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Risk for Behavior Problems in Children of Parents with Substance Use Disorders

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Introduction

Children of parents with alcohol and drug disorders are at risk for externalizing (Bornovalova, Hicks, Iacono, & McGue, 2010; Marmorstein, Iacono, & McGue, 2009) and internalizing problems (Eiden, Molnar, Colder, Edwards, & Leonard, 2009). A number of environmental mechanisms may underlie this risk, including exposure to impaired parenting, family conflict, and high levels of life stress (Kumpfer, Alvarado, & Whiteside, 2003). Additionally, parents with substance use disorders (SUDs) may have co-occurring internalizing and externalizing disorders that are transmitted to their children via shared genetic factors. Furthermore, although children's externalizing and internalizing problems are correlated (Cui, Donnellan, & Conger, 2007), there may be different risk pathways underlying development of such symptoms among children of parents with SUDs. Discerning the potentially different pathways into risk for such problems may aid in informing specific efforts to prevent such behavior problems in the offspring of parents with SUDs.

Risk for Externalizing Behavior Problems

Children of parents with SUDs may be at risk for externalizing problems because their parents pass on a "general vulnerability" to a broad spectrum of externalizing disorders (p. 922; Hicks, Krueger, Iacono, McGue & Patrick, 2004), as common genetic factors link conduct disorder, antisocial personality disorder, and alcohol and drug use disorders (Kendler, Jacobson, Prescott, & Neale, 2003). Additionally, the heritability of externalizing spectrum disorders might be a stronger predictor when examining clinical levels of outcomes rather than continuous symptoms (Rhee, Hewitt, Young, Corley, Crowley, & Stallings, 2003). Therefore, we hypothesize the strongest link between parental SUDs and adolescent externalizing outcomes when using problems, rather than number of symptoms.

In addition to genetic risk, parental SUD may also contribute to the development of externalizing problems by disrupting the home environment. For example, substance use may interfere with caregivers' abilities to maintain supportive parent-child interactions (Hayward, Depanfilis, & Woodruff, 2010), which impacts children's ability to internalize/respond to requests for desirable behavior (Grusec & Goodnow, 1994). Although parental

SUDs, parenting, and externalizing problems are associated (Mayes & Truman, 2002), to our knowledge no studies have examined parental consistency of support as a mediator of the relation between parental SUDs and child externalizing problems.

Parents' recovery status may impact the relation between parental SUD and child externalizing problems. For example, children of recovered alcoholics may not be as severely affected as children of current alcoholic parents (Delucia, Belz, & Chassin, 2001), because parenting may improve with recovery from SUD. However, other data show large significant effects of both historical and current parent alcoholism on child externalizing problems (Hussong, Huang, Curran, Chassin, & Zucker, 2010).

To the extent that SUDs pose risk for externalizing disorders through heritable factors, we expect elevated risk for children of parents with both current and recovered SUDs. On the other hand, to the extent that parent SUDs contribute to children's externalizing disorders by impairing current parenting practices, such as providing less consistent parental support, problems may only be elevated for children of parents with current SUDs. Prior literature has not tested whether children of parents with recovered SUDs and those of parents with current SUDs are at risk for externalizing problems via the same pathway. We hypothesized that children of parents with recovered SUDs would be at heightened risk for externalizing problems, compared to those whose parents were never diagnosed, regardless of level of parental support, due to inherited risk for externalizing disorders. For children of parents with current SUD, we expected an additional risk pathway due to the dual factors of less consistent parental support and inherited risk. That is, children of parents with current SUD would also demonstrate increased risk for externalizing problems, compared to those whose parents were never diagnosed, via less consistent parental support.

