



HHS Public Access

Author manuscript

J Child Fam Stud. Author manuscript; available in PMC 2016 March 01.

Published in final edited form as:

J Child Fam Stud. 2015 March ; 24(3): 638–648. doi:10.1007/s10826-013-9874-3.

Maternal mental health and children's internalizing and externalizing behaviors: Beyond maternal substance use disorders

Yih-Ing Hser, H. Isabella Lanza, Libo Li, Emily Kahn, Elizabeth Evans, and Marya Schulte

Semel Institute of Neuroscience and Human Behavior, Department of Psychiatry and Biobehavioral Sciences, University of Los Angeles, California, Los Angeles, CA 90025

Yih-Ing Hser: yhser@ucla.edu

Abstract

Maternal substance abuse and mental disorders can have adverse impacts on child development. We investigated the impact of maternal mental health on child behaviors based on a long-term follow-up study of mothers and their children approximately 10 years after mothers' admission to drug abuse treatment. Mothers (n=396) were assessed at admission to drug treatment during 2000 to 2002, and at follow-up in 2010–2011. At follow-up, each mother was asked to assess one target child using the Child Behavior Checklist for ages 6–18 (CBCL). Mothers' mental disorder diagnoses were obtained from records maintained by the California Department of Mental Health in 2009. About 46% of mothers had comorbid mental disorders; 27% had depressive disorder, 15% bipolar disorder, 15% adjustment disorder, 13% anxiety disorder, and 6% psychotic disorder. Of these mothers, more than half had two or more mental disorder diagnoses. The average age of the target child was approximately 10 years old (range 6 to 17). Relative to children of mothers without comorbid mental disorders, children were more likely to demonstrate internalizing behaviors if their mothers had comorbid depression/anxiety disorders (OR=2.0, 95%CI:1.0–4.0) or severe mental disorders (psychoses, bipolar) (OR=3.4, 95%CI:1.5–7.6). For externalizing behaviors, family problems was the only significant predictor (OR=3.2, 95%CI:1.7–6.0 for children of mothers with depression/anxiety disorders, OR=3.9, 95%CI:1.9–7.8 for severe mental disorders). Addressing maternal mental disorders (particularly severe mental disorders) and family problems are important for child well-being as these factors were significantly related to emotional and problem behaviors of children.

Keywords

child behavior; externalizing symptoms; internalizing symptoms; maternal substance abuse; maternal mental health

Introduction

Millions of children in the United States live with a parent who has a substance abuse problem (Substance Abuse and Mental Health Services Administration (DHHS/PHS) Office of Applied Studies, 2009). The 2007 National Survey on Drug Use and Health reports that 8.3 million children live with at least one parent who abused or was dependent on alcohol or an illicit drug during the past year. Among children age 2 or younger, an estimated 13.9% live in a substance-dependent household, as well as 13.6% of children age 3 to 5 years, 12.0% of children age 6 to 11 years, and 9.9% of youths age 12 to 17 years (Substance Abuse and Mental Health Services Administration (DHHS/PHS) Office of Applied Studies, 2009). These children are at increased risk for abuse or neglect, as well as physical, cognitive, social, and emotional problems (Haber et al., 2010; Nunes et al., 1998; Smith, Johnson, Pears, Fisher, & DeGarmo, 2007; Walden, Iacono, & McGue, 2007).

Maternal substance abuse is particularly problematic as mothers typically are the primary caregivers of their dependent children. The problems are exacerbated when mothers also suffer from mental health problems, and addicted individuals typically have high levels of several comorbid psychiatric disturbances, including depressive and anxiety diagnoses (Hesselbrock, Meyer, & Keener, 1985; Rounsaville et al., 1991; Rounsaville, Kosten, Weissman, & Kleber, 1986). Maternal psychiatric disorders, particularly depression, which has been most comprehensively studied in the literature, are associated with an increased risk of psychosocial and developmental difficulties in dependent children (Goodman & Gotlib, 1999; Ramchandani & Psychogiou, 2009). However, it is not clear if maternal mental disorders elevate the risks for child problem behaviors over and beyond maternal substance use disorders. Limited research has examined the effects of maternal comorbid substance use and mental health disorders on children. A better understanding of substance-abusing mothers' mental disorders and their relationships with children's behavioral and emotional development can inform existing services and interventions aimed at preventing or ameliorating the adverse consequences associated with substance abuse and mental health disorders.

Maternal drug abuse and child outcomes

It is well-known that maternal substance abuse has detrimental effects on children's health (Johnson & Leff, 1999; Schempf, 2007); however, studies examining the role of maternal substance abuse on child and adolescent behavior and emotional development is somewhat mixed. Previous work has shown both robust (Clark, Cornelius, Wood, & Vanyukov, 2004; deCubas & Field, 1993; Marmostein, Iacono, & McGue, 2009; Wilens, Biederman, Kiely, Bredin, & Spencer, 1995), as well as weak or insignificant (Frank et al., 2001; Johnson, Nusbaum, Bejarno, & Rosen, 1999; Messinger et al., 2004; Wakschlag & Hans, 1999) relationships between maternal substance abuse and children's behavioral and emotional development. Studies using the Child Behavior Checklist (CBCL) (Achenbach, 1991), a common measure of both behavioral and emotional symptoms, has generally linked maternal substance abuse to children's behavior and emotional functioning. For instance, deCubas and Field (1993) found that 6 to 13-year-old children of substance-abusing mothers scored higher on almost all problem scales as compared to matched controls, and Wilens and

colleagues (1995) documented higher levels of both internalizing and externalizing symptoms among school age children of opioid abusers compared to children of normal controls. Additionally, more than half the sample of substance abusers' offspring had clinically elevated levels of symptomatology as indicated by CBCL *t* scores. Overall, it appears that maternal substance abuse contributes to children's behavioral and emotional symptoms, but differences in biological and contextual risks may help explain previous mixed findings.

