Hare, & Neuman, 2000; McLearn, Minkovitz, Strobino, Marks, & Hou, 2006). One of parents' key responsibilities is to manage children's behavior in a way that will promote children's social and emotional competence. Mothers who are depressed are more likely than nondepressed mothers to discipline their children in ways that are harsh and punitive (e.g., Lovejoy et al., 2000; McLearn et al., 2006). For example, Silverstein, Augustyn, Young, and Zuckerman (2009) found that mothers with depressive symptoms in the clinical range were 60% more likely to spank their child than were mothers with no depressive symptoms, even after controlling for children's behavior problems.

In addition to managing their children's misbehavior, another of parents' key responsibilities is to provide children with an emotionally secure and nurturing home environment (Bowlby, 1973; De Wolff & van IJzendoorn, 1997). One of the ways that parents can accomplish this is by showing warmth, love, and acceptance to children (Rohner, Khaleque, & Cournoyer, 2005), all of which convey to children a sense of positive parental regard. Given the cognitive biases that are associated with depression, depressed mothers have been found to regard their children more negatively than nondepressed mothers (Gelfand & Teti, 1990). Thus, depression can increase negative parenting practices such as harsh discipline and decrease positive parenting practices such as conveying positive parental regard.

A large body of research has documented links between problematic parenting and children's subsequent behavior problems, including alcohol use during adolescence (e.g., Alati et al., 2010; Cleveland, Gibbons, Gerrard, Pomery, & Brody, 2005; van der Vorst, Engels, Meeus, & Dekovi, 2006; van der Zwaluw et al., 2008). For example, Dishion and colleagues (1999) demonstrated that harsh discipline practices at age 9 predicted alcohol use by age 15. Likewise, Johnson and Pandina (1991) found that parents' hostility and lack of warmth (both indicators of a lack of positive parental regard) predicted adolescents' subsequent alcohol use. In sum, previous research reveals the importance of considering symptoms of childhood depression and dysthymia along with parenting practices as possible mediators in the association between maternal depressive symptoms and youth alcohol use.

Although researchers have examined the association between maternal depressive symptoms and alcohol use, no studies to our knowledge have investigated the link between maternal depressive symptoms and the timing of subsequent alcohol use initiation and heavy episodic drinking (HED; "binge" drinking consisting of consuming five or more drinks on one occasion). An earlier age of alcohol use onset and heavy drinking has been linked to the development of alcohol abuse and dependence (Grant & Dawson, 1997; Hasin & Beseler, 2009; Hingson, Heeren, & Winter, 2010). For example, Hingson, Heeren, and Winter (2006) found that the younger individuals were when they began to drink, the greater their likelihood of developing alcohol dependence within 10 years of their first drink and before their 25th birthday. Thus, it is important to determine whether or not maternal depressive symptoms predict alcohol use initiation among youth in order to inform alcohol problem prevention programs.

In the current study we examine whether maternal depressive symptoms as measured in a child's kindergarten, first, and second grade years predict onset of alcohol use and HED in later childhood and adolescence. Additionally, we test whether childhood depression and dysthymia symptomatology, harsh discipline, and parental positive regard serve as mediating factors. Based on previous research and theory, we hypothesized that: 1) maternal depressive symptoms would significantly predict alcohol use onset and HED, such that greater depressive symptoms experienced by a child's mother will predict an earlier age of onset of alcohol use and HED for the child; 2) the child's depression and dysthymia

symptom criterion count would mediate the relation between maternal depressive symptoms and the timing of alcohol use onset and HED; and 3) more harsh discipline and less parental positive regard would mediate the relation between maternal depressive symptoms and alcohol use onset and HED.