Mothers with comorbid mental health and substance use problems and child outcomes

Inconsistencies in past findings most likely reflect complex child developmental processes, and also the cumulative effect of risk factors (Conners et al., 2004). For instance, comorbidity with maternal mental health disorders may potentially play a critical role in explaining associations between maternal substance use and children's developmental outcomes. Research focusing on maternal mental health has consistently indicated that mothers' psychiatric well-being is strongly related to child behavioral outcomes (Accornero, Morrow, Bandstra, Johnson, & Anthony, 2002; Luthar, Cushing, Merikangas, & Rounsaville, 1998; Steinhausen, Mas, Ledermann, & Metzke, 2006; VanDeMark et al., 2005; Weissman et al., 1999; Whitaker et al., 2006). Luthar and colleagues (1998) examined risk and protective factors in the adjustment of 78 school-age and teenage offspring of opioid- and cocaine-abusing mothers, and found that maternal psychiatric illness was associated with CBCL Internalizing and Externalizing disorders. Later, Luthar and Sexton (2007) compared children of mothers with and without substance abuse and mental disorders, and the results generally showed that the comorbid and affective/anxiety-only, but not the drug-only, groups showed significantly more impairment among both mothers and children. Further evidence has demonstrated that the psychological state of substance-using mothers is significantly associated with child internalizing behaviors, more so than prenatal drug exposure (Steinhausen et al., 2006) or recent maternal drug use (Accornero et al., 2002; Hser et al, In press; Luthar & Sexton, 2007).

Given the abundance of studies reporting that the prevalence of child behavior problems increases as cumulative risk factors increase (Conners et al., 2004; Luthar et al., 1998; VanDeMark et al., 2005; Whitaker, Orzol, & Kahn, 2006), it is likely that mothers with comorbid mental health diagnoses and substance use disorders place their children at increased risk of problem behaviors. In addition, other environmental risks such as exposure to violence, crime, and family conflict may add to vulnerability for negative behavioral and emotional development among children and adolescents. For example, Whitaker et al. (2006) found that as risks related to substance use, mood disorders, and domestic violence compounded, children's behavioral and emotional symptoms increased. Similarly, as risks related to family conflict began to accumulate, teacherreported behavioral problems in children of substance using mothers also increased to problematic levels (Conners-Burrows et al., 2012a). These findings are particularly concerning given that the 2011 National Survey on Drug Use and Health found that over three million women of child-rearing age suffer from co-occurring mental health and substance abuse disorders (Substance Abuse and Mental Health Services Administration (HHS), 2012), as well as strong evidence showing that maternal substance negatively impacts parenting behaviors, including discipline and

involvement (Dunn et al., 2002; Suchman & Luthar, 2000). Nevertheless, studies have mostly focused on depression and anxiety as these are the most prevalent comorbid mental disorders among substance-abusing women. There is a lack of knowledge regarding the effects on children of mothers' comorbid substance abuse and more severe mental illness, such as psychosis and/or bipolar disorder, and how comorbid psychiatric disorders and substance abuse increase risk of children's behavioral and emotional problems alongside familial risk factors.

Although the frequently complex nature of the problems mothers with substance use disorders (SUD) face is difficult to disentangle, distinguishing the effects of substance use from other risk factors is warranted. This is in line with recent empirical work not only addressing cumulative risk factors but measuring specific contributions to children's socio-emotional functioning, such as maternal psychiatric symptoms, exposure to violence, family conflict, and parenting behaviors (Conners-Burrows et al., 2012b; Whitaker et al., 2006). Assessing whether maternal SUDs in itself is a risk factor for children's behavioral and emotional problems is critical for targeting families in most need of intervention services and developing more effective interventions. Above and beyond the impact of maternal psychiatric conditions, and other biological and environmental risks children with behavioral and emotional problems are commonly exposed to (i.e., genetic heritability for mental disorders, poorer parenting behaviors; Clark et al., 2004; McKeganey et al., 2002), they may also be exposed to risks that are unique or more common to mothers with SUDs. For example, children may have increased access to substances, resulting in earlier-onset and more severe drug use (Kaplow, Curran, Dodge, & The Conduct Problems Prevention Research Group, 2002). Also, neglect of children in terms of lack of regard for child safety and hygiene has been cited as a common consequence of SUDs among mothers (Kroll & Taylor, 2013), which has resulted in proportionally more children from mothers with SUDs being removed from maternal care than mothers with other psychiatric disorders (Gregoire & Schultz, 2001; McGlade, Ware, & Crawford, 2009). Additionally, children of mothers with SUDs are more often exposed to violence and crime exposure in and outside of the home (Shuler & Nair, 2001), also adding to cumulative risks for future developmental problems. Given the unique pathways by which maternal substance use may increase risk of behavior and emotional problems in children, it is necessary to pinpoint the patterns of risk that lead to more problematic behavioral and emotional problems in children.

The present study

The present study takes advantage of a large and ethnically diverse sample of women who were admitted to drug abuse treatment and participated in the California Treatment Outcome Project (CalTOP) in 2000–2002. A follow-up interview was conducted with a subset of these women 10 years later to assess their status and that of their children. This article examines maternal mental disorders in relation to children's problem behaviors. Our primary research question focuses on whether problem behaviors increased among children whose mothers had a history of comorbid substance abuse and mental disorders compared to children whose mothers had a history of substance use disorders (SUDs) only (not comorbid with mental disorders). We also investigated other maternal characteristics (current substance use, employment, and family functioning) related to child behavior. The goal was

to examine the differential impact of maternal mental health disorders among mothers with a history of SUDs on child problem behaviors. We hypothesized that compared with children of mothers without comorbid mental disorders, the children of mothers with a history of substance abuse and either severe mental disorders (psychosis, bipolar disorder), or moderately severe mental disorders (depression, anxiety, adjustment) will have more behavior problems reported at follow-up.

Method

Participants

The present study includes 396 mothers who were part of a larger study that recruited consecutive admissions to 44 drug abuse treatment programs in 13 California counties during 2000–2002 as part of the California Treatment Outcome Project (CalTOP). As part of CalTOP, approximately 4,500 pregnant or parenting women (i.e., women having dependent children or children younger than 18 years) were assessed at admission between 2000 and 2002. Treatment programs consisted of 24 outpatient drug-free (i.e., non-methadone), 11 residential, 4 methadone maintenance, and 4 mixed-modality programs located in both urban and rural areas throughout California. Women were referred to the programs from multiple sources including criminal justice referral (37%), self referral (32%), and other community or provider referrals (31%). The mean age at treatment admission was 31.1 (SD = 7.1) years. Methamphetamine was the most commonly reported primary drug (46.8%), followed by heroin (16.5%), alcohol (16.0%), marijuana (8.9%), cocaine (5.9%), and other drugs (5.9%). Approximately 10 years after completing drug abuse treatment, 1,000 mothers were randomly selected for a follow-up assessment. By 2010–11, 713 (71.3%) of these mothers were re-interviewed, with 396 parenting dependent children (under age 18). No significant differences were found between mothers who participated in the follow-up study vs. those lost to follow-up in terms of demographic variables like age, ethnicity, education and employment status. However, those in the follow-up study were more likely to report methamphetamine (43% vs. 33%) and cocaine (11% vs. 7%) and less likely to report heroin (19% vs. 28%) and alcohol (17% vs. 22%) as their primary drug at baseline compared to mothers who did not participate in the follow-up ($\chi^2=19.66, p < .01$).

Mothers' in the follow-up study were on average 38-years-old (SD=6.7), predominately white (52%) or Hispanic (25%), 35% did not complete high school, most were never married (31.9%) or divorced (38.4%), 37% were employed, and 58% received public assistance. Mothers reported having a mean of 3.7 children with 2.7 under age 18. About 16% reported having children living with others by court order. Among the assessed children, the mean age was 10 (SD=3.2), 53% were male and 47% female.

Assessment Procedures

Mothers were assessed at intake and follow-up using the Addiction Severity Index. All mothers were asked to rate a child under 18 years if the child had been living with the mother in the past six months or had spent enough time in the mother's custody for her to be able to rate the child. When there were multiple children, priority was given to the child that was born closest to the time when the mother was participating in drug abuse treatment

studied by CalTOP. Although specific data are unavailable to determine whether children were born before, during, or after baseline drug treatment, about 40% of mothers were pregnant at baseline. Children (n=396) were assessed by their mothers using the Child Behavior Checklist (CBCL). All assessment procedures were reviewed and approved by the university's Institutional Review Board and the State of California Health and Human Services Agency.

Measures

Addiction Severity Index-Lite (ASI); (McLellan et al., 1992). The ASI is a structured interview that assesses problem severity in seven areas: alcohol use, drug use, employment, family and social relationships, legal, medical, and psychological. The ASI is the most commonly used instrument in the substance abuse field with demonstrated psychometric validity and reliability for assessing problem severity in diverse populations (McLellan et al., 1992; McLellan et al., 1985). ASI questions administered at follow-up were used in analyses. ASI questions related to family conflict and alcohol/drug use were dichotomized (0 = *no endorsement*; 1 = *any endorsement*). Because a large proportion of mothers reported no family conflict, distinguishing these mothers from those that endorsed any frequency of conflict was deemed appropriate for analyses. Also, ASI questions asking about the frequency of specific types of drug use in the past 30 days were aggregated to create a variable reflecting any drug use in the past 30 days.

Mental health records. Information regarding mental health services and diagnoses were obtained from the California Department of Mental Health (DMH) in 2009, approximately 1 year before follow-up interview. DMH maintains the Client and Service Information (CSI), a database with services and clinical staff reporting psychiatric diagnoses for clients treated in mental health facilities that received DMH funds. Although personality disorders (Axis II), specifically Antisocial Personality Disorder, are recognized as being highly comorbid with SUDs (American Psychiatric Association. & American Psychiatric Association. Task Force on DSM-IV., 2000), the focus of the current study was on Axis I mental health disorders.

Child Behavior Checklist (CBCL); (Achenbach, 1978, 1991). The CBCL for ages 6 to 18 is a 120-item standardized parent-report measure of behavior problems in children, with norms available separately for boys and girls and for ages 6 to 18 in each of the nine domains of behavior syndromes. Standardized scores are determined for nine subscales (withdrawn, somatic complaints, anxious/depressed, social problems, thought problems, attention problems, delinquent behavior, aggressive behavior, sex problems) and three summary scales (Internalizing Problems scale, Externalizing Problem scale, Total Problems scale). The instrument has good reliability and validity (Achenbach, Edelbrock, & Howell, 1987). Mothers used this instrument to report information about target children at follow-up. We used the recommended T-score transformations of the raw behavior scores, which adjusted for age and sex differences in behavior found in normative samples. A T-score greater than 60 on the score indicates borderline or clinically meaningful symptoms. Clinical cutoff scores were used in an attempt to identify the subgroup of children at highest risk for functional impairment and, thus, prime targets for clinical intervention services.

Analytic Strategies

Descriptive statistics were provided to describe the sample characteristics. Mothers were grouped as previously described: (1) history of SUDs comorbid with psychotic or bipolar disorder; (2) history of SUDs comorbid with depression, anxiety, or adjustment disorder; and (3) no comorbidity, history of SUDs only. Group differences were assessed using ANOVA for continuous measures or chi-square for categorical measures. Separate multivariate logistic regression analyses were conducted predicting the CBCL Internalizing and Externalizing disorder. These logistic regression analyses were tested using the non-comorbid group as the reference compared separately to those with psychotic or bipolar disorder and those with depression, anxiety, or adjustment disorder. Controlling for child characteristics (age, gender, ethnicity), other maternal factors (current drug use, employment, family problems) were also included to test for their relationships with child problem behavior. Significance was set at alpha of .05.

Results

Mothers' comorbid mental disorders

About 46% of mothers had comorbid mental disorders; 27% had depressive disorder, 15% bipolar disorder, 15% adjustment disorder, 13% anxiety disorder, and 6% psychotic disorder. Of these mothers, more than half had two or more mental disorder diagnoses, and this was particularly evident among mothers with severe mental disorders as most of them also had depression (53.4%), anxiety (28.8%), or adjustment disorder (20.6%).

Mothers' characteristics by comorbid mental disorder diagnoses are provided in Table 1. Compared to those with only a history of substance use disorder, mothers with comorbid mental disorder (regardless of specific diagnosis) did not differ in age, ethnicity, education level, or marital status. Relative to non-comorbid mothers, mothers with a psychotic disorder or bipolar disorder were significantly less likely to have a job and were more likely to receive public assistance. Comorbid mothers reported significantly more severe psychiatric problems (e.g., depression, anxiety, trouble understanding), and increased family or social problems.

Mothers' drug use and other problems by mental health diagnosis

Table 2 provides information on maternal drug use and other problems assessed at follow-up. Comorbid mothers, regardless of specific diagnosis, were not significantly different from non-comorbid mothers in terms of primary drug type, or age of first use of primary drug. About 44% of mothers reported methamphetamine as their primary drug problem, followed by alcohol (16%), heroin (13%), cocaine (8%), and marijuana (9%), with 10% reporting other drugs. The mean age of first use of the primary drug was at 17.5 years. About 23% reported being heavy drinkers during the 30 days before the follow-up interview. Approximately 37% still used illicit drugs; significantly more comorbid mentally ill mothers reported recent illicit drug use than those with a history of SUDs only.

Comorbid mentally ill mothers, particularly those with severe mental disorders, consistently reported more problems in mental health and family relationships, including serious

depression, anxiety, cognitive dysfunction, and trouble controlling violent behavior. Many of these mothers reported previous psychiatric treatment, more so among mothers with comorbid mental and substance use disorders. Similarly, more comorbid mentally ill mothers reported having serious conflicts or problems with family or non-family individuals in the past 30 days.