Method

Participants

Participants came from the control schools of a longitudinal, multi-site investigation of the development and prevention of conduct problems in children, the Fast Track Project (Conduct Problems Prevention Research Group [CPPRG], 1992). At each of four sites (Durham, NC; Nashville, TN; Seattle, WA; and rural, central Pennsylvania), high-risk schools were selected and randomly assigned to intervention or control conditions. For a school to be deemed at-risk, we gathered information about each school's rates of free-and-reduced-lunch, their school-wide academic achievement levels, and rates of minority youth in each school, and selected schools within the systems that had more economic and academic disadvantage. From among the control schools ($n = 27$), teachers completed ratings of child disruptive behavior in order to identify a within-site stratified sample of about 10 children within each decile of behavior problems. Across the four sites, 387 children were selected to represent the normative population of these schools. In addition, high-risk children were over-sampled in order to measure finer gradations of high risk. A multistage, multi-informant screening process identified three annual cohorts of kindergartners with the highest disruptive behavior scores, yielding an n of 446 high-risk students and bringing the total number of participants to 754 (79 students were included in both the high-risk sample and the normative sample, as they represented the highest-risk deciles in their [control] schools; see Lochman & CPPRG, 1995 for further details). The 79 students who were high risk controls were selected due to their baseline problem scores in order to representatively fill out the upper end of the standard distribution of the normative group. Given that we wanted the normative group to be a representative sample of the schools involved, the non-risk normative group was selected to fill out the major portion of the bell curve and some high-risk controls were selected to fill out the upper end of the bell curve. Of the normative sample, 35% came from single-parent families, 23% of mothers had not graduated from high school, 50% were male, and 43% were African American. Although the high-risk sub-sample included higher proportions of each of these characteristics, weighting was used in all analyses to reflect the over-sampling of high-risk children. Wu, Witkiewitz, McMahon, and Dodge (2010) reported no differences by baseline demographic or study variables in attrition in the high-risk sample through twelfth grade.

Fast Track participation was contingent on active parental consent and youth assent when age-appropriate. Modest financial incentives were provided to parents and youth for interview completion at each wave. The study was approved and monitored by Institutional Review Boards at the four governing universities at which the study originated.

Procedure

Multi-method, multisource data were collected from children, parents, teachers, independent observers (in the classroom; and of parent-child interactions), peers (e.g., sociometrics), and official archives (e.g., grades and achievement at school; arrests and convictions from court records), which covered a variety of domains in children's (e.g., behavior in school and home settings; social cognitive processes) and parents' (parenting practices; social support; life stressors) functioning. The current study uses annual measurements that were collected from the child and mother beginning in kindergarten and continuing through eleventh grade after the completion of each school year. Subsequent measures have been taken, as well as

measures from other data sources, which are not utilized herein. The timing of data collection for specific measures is described in the sections below.

Measures

The following measures used in the current study are described in detail at <http://www.fastrackproject.org>. The principle constructs include maternal depressive symptoms, child depression/dysthymia symptoms, harsh discipline, parental positive regard, and youth alcohol use.

Maternal depressive symptoms—Mothers completed the Center for Epidemiological Studies-Depression Scale (CES-D; Radloff, 1977) during the child's kindergarten, first, and second grade years. The CES-D is a 20-item self-report measure of symptoms of depression and has demonstrated high internal consistency (ranging from .84 to .90 across four different samples) as well as adequate discriminate validity (Radloff, 1977). In the present study, each of the three time points was used as a continuous indicator of a latent variable of maternal depressive symptoms. The percentage of mothers scoring above the clinical cutoff score of 16, which suggests a diagnosis of depression, was 41% after the child's kindergarten year, 38% in the child's first grade year, and 36% in the child's second grade year. In addition, 59% ($n = 443$) of mothers met clinical cutoff for at least one of the three time points.

Symptoms of child's depression and dysthymia—The Diagnostic Interview Schedule for Children (DISC 2.3; Costello, Edelbrock, & Costello, 1985) assessed DSM-III-R psychiatric symptoms and diagnoses in children through parent interview. Although a revised DSM-IV classification has come into general use since this data collection, evidence suggests that there are few differences in the two classification systems (McCullough et al., 2003). Information regarding the reliability and validity of the DISC 2.3 can be found in Shaffer, Fisher, Dulcan, and Davis (1996). The DISC 2.3 yields scores on 27 hierarchical ordered symptom areas and was administered by trained clinical interviewers when the study participants were in the third grade. In the current study, the primary caretaker was asked whether the child experienced specific symptoms related to depression or dysthymia during the past 6 months. The possible responses to the DISC questions were "no," "yes," "not applicable," and "don't know." Responses in the latter two categories were coded as "no," as recommended by the developers of the instrument, and "yes" item responses were totaled based on parent report. A combined continuous variable assessing non-overlapping criterion counts for major depression and dysthymia was used in the present analyses. We did not calculate an internal consistency coefficient, as indices such as symptom checklists, as opposed to psychometric scales, are not necessarily driven by inter-item correlations.