Child problem behaviors by maternal mental health diagnosis

Children of mothers with comorbid mental disorders were more likely to have clinically significant internalizing symptoms; 18.7% among children whose mothers had depression/anxiety/adjustment and 27.9% among children whose mothers had psychoses/bipolar disorders, whereas 10.2% of children of non-comorbid mothers had clinically significant internalizing symptoms (see Table 1). Similarly, 25.2% of children with clinically significant externalizing behaviors had a mother with depression, anxiety, or adjustment disorder, and 32.4% had a mother with psychotic or bipolar disorder, compared to 20% among non-comorbid mothers, although this between-group difference was not significant.

Predicting problem behaviors among children

Separate analyses were conducted among mothers with depression/anxiety/adjustment disorder versus non-comorbid mothers, and among mothers with severe disorders (psychoses, bipolar) versus non-comorbid, mothers (see Table 3).

Compared to those without comorbid mental disorders, mothers with depression, anxiety, or adjustment disorders were twice as likely (OR=2.0, 95%CI: 1.0–4.0) to report child internalizing problem behaviors. Mothers with depression, anxiety, or adjustment disorders were not more likely to report child externalizing problem behaviors; however, in the presence of family problems, the likelihood increased three-fold (OR=3.2, 95%CI: 1.7–6.0).

Compared to those without comorbid mental disorders, mothers with severe mental disorders (psychoses, bipolar disorder) were three times more likely (OR=3.4, 95%CI: 1.5–7.6) to report their children exhibiting internalizing problem behaviors. Additionally, those mothers who were current drug users or having family problems had elevated odds of internalizing problem behaviors among their children (OR=2.3, 95%CI: 1.0–4.9; OR=2.3, 95%CI: 1.0–5.3, respectively). As for externalizing problem behaviors, the presence of family problems increased the likelihood almost four times the odds (OR=3.9, 95%CI: 1.9–7.8), relative to those without family problems.

Discussion

Consistent with previous literature indicating comorbid mental disorders are highly prevalent among substance-abusing women, the present study revealed that about 46% of mothers in our study had a history of SUDs along with mental disorders and more than half of those women had two or more mental disorder diagnoses. Among the various psychosocial risk factors, maternal mental health stands out as a main predictor of child behaviors in many previous studies. The present study confirms that depression and anxiety, which are most prevalent mental disorders comorbid with SUDs, increased the risk for child internalizing problems over and beyond the negative impact of history of maternal SUDs.

Such risk is even greater among children of mothers with comorbid history of SUDs and severe mental disorders (psychosis or bipolar disorder). Contrary to our hypotheses, we did not find that maternal mental disorders comorbid with history of SUDs significantly increased the risk of child externalizing problems over and beyond maternal history of SUDs. Instead, the presence of family problems was a significant predictor of child externalizing problem behavior, regardless of maternal mental disorders.

Not surprisingly, family problems were related to externalizing behaviors. On the other hand, psychiatric comorbidity with a history of SUDs was not related to increased risk of externalizing behaviors. This suggests that the perception of family problems by a mother with substance abuse history is a robust predictor of child externalizing problem behaviors above maternal mental health, which is in line with many studies indicating children of mothers with a history of SUDs live in family environments with less emotional support (Jones, 2007; Suchman & Luthar, 2000), more dysfunctional interactions among family members (Jester, Jacobson, Sokol, Tuttle, & Jacobson, 2000), and have mothers engaging in more coercive and punitive forms of discipline (Miller, Smyth, & Mudar, 1999). It appears that the effects of SUDs on children's externalizing behavior may best be explained by the negative effects a history of SUDs has on the family environment. This is a risk factor that is very amenable to intervention compared to psychiatric treatment or socio-environmental conditions increasing vulnerability.

Overall, it has been difficult to determine why some children of mothers with a substance abuse history are at greater risk than others for poor developmental and behavior outcomes. Taking a cumulative risk approach is necessary to understand the interactions and complexities occurring in the lives of mothers with a history of SUDs. In this study we were able to parse out the effects of psychiatric diagnoses vs. substance use, but other risk factors like sexual abuse, partner violence, and criminal behavior were not assessed. However, just with the inclusion of specific psychiatric diagnoses, it is clear that various psychiatric diagnoses, including bipolar and psychotic disorder, increase risk of internalizing problem behaviors in children. Previous research parsing out the contributions of mood disorders and substance use has shown that each factor increases risk of externalizing behavior problems in young children (Whitaker et al., 2006), and this study extends this work to show that comorbid psychiatric diagnoses and history of SUDs predicts higher levels of internalizing problem behaviors in children and adolescents.

The present study has several limitations. We relied solely on maternal report in measuring child behavior problems. Maternal reports can be unreliable or biased; in particular, psychiatrically affected mothers tend to view their offspring in a relatively negative light (Fergusson, Lynskey, & Horwood, 1993; Hennigan, O'Keefe, Noether, Rinehart, & Russell, 2006; Renouf & Kovacs, 1994). Others have found that children were more likely to report clinically significant symptoms of depression than their mothers (Tien, Roosa, & Michaels, 1994). Future studies should seek corroborative evidence or more objective behavioral measures to confirm and extend the study findings. Another limitation is that mothers' mental health diagnoses were based on records maintained by the California Department of Mental Health. Only severely mentally ill and disabled individuals can receive mental health services in participating clinics that receive public funds. Thus, the mental health diagnoses

could be underestimated in our sample of mothers. However, mothers receiving publically funded drug treatment are also very likely to receive mental health services from public sources (Grella, 2003), and 47% of mothers at follow-up reported receiving public assistance in the last 30 days. Additionally, in order to obtain sufficient sample sizes in diagnostic groups, we combined diagnoses into three groups as described. The decision was based on substantial overlap in genetic and environmental risk factors (Craddock, O'Donovan, & Owen, 2005; Kendler et al., 2011; Kendler, Neale, Kessler, Heath, & Eaves, 1992; Lichtenstein et al., 2009) and shared phenotypic aspects such as symptomology and psychopharmacological therapies (American Psychiatric Association. & American Psychiatric Association. Task Force on DSM-IV., 2000; Gelder, Mayou, & Geddes, 2005; Moffitt et al., 2007). Furthermore, the psychiatric symptoms assessed by the ASI appeared to be consistent with the maternal diagnostic groups (see Table 2). We emphasize that these study results may generalize only to children living with mothers with a history of substance abuse, given that our study only included mother and child dyads if children (under age 18) were living or maintaining contact with the mothers (so that mothers can provide meaningful assessment of their children). Finally, it is important to note that children's experience is likely to vary depending on how long they have been exposed to mother substance abuse; however, data are unavailable to ascertain how long each child was exposed to maternal substance abuse and whether they were exposed to drugs in utero.

Despite these study limitations, the study results substantiate prior findings on comorbid maternal substance abuse and mental disorders and, in addition, provide valuable insight regarding the relationship between maternal diagnoses and behavioral patterns in offspring. Several maternal factors have been offered to explain heightened vulnerability among offspring of mothers with comorbid SUDs and mental disorders, including genetic influences (Rutter, 1990), parents' role modeling of dysfunctional behaviors (Cummings, 1990; Downey & Coyne, 1990; Patterson, 1982), disturbances in distressed mothers' parenting behaviors (McLoyd, 1990), and/or the stressful context of the children's lives (Goodman & Gotlib, 1999). Parents are key figures in the socialization of children's emotion, and contribute to children's emotional development through reactions to their children's emotions, their discussion of emotion, and their expression of emotion (Eisenberg, Cumberland, & Spinrad, 1998). The mechanisms by which maternal mental health affects children's risk of internalizing problem behaviors warrants consideration of both social and biological factors.

Past studies have indicated that mothers presenting with mood disorders, particularly depression, are less effective at providing children with emotional or motivational support, thus decreasing children's opportunities to develop or implement strategies to succeed in academics and social relationships (Gross & Munoz, 1995; Hoffman, Crnic, & Baker, 2006). This higher risk of failure in academic and social domains is also compounded by exposure to mentally ill mothers' maladaptive cognitions, behaviors, and affect, which likely contribute to children developing emotionally dysregulated behaviors reflected in depressive and anxious symptoms (Brenner & Salovey, 1997; Goodman & Gotlib, 1999; Silk, Shaw, Skuban, Oland, & Kovacs, 2006). Furthermore, previous studies have shown that children of mothers with mental illness, such as depression and psychotic disorder, are at higher risk for developing these disorders themselves as a result of biological/genetic predispositions

(Craddock et al., 2005; Dawson et al., 2001; Zahn-Waxler, Klimes-Dougan, & Slattery, 2000). Consequently, both environmental and biological influences likely explain why children of mothers with comorbid history of SUDs and mental health diagnoses are at greater risk for internalizing symptoms than those with mothers who only endorse a history of SUDs.

The finding that the presence of family problems increased child externalizing behaviors is of particular interest because it implies that even among mothers with a history of SUDs and reporting significant mental health symptoms, mothers were able to recognize the impact of current family stress on their children. It is unclear, however, to what degree the reported family/social conflict was caused or influenced by the mothers' diagnoses. Because clinically significant child externalizing behaviors among all three maternal diagnostic groups were higher than the general population of similar age and ethnicity (about 16%), it is likely that any additional stressors placed on these children increases their likelihood of "acting out." Thus, it may be that children of mothers with a history of SUDs have little ability left to cope with any added stress or conflict.

In terms of future studies, examining whether genetic and above-described environmental factors differ among mothers with specific mental disorders could further inform influences on child problem behaviors. Additionally, although maternal mental and substance use disorders elevate child risks for the development of emotional and behavioral problems, not all children reveal problematic behaviors. Assessing children to identify factors contributing to child resilience could advance understanding of successful coping strategies that would inform development of interventions for increasing resilience, which may prevent the negative outcomes associated with maternal substance abuse and mental health disorders.

In conclusion, our study has found that maternal mental disorders have a significant impact on child internalizing behaviors, but not on child externalizing behaviors. The presence of family problems, regardless of maternal mental diagnoses, was significantly related to child externalizing behaviors. These findings suggest that child internalizing and externalizing behaviors among mothers with substance abuse history are influenced by somewhat different factors and future studies may benefit from examining them separately. Both SUDs and mental illness are chronic conditions that require sustained assistance and support. Efforts to address maternal mental health and family relationships are obviously needed, not only to help these mothers but also to reduce potential problem behaviors among at-risk children. Improved maternal mental health and reduced substance abuse are likely to improve children's well-being and life course.

Acknowledgements

This study is funded by the National Institute on Drug Abuse Grant No. R01DA021183 & P30DA016383 (PI: Hser).

References

Accornero VH, Morrow CE, Bandstra ES, Johnson AL, Anthony JC. Behavioral outcome of preschoolers exposed prenatally to cocaine: Role of maternal behavioral health. *Journal of Pediatric Psychology*. 2002; 27(3):259–269. [PubMed: 11909933]