Parenting practices—The Parental Discipline Scale (CPPRG, 1994) is a parent-report measure, which was adapted from the Discipline Scale of the Pittsburgh Youth Study (Loeber, Farrington, Stouthamer-Loeber, & von Kammen, 1998; Thornberry, Huizinga, & Loeber, 1995). The Parental Discipline Scale was administered to the parent with the primary caretaking responsibility (typically the mother in the present study) while the children were in fourth grade. The Harsh Discipline subscale included four items (i.e., hit, spank, scold, and lock out) reflecting parents' responses to children's misbehavior. The Parental Positive Regard subscale included 8 items (e.g., smile, praise, physical affection, reward) reflecting parents' responses to children's desirable behaviors. The items were rated on a 5-point scale ranging from 1 (almost never) to 5 (almost always). The scores on the measures were derived from the mean of the items, and higher scores indicated a higher frequency of parental harsh discipline and parental positive regard, respectively. The reliability estimates for the Harsh Discipline and Parental Positive Regard subscales were .74 and .77, respectively.

Alcohol use—Beginning in the summer after the child's fourth-grade year (i.e., four years after kindergarten recruitment), the child completed *Things That You Have Done* (CPPRG, 1995a), a 32-item self-report problem behavior scale derived from the National Youth Survey (Elliott, Ageton, & Huizinga, 1985). For each item, students were asked whether they had engaged in the behavior in the past year and, if so, how many times. Three of the items referred to alcohol use. At each year of administration, the child was scored as having used alcohol if they reported past-year use of beer, wine, or liquor. Youth received a score of 1 if they reported drinking alcohol (beer, wine, or liquor) and 0 if they reported consuming no alcohol. Although the instrument did not assess lifetime use, we considered the likelihood of a child having used alcohol before but not during fourth grade to be minimal.

After the child's sixth-grade year, *Things That You Have Done* was no longer administered. Beginning after seventh grade and continuing through the study duration, youth reported alcohol use on the *Tobacco, Alcohol, and Drugs* measure (CPPRG, 1995b). This measure asked participants to report if they had had a drink of alcohol more than two to three times (no directly parallel item to the earlier measure was asked). For those youth who had not reported alcohol use in a prior year, reporting any use was scored as initiation. Responses were coded as 1 if they had ever had a drink and 0 if they had not. This measure also assessed the child's frequency of HED (i.e., consuming five or more drinks on one occasion) in the past year. A year in which any HED was reported was coded as 1.

Covariates

We carefully considered several constructs as potential confounding variables that would interfere in appropriate interpretation of our findings. Our criteria included probable (based on theory and literature) association with maternal depressive symptoms; probable association with youth alcohol use; and a judgment that the potential confound could not plausibly be itself caused by maternal depression (see MacKinnon, Krull, & Lockwood, 2000). On this basis, we included a dichotomous indicator of whether the child's mother had gone beyond a high school education (any college vs. none), youth gender and ethnicity (African American vs. other), and study site and cohort membership.

Analysis Strategy

The first step in our analysis plan was to test the overall relation between maternal depressive symptoms and the child's first use of alcohol and first HED. Maternal depressive symptoms were modeled as a latent variable (factor) with three indicators: symptom scores when the child was in kindergarten, grade 1, and grade 2. This latent variable was then tested as a predictor in a discrete-time survival analyses (DTSA) of the child's first alcohol use and first HED in separate models. In DTSA, the hazard of the outcome (e.g., first alcohol use) is modeled as the odds that a participant who had not used alcohol prior to a given measurement occasion had consumed alcohol by that occasion (e.g., abstainers in grade six using by grade seven). The latent variable modeling, survival analysis, and all other analyses reported herein were estimated using *Mplus* v.6.11 (Muthén & Muthén, 2011), with the covariates included in every model as predictors of all study constructs, effectively partialing out their impacts. All analyses incorporated sampling weights so that the results would most closely match the school populations.

The second stage of our analysis tested mediation through a series of tests of indirect effects linking maternal depressive symptoms to first use of alcohol and first HED (separately). We first tested the three hypothesized mediators – child depression/dysthymia, harsh discipline, and parental positive regard, as a set, assessing the unique contribution of each to the effect of maternal depressive symptoms on alcohol use in a model including the other two. We followed this with tests of the indirect effects with each variable taken separately as a gauge

of the impact of the inter-mediator correlations. We tested indirect effects using the product of coefficients method with confidence intervals derived from the percentile bootstrap (3,000 draws) as recommended by MacKinnon (2008) for complex models. All covariates were also included in the mediation models.