- Achenbach TM. The Child Behavior Profile: I. Boys aged 6–11. *Journal of Consulting and Clinical Psychology*. 1978; 46(3):478–488. [PubMed: 670491]
- Achenbach TM, Edelbrock C, Howell CT. Empirically based assessment of the behavioral/emotional problems of 2- and 3- year-old children. *Journal of Abnormal Child Psychology*. 1987; 15(4):629–650. [PubMed: 3437096]
- Achenbach, TM. Manual for the child behavior checklist/4–18 and 1991 profile. Burlington, VT: Dept. of Psychiatry, University of Vermont; 1991.
- American Psychiatric Association., & American Psychiatric Association. Diagnostic and statistical manual of mental disorders : DSM-IV-TR. 4th ed.. Washington, DC: American Psychiatric Association; 2000. Task Force on DSM-IV.
- Brenner, EM.; Salovey, P. Emotional development and emotional intelligence Educational implications. New York: Basic Books; 1997.
- Clark DB, Cornelius J, Wood DS, Vanyukov M. Psychopathology risk transmission in children of parents with substance use disorders. *American Journal of Psychiatry*. 2004; 161:685–691. [PubMed: 15056515]
- Conners NA, Bradley RH, Mansell LW, Liu JY, Roberts TJ, Burgdorf K, et al. Children of mothers with serious substance abuse problems: an accumulation of risks. *American Journal of Drug and Alcohol Abuse*. 2004; 30(1):85–100. [PubMed: 15083555]
- Conners-Burrows NA, Kyzer A, Pemberton J, McKelvey L, Whiteside-Mansell L, Fulmer J. Child and family factors associated with teacher-reported behavior problems in young children of substance abusers. *Child and Adolescent Mental Health*. 2012a
- Conners-Burrows NA, McKelvey L, Pemberton JR, Lagory J, Mesman GR, Whiteside-Mansell L. Moderators of the relationship between maternal substance abuse symptoms and preschool children's behavioral outcomes. *Journal of Child and Family Studies*. 2012b
- Craddock N, O'Donovan MC, Owen MJ. The genetics of schizophrenia and bipolar disorder: dissecting psychosis. *Journal of Medical Genetics*. 2005; 42(3):193–204. [PubMed: 15744031]
- Cummings, EM.; Cicchetti, D. Towards a transactional model of relations between attachment and depression. In: Greenberg, MT.; Cicchetti, D.; Cummings, EM., editors. Attachment in the preschool years: Theory, research, and intervention. Chicago: University of Chicago Press; 1990. p. 339-372.
- Dawson G, Ashman SB, Hessel D, Spieker S, Frey K, Panagiotides H, et al. Autonomic and brain electrical activity in securely- and insecurely-attached infants of depressed mothers. *Infant Behavior & Development*. 2001; 24(2):135–149.
- deCubas MM, Field T. Children of methadone-dependent women: developmental outcomes. *American Journal of Orthopsychiatry*. 1993; 63(2):266–276. [PubMed: 7683453]
- Downey G, Coyne JC. Children of depressed parents: an integrative review. *Psychological Bulletin*. 1990; 108(1):50–76.
- Eisenberg N, Cumberland A, Spinrad TL. Parental Socialization of Emotion. *Psychological Inquiry*. 1998; 9(4):241–273. [PubMed: 16865170]
- Fergusson DM, Lynskey MT, Horwood LJ. The effect of maternal depression on maternal ratings of child behavior. *Journal of Abnormal Child Psychology*. 1993; 21(3):245–269. [PubMed: 8335763]
- Frank DA, Augustyn M, Knight WG, Pell T, Zuckerman B. Growth, development, and behavior in early childhood following prenatal cocaine exposure: A systematic review. *Journal of American Medical Association*. 2001; 285:1613–1625.
- Gelder, MG.; Mayou, R.; Geddes, J. Psychiatry. 3rd ed.. New York: Oxford University Press; 2005.
- Goodman SH, Gotlib IH. Risk for psychopathology in the children of depressed mothers: A developmental model for understanding mechanisms of transmission. *Psychological Review*. 1999; 106(3):458–490. [PubMed: 10467895]
- Grella CE. Effects of gender and diagnosis on addiction history treatment utilization, and psychosocial functioning among a dually-diagnosed sample in drug treatment. *Journal of Psychoactive Drugs*. 2003; 35(4):169–179. [PubMed: 12825760]
- Gross JJ, Munoz RF. Emotion Regulation and Mental-Health. *Clinical Psychology-Science and Practice*. 1995; 2(2):151–164.

- Gregoire KA, Schultz DJ. Substance-abusing child welfare parents: Treatment and child placement outcomes. *Child Welfare*. 2001; 80(4):433–452. [PubMed: 11480487]
- Haber JR, Bucholz KK, Jacob T, Grant JD, Scherrer JF, Sartor CE, et al. Effect of paternal alcohol and drug dependence on offspring conduct disorder: gene-environment interplay. *The Journal of Studies on Alcohol and Drugs*. 2010; 71:652–663.
- Hennigan KM, O'Keefe M, Noether CD, Rinehart DJ, Russell LA. Through a mother's eyes: Sources of bias when mothers with co-occurring disorders assess their children. *The Journal of Behavioral and Health Services Research*. 2006; 33(1):87–104.
- Hesselbrock MN, Meyer RE, Keener JJ. Psychopathology in hospitalized alcoholics. *Archives of General Psychiatry*. 1985; 42(11):1050–1055. [PubMed: 4051682]
- Hoffman C, Crnic KA, Baker JK. Maternal depression and parenting: Implications for children's emergent emotion regulation and behavioral functioning. *Parenting-Science and Practice*. 2006; 6(4):271–295.
- Hser Y, Evans E, Li L, Metchik A, Messina N. Children of treated substance-abusing mothers: A 10-year prospective study. *Clinical Child Psychology and Psychiatry*. 2013
- Jester JM, Jacobson SW, Sokol RJ, Tuttle BS, Jacobson JL. The Influence of Maternal Drinking and Drug Use on the Quality of the Home Environment of School - Aged Children. *Alcoholism: Clinical and Experimental Research*. 2000; 24(8):1187–1197.
- Johnson JL, Leff M. Children of substance abusers: Overview of research findings. *Pediatrics*. 1999; 103(5 Pt 2):1085–1099. [PubMed: 10224196]
- Johnson HL, Nusbaum BJ, Bejarno A, Rosen TS. An ecological approach to development in children with prenatal drug exposure. *American Journal of Orthopsychiatry*. 1999; 69(4):448–456. [PubMed: 10553456]
- Jones AS. Maternal alcohol abuse/dependence, children's behavior problems, and home environment: Estimates from The National Longitudinal Survey of Youth using propensity score matching. *Journal of Studies on Alcohol and Drugs*. 2007; 68(2):266–275. [PubMed: 17286345]
- Kaplow JB, Curran PJ, Dodge KA. The Conduct Problems Prevention Research Group. Child, parent, and peer predictors of early-onset substance use: A multisite longitudinal study. *Journal of Abnormal Child Psychology*. 2002; 30(3):199–216. [PubMed: 12041707]
- Kendler KS, Aggen SH, Knudsen GP, Roysamb E, Neale MC, Reichborn-Kjennerud T. The structure of genetic and environmental risk factors for syndromal and subsyndromal common DSM-IV axis I and all axis II disorders. *American Journal of Psychiatry*. 2011; 168(1):29–39. [PubMed: 20952461]
- Kendler KS, Neale MC, Kessler RC, Heath AC, Eaves LJ. A population-based twin study of major depression in women. The impact of varying definitions of illness. *Archives of General Psychiatry*. 1992; 49(4):257–266. [PubMed: 1558459]
- Kroll, B.; Taylor, A. *Parental Substance Misuse and Child Welfare*. London: Jessica Kingsley; 2003.
- Lichtenstein P, Yip BH, Bjork C, Pawitan Y, Cannon TD, Sullivan PF, et al. Common genetic determinants of schizophrenia and bipolar disorder in Swedish families: A population-based study. *Lancet*. 2009; 373(9659):234–239. [PubMed: 19150704]
- Luthar SS, Cushing G, Merikangas KR, Rounsaville BJ. Multiple jeopardy: Risk and protective factors among addicted mothers' offspring. *Developmental Psychopathology*. 1998; 10(1):117–136.
- Luthar SS, Sexton CC. Maternal drug abuse versus maternal depression: Vulnerability and resilience among school-age and adolescent offspring. *Developmental Psychopathology*. 2007; 19(1):205–225.
- Marmorstein NR, Iacono WG, McGue M. Alcohol and illicit drug dependence among parents: Associations with offspring externalizing disorders. *Psychological Medicine*. 2009; 39(1):149–155. [PubMed: 18410699]
- McGlade A, Ware R, Crawford M. Child protection outcomes for infants of substance-using mothers: A matched cohort study. *Pediatrics*. 2009; 124(1):285–293. [PubMed: 19564311]
- McKeganey N, Barnard M, McIntosh J. Paying the price for their parents addiction: Meeting the needs of the children of drug-using parents. *Drugs: Education, Prevention, and Policy*. 2002; 9:233–246.

- McLellan AT, Kushner H, Metzger D, Peters R, Smith I, Grissom G, et al. The Fifth Edition of the Addiction Severity Index. *Journal of Substance Abuse Treatment*. 1992; 9(3):199–213. [PubMed: 1334156]
- McLellan AT, Luborsky L, Cacciola J, Griffith J, Evans F, Barr HL, et al. New data from the Addiction Severity Index. Reliability and validity in three centers. *Journal of Nervous and Mental Disease*. 1985; 173(7):412–423. [PubMed: 4009158]
- McLoyd VC. The impact of economic hardship on black families and children: psychological distress, parenting, and socioemotional development. *Child Development*. 1990; 61(2):311–346. [PubMed: 2188806]
- Messinger DS, Bauer CR, Das A, Seifer R, Lester BM, LaGasse LL, et al. The maternal lifestyle study: Cognitive, motor, and behavioral outcomes of cocaine-exposed and opiate -exposed infants through three years of age. *Pediatrics*. 2004; 113:1677–1685. [PubMed: 15173491]
- Miller BA, Smyth NJ, Mudar PJ. Mothers' alcohol and other drug problems and their punitiveness toward their children. *Journal of Studies on Alcohol and Drugs*. 1999; 60:632–642.
- Moffitt TE, Harrington H, Caspi A, Kim-Cohen J, Goldberg D, Gregory AM, et al. Depression and generalized anxiety disorder: Cumulative and sequential comorbidity in a birth cohort followed prospectively to age 32 years. *Archives of General Psychiatry*. 2007; 64(6):651–660. [PubMed: 17548747]
- Nunes EV, Weissman MM, Goldstein RB, McAvay G, Seracini AM, Verdelli H, et al. Psychopathology in children of parents with opiate dependence and/or major depression. *Journal of the American Academy of Child & Adolescent Psychiatry*. 1998; 37(11):1142–1151. [PubMed: 9808925]
- Patterson, Gerald R. *Coercive family process*. Eugene, OR: Castalia; 1982.
- Peterson L, Gable S, Saldana L. Treatment of maternal addiction to prevent child abuse and neglect. *Addictive Behaviors*. 1996; 21(6):789–801. [PubMed: 8904944]
- Ramchandani P, Psychogiou L. Paternal psychiatric disorders and children's psychosocial development. *Lancet*. 2009; 374(9690):646–653. [PubMed: 19411102]
- Renouf AG, Kovacs M. Concordance between mothers' reports and children's self-reports of depressive symptoms: A longitudinal study. *Journal of the American Academy of Child & Adolescent Psychiatry*. 1994; 33(2):208–216. [PubMed: 8150792]
- Rounsaville BJ, Anton SF, Carroll K, Budde D, Prusoff BA, Gawin F. Psychiatric diagnoses of treatment-seeking cocaine abusers. *Archives of General Psychiatry*. 1991; 48(1):43–51. [PubMed: 1984761]
- Rounsaville BJ, Kosten TR, Weissman MM, Kleber HD. Prognostic significance of psychopathology in treated opiate addicts. A 2.5-year follow-up study. *Archives of General Psychiatry*. 1986; 43(8): 739–745. [PubMed: 3729668]
- Rutter M. Some Focus and Process Considerations Regarding Effects of Parental Depression on Children - Commentary. *Developmental Psychology*. 1990; 26(1):60–67.
- Schempf AH. Illicit drug use and neonatal outcomes: A critical review. *Obstetrical and Gynecological Survey*. 2007; 62(11):749–757. [PubMed: 17925048]
- Schuler ME, Nair P. Witnessing violence among inner-city children of substance-abusing and non-substance-abusing women. *Archives of Pediatrics and Adolescent Medicine*. 2001; 155(3):342–346. [PubMed: 11231799]
- Silk JS, Shaw DS, Skuban EM, Oland AA, Kovacs M. Emotion regulation strategies in offspring of childhood-onset depressed mothers. *Journal of Child Psychology & Psychiatry*. 2006; 47(1):69–78. [PubMed: 16405643]
- Smith DK, Johnson AB, Pears KC, Fisher PA, DeGarmo DS. Child maltreatment and foster care: Unpacking the effects of prenatal and postnatal parental substance use. *Child Maltreatment*. 2007; 12(2):150–160. [PubMed: 17446568]
- Steinhausen HC, Mas SD, Ledermann C, Metzke CW. Risk factors for the development of emotional and behavioural problems in children born to drug-dependent mothers. *European Child & Adolescent Psychiatry*. 2006; 15(8):460–466. [PubMed: 16964454]

- Substance Abuse and Mental Health Services Administration (DHHS/PHS) Office of Applied Studies. The NSDUH Report: Children Living with Substance-Dependent or Substance-Abusing Parents: 2002 to 2007. RTI International; 2009. p. 4
- Substance Abuse and Mental Health Services Administration (HHS). Results from the 2011 National Survey on Drug Use and Health: Mental Health Findings. RTI International; 2012.
- Suchman NE, Luthar SS. Maternal addiction, child maladjustment and socio-demographic risks: Implications for parenting behaviors. *Addiction*. 2000; 95(9):1417–1428. [PubMed: 11048359]
- Tein JY, Roosa MW, Michaels M. Agreement between Parent and Child Reports on Parental Behaviors. *Journal of Marriage and the Family*. 1994; 56(2):341–355.
- VanDeMark NR, Russell LA, O'Keefe M, Finkelstein N, Noerher CD, Gampel JC. Children of mothers with histories of substance abuse, mental illness, and trauma. *Journal of Community Psychology*. 2005; 33(4):445–459.
- Walden B, Iacono WG, McGue M. Trajectories of change in adolescent substance use and symptomology: Impact of paternal and maternal substance use disorders. *Psychology of Addictive Behaviors*. 2007; 21(1):35–43. [PubMed: 17385953]
- Wakschlag LS, Hans SL. Relation of maternal responsiveness during infancy to the development of problem behaviors in high-risk youths. *Developmental Psychology*. 1999; 35:569–579. [PubMed: 10082027]
- Weissman MM, McAvay G, Goldstein RB, Nunes EV, Verdelli H, Wickramaratne PJ. Risk/protective factors among addicted mothers' offspring: A replication study. *American Journal of Drug and Alcohol Abuse*. 1999; 25(4):661–679. [PubMed: 10548441]
- Whitaker RC, Orzol SM, Kahn RS. Maternal mental health, substance use, domestic violence in the year after delivery and subsequent behavior problems in children at age 3 years. *Archives of General Psychiatry*. 2006; 63(5):551–560. [PubMed: 16651512]
- Wilens TE, Biederman J, Kiely K, Bredin E, Spencer TJ. Pilot study of behavioral and emotional disturbances in the high-risk children of parents with opioid dependence. *Journal of the American Academy of Child and Adolescent Psychiatry*. 1995; 34(6):779–785. [PubMed: 7608052]
- Zahn-Waxler C, Klimes-Dougan B, Slattery MJ. Internalizing problems of childhood and adolescence: prospects, pitfalls, and progress in understanding the development of anxiety and depression. *Developmental Psychopathology*. 2000; 12(3):443–466.