Results

Table 1 presents the weighted frequency distributions for age of first alcohol use and first HED among study participants. Over half (51.2%) of youth had consumed alcohol before the twelfth grade with the largest increase of first time use (11.1%) occurring in grade seven (confounded with the change in measure). Thirty-nine percent (39.0%) of study youth reported at least one incidence of HED before the twelfth grade with the largest increase of first HED (13.2%) occurring in tenth grade. Descriptive statistics and correlation coefficients among study variables are presented in Table 2. These statistics are based on full information maximum likelihood (FIML) estimation and thus represent the best estimates of the population parameters, after adjusting for missing data.

The measurement model comprising the latent variable for maternal depressive symptoms and the survival model for first alcohol use, with manifest scores of other variables, fit the data well as assessed by the estimated root mean squared error of approximation, RMSEA = .029, 90% CI: .022, .036, though not by CFI, .852, or TLI, .800. The test of exact fit was significant $\chi^2(150, N = 742) = 244, p < .001$. The logistic regression intercepts for the hazard ranged from $b = -2.83, SE = 0.43$, at grade 5 to $b = -0.56, SE = 0.39$, at grade 10. The latent variable for maternal depressive symptoms was well estimated from the data, with standardized loadings for kindergarten, grade one, and grade two symptoms ranging from .74 to .76.

The corresponding measurement model with first HED did not initially converge. We resolved this problem by condensing the first two years of first HED (grades 7 and 8) into a single indicator. This model fit the data well as assessed by the estimated root mean squared error of approximation, RMSEA = .033, 90% CI: .024, .042, and CFI, .925, though not by TLI, .860. The test of exact fit was significant $\chi^2(77, N = 742) = 140, p < .001$. The logistic regression intercepts for the hazard ranged from $b = -1.87, SE = 0.43$, at grade 11 to $b = -0.85, SE = 0.32$, at grade 10. The latent variable for maternal depressive symptoms showed standardized loadings ranging from .73 to .78.

As hypothesized, earlier first use of alcohol and earlier first HED were each significantly predicted by maternal depressive symptoms (see Figures 1 and 2, respectively). A standard deviation increase in the latent maternal depression variable was associated with a logistic regression coefficient predicting first alcohol use of 0.56, $SE = 0.21$, $Est./SE = 2.72, p = .006$, corresponding to a hazard odds ratio (hOR) of 1.76, 95% CI: 1.17, 2.64. The parallel association with first HED yielded a logistic regression coefficient of 0.62, $SE = 0.29$, $Est./SE = 2.15, p = .032$, hOR = 1.86, 95% CI: 1.05, 3.26.

In analyses predicting first alcohol use with the three potential mediators taken together (the residual components of the mediators were allowed to covary; directional relations among the mediators are beyond the scope of this analysis), we found a significant overall indirect effect, $\Sigma ab = 0.010$, 95% CI: 0.003, 0.015. Harsh discipline showed the hypothesized significant unique indirect effect between maternal depressive symptoms and first use, $ab = 0.004$, 95% CI: 0.001, 0.007. The 95% confidence intervals for the unique indirect effects via parental positive regard and child dysthymia both included zero, indicating no significant mediation, $p > .05$; positive regard $ab = 0.002$, 95% CI: $-0.002, 0.006$, dysthymia $ab = 0.004$, 95% CI: $-0.001, 0.008$ (see Table 3). The associated standardized regression

coefficients for the alcohol use onset mediation model are presented in Figure 3. We conducted a small sensitivity analysis for effects of shared variance: Excluding each parenting mediator taken in turn with dysthymia showed essentially the same result.

The component paths and indirect effects for the HED mediation model are presented in Table 4 with the associated standardized regression coefficients depicted in Figure 4. Analyses predicting first HED with the three mediators taken together showed no significant overall indirect effect, $\Sigma ab = 0.012$, 95% CI: $-0.005, 0.029$. In light of this null finding for the aggregate indirect effect, we did not pursue follow-up analyses.

Discussion

We explored the effect of maternal depressive symptoms on the timing of alcohol use initiation and HED in youth and also considered childhood depressive and dysthymia symptoms as well as harsh discipline and parental positive regard as potential mediators. The percentage of study participants who had consumed alcohol in our sample was higher than that reported in previous nationally representative samples of youth of comparable age (e.g., Eaton et al., 2010; Fryar et al., 2009), even when sampling weights were applied. Similarly, the percentage of students who had engaged in heavy episodic drinking was also higher than reported in recent national samples of youth (Patrick & Schulenberg, 2010). These findings are not surprising given that the communities selected for Fast Track were deemed “high-risk” populations, and the youth could be expected to be more likely to engage in problem behaviors such as alcohol use than the general population. Moreover, past research (e.g., Lieb et al., 2002) has suggested that children of depressed mothers are at an increased risk of consuming alcohol and developing alcohol problems. In the present work, we extend prior research by using longitudinal data obtained from children and their mothers to determine the role that maternal depressive symptoms may play in alcohol use onset and HED in youth.

As hypothesized, results indicated that a mother’s depressive symptoms significantly predicted both an earlier age of first time alcohol use as well as an earlier age of first episode of heavy drinking. These findings are consistent with similar research (Cortes et al., 2009) suggesting that depressive symptoms experienced by a mother are a potent predictor of offspring alcohol use initiation. Although there are several factors that may contribute to a youth becoming involved in problem behaviors including peer group and neighborhood predictors, a key finding in the current study is that maternal depressive symptoms are directly related to a child’s earlier onset of alcohol use and HED. Moreover, this is the first study to our knowledge that has examined maternal depressive symptoms as a predictor of the timing of alcohol use initiation and HED.

We then tested the hypothesis that childhood depression and dysthymia symptoms would mediate the association between maternal depressive symptoms and the timing of alcohol use onset and HED. Contrary to expectation, children’s symptoms of depression and dysthymia did not significantly mediate the relation between maternal depressive symptoms and child alcohol use initiation or maternal depressive symptoms and child HED. However, it is important to note that maternal depressive symptoms did significantly predict symptoms of childhood depression and dysthymia in both models. This finding is consistent with previous research (e.g., Campbell, Morgan-Lopez, Cox, & McLoyd, 2009; Ohannessian et al., 2005) and further supports the familial aggregation of internalizing symptoms. It is possible that genetic and environmental components play a role in the development of depression and dysthymia symptoms in children who have mothers experiencing symptoms of depression. Further, depression and dysthymia symptoms predicted alcohol use onset, but not HED in youth. The significant relation between childhood dysthymia/depressive

symptoms and alcohol use initiation is consistent with previous research (e.g., Fleming et al., 2008; Katon et al., 2010) suggesting that youth who are experiencing a depressed mood are at an increased risk of consuming alcohol at an earlier age. Prior research has found that youth with high levels of both depressive and conduct problem symptoms are at especially high risk for early onset substance use (Miller-Johnson et al., 1998), and that maternal depression has been linked to youths' conduct problems (Barry et al., 2005). Although our results indicate that depression and dysthymia symptoms did not emerge as a significant mediator, we encourage future researchers to continue this line of inquiry, particularly in light of the significant associations that were found among the study variables. Having a better understanding of the contributing factors that lead to initial alcohol use, including the co-occurrence of depression and conduct problem symptoms, may help identify those youth most at risk and aid in the development of improved alcohol prevention programs.

As hypothesized, harsh discipline was found to significantly mediate the relation between maternal depressive symptoms and alcohol use onset. Although this is the first prospective study to our knowledge that investigates harsh discipline as a potential mediator, previous research (e.g., Davies & Windle, 1997; Dishion et al., 1999; Lim, Wood, & Miller, 2008) has shown that maternal depressive symptoms significantly predict negative and harsh parenting behaviors. Moreover, researchers (e.g., Alati et al., 2010; Latendresse et al., 2009) have documented that parenting practices directly contribute to alcohol consumption in youth. Thus, our finding that harsh discipline mediates the link between maternal depression and youth alcohol use onset is consistent with and extends this larger body of research. It is notable that harsh discipline mediated the link between maternal depression and youth alcohol use onset, but not the link between maternal depression and youth HED. It is possible that given the greater severity of HED than simple experimentation, different aspects of parenting such as lack of monitoring and supervision may be more important proximal predictors. A direction for future research will be to investigate which aspects of parenting differentially mediate links between maternal depression and distinct aspects of youth alcohol use.