Table 1

Characteristics of Mothers and Children According to Mothers' Diagnoses

	Psychoses/ Bipolar n=73	Depression/ Anxiety/Others n=111	Drug/Alcohol Only n=212
Maternal measures			
Age at follow-up (SD)	37.3 (6.7)	38.9 (6.8)	38.6 (6.6)
Ethnicity, %			
White	60.3	51.4	50.5
Hispanic	16.4	25.2	27.8
Black	17.8	17.1	15.6
Asian/others	5.5	6.3	6.1
Education (>High school), %	63.0	67.6	65.1
Marital status, %			
Married	34.3	22.5	32.1
Never married	34.3	31.5	31.1
Divorced, widowed, separated	31.5	46.0	36.8
Employed, % **	20.8	42.3	39.2
Receiving public assistance, % **	74.0	58.6	52.4
Number of all children (SD)	3.5 (1.9)	3.8 (2.1)	3.8 (2.1)
Number of children under 18 (SD)	2.7 (1.9)	2.7 (1.6)	2.7 (1.6)
Psychiatric diagnoses, %			
Adjustment	20.6	40.5	0
Anxiety	28.8	28.8	0
Depression	53.4	59.5	0
Bipolar	82.2	0	0
Psychotic	34.2	0	0
Child measures			
Age (SD)	10.7 (3.3)	10.8 (3.1)	10.0 (3.2)
Gender: girls, %	45.2	43.2	49.5
Children problem behavior, %			
Internalizing **	27.9	18.7	10.2
Externalizing	32.4	25.2	20.0

* p<0.05;

** p<0.01

Table 2

Maternal drug use, psychiatric symptoms, and family/social relationships according to Mothers' Diagnoses

	Psychoses/ Bipolar	Depression/ Anxiety/Others	Drug/Alcohol Only
Drug use			
Primary drug, %			
Alcohol	15.1	22.5	13.7
Cocaine	8.2	10.8	7.1
Heroin	8.2	11.7	14.6
Marijuana	9.6	7.2	9.4
Methamphetamine	48.0	40.5	44.8
Others	11.0	7.2	10.4
Age first use primary drug	16.6 (5.4)	17.0 (5.9)	18.1 (6.2)
Alcohol use to intoxication in the past 30 days, %	24.7	24.6	21.7
Use illicit drugs in the past 30 days, % *	49.3	40.5	32.6
Psychiatric symptom, %			
Received pension for psychiatric problems **	31.5	14.4	0.9
Psychiatric medications in past 30 days **	45.2	20.7	7.1
Psychiatric symptoms in past 30 days			
Serious depression **	42.5	22.5	12.7
Serious anxiety **	53.4	43.2	24.6
Trouble understanding, concentrating, or remembering **	60.3	44.1	30.7
Trouble controlling violent behavior *	11.0	5.4	2.8
Serious thoughts of suicide	0.0	1.8	0.9
Prior inpatient psychiatric treatment, % **	54.8	26.1	9.0
Prior outpatient psychiatric treatment, % **	84.3	65.5	31.3
Family/Social Relationships, %			
Living arrangements			
Homeless	0.0	1.8	1.4
Dependent living	5.5	2.7	1.9
Independent living	94.5	95.5	96.7
Satisfied with the living arrangement in past 3 years	67.1	72.1	79.4
Having children living with others by court order	20.6	16.2	15.1
Had serious conflicts with family in past 30 days *	27.4	22.5	14.2
Had serious conflicts with non-family in past 30 days	7.5	6.0	3.0
Troubled by family problems in past 30 days *	26.0	25.2	15.1
Troubled by social problems in the past 30 days **	32.9	26.1	14.6

* p<0.05;

** p<0.01

Table 3

Logistic Regression, Child Internalizing and Externalizing

	Maternal Depression/Anxiety/Other vs. Drug/Alcohol only				Maternal Psychoses/Bipolar vs. Drug/Alcohol only			
	Internalizing		Externalizing		Internalizing		Externalizing	
	OR	95%CI lower upper	OR	95%CI lower upper	OR	95%CI lower upper	OR	95%CI lower upper
Child characteristics								
Age	0.896	0.791 1.015	0.981	0.892 1.078	0.898	0.783 1.03	0.922	0.825 1.029
Male	1.125	0.567 2.229	1.292	0.735 2.272	1.903	0.896 4.044	1.35	0.729 2.499
Hispanic (vs. white)	1.306	0.596 2.86	0.808	0.412 1.585	1.125	0.456 2.776	0.496	0.219 1.125
Black (vs. white)	0.719	0.248 2.086	0.877	0.394 1.952	0.718	0.247 2.086	0.766	0.327 1.799
Asian/others (vs. white)	0.394	0.048 3.251	0.21	0.026 1.682	0.676	0.121 3.772	0.608	0.15 2.473
Maternal characteristics								
Education (high school)	1.347	0.627 2.893	0.81	0.443 1.481	0.599	0.273 1.31	0.62	0.322 1.195
Employed	1.163	0.57 2.374	0.991	0.547 1.798	1.023	0.422 2.478	0.805	0.391 1.654
Use drugs in past 30 days	1.59	0.785 3.221	1.05	0.578 1.908	2.257*	1.036 4.913	1.676	0.876 3.209
Family problems in past 30 days	1.607	0.744 3.468	3.186	1.688 6.011	2.347*	1.043 5.282	3.885***	1.924 7.846
Comorbid mental disorder	2.008*	1.008 4.001	1.19	0.664 2.133	3.412**	1.542 7.551	1.411	0.7 2.844

* p<0.05;

** p<0.01;

*** p<0.001