Contrary to expectation, parental positive regard was not a significant mediator in the relation between maternal depressive symptoms and the onset of alcohol use or HED. This result is surprising given previous research suggesting that maternal depression can disrupt mothers' ability to demonstrate warmth and affection in parenting (Gelfand & Teti, 1990) and that lack of parental warmth and affection predicts worse child adjustment (Rohner et al., 2005). However, in a meta-analysis of 46 observational studies, maternal depression was found to be strongly associated with negative maternal behavior but only weakly associated with positive maternal behavior (Lovejoy et al., 2000). In our simultaneous examination of both positive and negative aspects of parenting, negative aspects of parenting (harsh discipline) explained more variance in the relation between maternal depression and adolescents' alcohol use than did positive aspects of parenting (parental positive regard). We focused on harsh discipline and positive parental regard as two aspects of parenting likely to contribute to alcohol use onset and HED in youth; it is unclear what other specific parenting practices might contribute to the initiation of first time alcohol use and heavy drinking (Hayes, Smart, Toumbourou, & Sanson, 2004; Latendresse et al., 2008). It will, therefore, be important for future investigators to examine several parenting practices as possible mediating variables in the relation between maternal depressive symptoms and subsequent alcohol use behaviors in youth.

It should be noted that there are several limitations to the present study. First, the current study relied on self-report data for maternal depression, child dysthymia, and parenting practices, which raises the potential problem of self-serving bias, such as social desirability and increases the chances of associations that are due to similar methods, rather than related

constructs, though this is somewhat ameliorated by using youth reports of the alcohol use outcome (vs. parent reports of the other constructs). Moreover, assessing maternal depressive symptoms and child depression and dysthymia symptoms through maternal interview may be problematic given the possibility that a depressed mother may be more inclined to report elevated symptoms for her child due to her own depression. Researchers would ideally employ multiple types of measures (e.g., observation, peer report, teacher report) to assess these behaviors. Second, depressive symptoms were measured using the CES-D, which has been shown to be a valid and reliable instrument but assessed maternal depressive symptoms and not clinical diagnoses of depression. The relations among maternal depression, the mediators, and the outcomes may be different depending on whether the mother's symptoms are episodic or chronic in nature. Future research should employ more extensive evaluations of mothers' mental status through methods such as structured clinical interviews, which include further assessment of symptom duration. Third, although maternal depressive symptoms significantly predicted earlier alcohol use onset and HED, there are other factors not assessed in the current study that contribute to a youth's alcohol use. Some of these factors include marital discord, parental divorce, and family conflict, which are conceivably third-variable causes of both maternal depressive symptoms and youth alcohol use. The Fast Track dataset does not have family measures taken temporally prior to the kindergarten-year CES-D, but other longitudinal studies may be better suited to investigating these possibilities. Finally, generalizability is limited due to the Fast Track sample being collected from select communities. Replication of these results across samples and populations will be necessary.

Despite these limitations, our findings demonstrate that the presence of maternal depressive symptoms significantly predicts an earlier age of alcohol use onset and earlier HED in youth. Moreover, these findings have practical implications. For example, interventions may be developed to address and prevent depressive/dysthymia symptoms as well as alcohol use in children who have been identified as having a mother who is clinically depressed. Further, interventions may be designed specifically for mothers to reduce their depressive symptoms and avoid having their depression spill over into harsh parenting of their children. Similarly, effective parenting skills may be taught to depressed mothers to ensure that they have a level of control in reducing the likelihood that their children will begin drinking alcohol. From an ecological perspective (Bronfenbrenner, 1986), programs including both depressed mothers and their at-risk children may prove to be the most successful strategy for alcohol use prevention. These improved intervention and prevention programs could have important implications for reducing the occurrence and early initiation of alcohol use and HED among at-risk youth.

Acknowledgments

This work was supported by National Institute of Mental Health (NIMH) grants R18 MH48043, R18 MH50951, R18 MH50952, and R18 MH50953. The Center for Substance Abuse Prevention and the National Institute on Drug Abuse also have provided support for Fast Track through a memorandum of agreement with the NIMH. This work was also supported in part by Department of Education grant S184U30002, NIMH grants K05MH00797 and K05MH01027, and NIDA grants DA16903, DA017589, and DA015226.

We are grateful for the close collaboration of the Durham Public Schools, the Metropolitan Nashville Public Schools, the Bellefonte Area Schools, the Tyrone Area Schools, the Mifflin County Schools, the Highline Public Schools, and the Seattle Public Schools. We greatly appreciate the hard work and dedication of the many staff members who implemented the project, collected the evaluation data, and assisted with data management and analyses.

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Figure 1.
Model-implied and actual survival curves for alcohol use onset.

Figure 2.
Model-implied and actual survival curves for heavy episodic drinking onset.

Figure 3.

Alcohol use onset mediation model with standardized regression coefficients.

* $p < .05$. ** $p < .01$

Figure 4. Heavy episodic drinking onset mediation model with standardized regression coefficients.
 * $p < .05$. ** $p < .01$

Table 1

Weighted Percentages of Alcohol Use Onset and First Heavy Episodic Drinking (HED) by Grade

Grade	First Use		First HED	
	% First Use	Cumulative % Use	% First HED	Cumulative % HED
4	3.1	3.1	*	*
5	1.9	5.0	*	*
6	2.2	7.2	*	*
7	11.1	18.3	4.8	4.8
8	9.5	27.8	7.3	12.1
9	6.7	34.5	9.2	21.3
10	10.5	45.0	13.2	34.6
11	6.2	51.2	4.4	39.0

Note.

* = not assessed. $N = 754$. Proportions are adjusted for missing data based on full information maximum likelihood estimation with all model variables.

Table 2

Correlations among Study Variables

Variable	1	2	3	4	5	6	7	8	9
1. Gender ^a	--								
2. Ethnicity ^b	.05	--							
3. Mother's Education ^c	.08	-.19*	--						
4. Maternal Depressive Symptoms Kindergarten	.06	-.28*	-.20*	--					
5. Maternal Depressive Symptoms First Grade	.05	-.30*	-.23*	.55*	--				
6. Maternal Depressive Symptoms Second Grade	.03	-.27*	-.26*	.53*	.58*	--			
7. Childhood Depression/Dysthymia Symptoms	.15*	-.03	.02	.22*	.26*	.24*	--		
8. Harsh Discipline	.12*	-.06	-.09*	.18*	.26*	.15*	.14*	--	
9. Positive Regard	.03	.26*	.19*	-.22*	-.21*	-.23*	-.21*	-.25*	--
Mean	.46	.43	.77	12.03	11.92	11.03	1.53	1.23	1.65
SD	.50	.50	.42	8.88	9.33	8.54	1.50	1.35	.42

Note: N = 754.

* $p < .05$. Gender (Male vs. Female), ethnicity (African American vs. Other), and mother's education (any college vs. none) are dichotomous variables. Alcohol use and heavy episodic drinking were not included in the correlation matrix as they consist of binary variables only existing at the latent level.

^a Male is coded high.

^b African American is coded high.

^c Any college is coded high.

Table 3

Beta Coefficients (Standard Errors) and Indirect Effects (Confidence Intervals) in the Full Alcohol Use Onset Model

	Mediator Youth Depression/Dysthymia	Harsh Discipline	Positive Regard	None (Direct Effect)
Maternal Depressive symptoms effect on mediator	0.082 (0.012) **	0.021 (0.004) **	-0.083 (0.013) **	
Mediator effect on alcohol use onset	0.050 (0.025) *	0.190 (0.074) **	-0.023 (0.022)	
Indirect effect	0.004 (-0.001, 0.008)	0.004 * (0.001, 0.007)	0.002 (-0.002, 0.006)	0.008 (-0.009, 0.021)

Note: $N = 754$.

*
 $p < .05$;

**
 $p < .01$

Table 4

Beta Coefficients (Standard Errors) and Indirect Effects (Confidence Intervals) in the Full Heavy Episodic Drinking Onset Model

	Mediator Youth Depression/Dysthymia	Harsh Discipline	Positive Regard	None (Direct Effect)
Maternal Depressive symptoms effect on mediator	0.092 (0.014) **	0.025 (0.005) **	-0.102 (0.016) **	
Mediator effect on heavy episodic drinking onset	0.069 (0.044)	0.091 (0.141)	-0.031 (0.047)	
Indirect effect	0.160 (-0.002, 0.015)	0.057 (-0.005, 0.009)	0.078 (-0.007, 0.013)	0.010 (-0.023, 0.039)

Note: $N = 754$.

*
 $p < .05$;

**
 $p < .01$