Risk for Internalizing Behavior Problems

Although some have found that children of parents with SUDs may be at risk for internalizing problems (Ohannessian, Hesselbrock, Kramer, Kuperman, Bucholz, Schuckit, & Nurnberger, 2004), support for this link has not been universal (Brennan, Hammen, Katz, & Le Brocque, 2002). Genetic factors influence transmission of internalizing behavior problems, yet much of the variance in internalizing disorders is left unexplained by genetic factors (Ehringer, Rhee, Young, Corley, & Hewitt, 2006). Thus risk for internalizing problems among children of parents with SUDs may be more influenced by impaired family environment. Parental substance use may interfere with parents' abilities to remain warm during parent-child interactions (Hayward et al., 2010). Given that children internalize experiences with their caregivers and form "working models" to guide their interactions with the world around them (Dixon, Hamilton-Giachrits & Browne, 2005), less nurturing parenting may disrupt children's sense of security and increase risk for later depression (Hale, Engels, & Meeus, 2006). Therefore, children of parents with current SUDs may be at heightened risk for internalizing problems through exposure to less consistent parental support.

Since internalizing problems may be particularly linked to the current quality of relationships with parents, risk for internalizing behavior problems may be higher among children of parents with current, rather than prior, SUD. Indeed, Andreas and O'Farrell

(2007) found that children's internalizing behavior increased with parents' increased drinking. Yet Hussong, Cai, Curran, Flora, Chassin, and Zucker (2008) found few proximal effects of parent alcoholism on internalizing problems beyond distal influences, and others have not distinguished between current and recovered SUD. Given this prior literature, the present study hypothesized that children of parents with current SUDs would be at heightened risk for internalizing problems (via less consistent parental support), compared to those whose parents were never diagnosed. The current study makes no such hypothesis about risk for internalizing problems among children of parents with recovered SUDs.

Possible Confounders

Because the current study was interested in unique influences of parents' current versus recovered SUD, it was important to rule out potentially confounding "third variables" that are related to recency and may explain these effects. Constructs related to group differences on other parent SUD variables, parenting constructs, and parent other psychopathology may also influence relations among study constructs and thus will be used as covariates.

Variables related to group differences on other parent SUD variables may influence relations among parental consistency of support, and child internalizing and externalizing behavior problems. Specifically, severity of parent mental health problems is linked to child functioning (Hammen, & Brennan, 2003), and those with multiple problems are more likely to endorse greater severity of problems (Kessler, Chiu, Demler, & Walters, 2010). Therefore, it may be that those with more severe SUDs (i.e. who have more lifetime substance use symptoms) or comorbid SUDs may be less likely to recover and it might be severity and/or comorbidity rather than recovery that predicts child behavior problems. Additionally, prenatal exposure to substances is associated with less consistent support and behavior problems, and may be more likely among parents with current as opposed to recovered SUDs (Thornberry, Freeman-Gallant, Lizotte, Krohn, & Smith, 2002). Finally, although unstudied, parents' length of time in recovery from a SUD and/or child age at time of parental recovery may influence caregiving and child outcomes.

Next, other forms of impaired parenting such as inconsistent discipline/rule enforcement is associated with less consistent support and child behavior problems, and may be more likely among parents with current as opposed to recovered SUDs (Thornberry et al., 2002). Finally, parent other mental health problems may influence relations among study variables. Specifically, parents with current SUDs may be more likely to meet criteria for Anxiety, Depression, and Antisocial Personality Disorder, which influence caregiving and child behavior (Clark, Cornelius, Wood, & Vanyukov, 2004; Preuss, Schuckit, Smith, Barnow, & Danki, 2002). Therefore, in these cases, it may be other parenting constructs or parent other psychopathology, rather than parental recovery that influences consistency of parental support and child behavior problems.

The Current Study

The current study tested the unique effects of parental recovered and current SUDs on children's externalizing and internalizing problems, mediated by impairments in consistency of support. This study extends prior work by examining whether parental consistency of

support mediates the effects of parental recovered and current SUDs on internalizing and externalizing problems. This study adds to existing literature by prospectively examining the unique effects of parent current versus recovered SUD on consistency of support and child behavior problems, over and above SUD severity, comorbidity, time in recovery from SUD, age at time of parental recovery, prenatal exposure to substances, parental consistency of discipline/rule enforcement, and earlier levels of internalizing and externalizing behavior problems.

Given these aims, the current study has several hypotheses. First, it was predicted that children of parents with current SUDs will show clinical elevations in both internalizing and externalizing symptoms. Second, children of parents with recovered SUDs will show clinical elevations in externalizing, but not internalizing symptoms. Third, consistency of parental support will mediate the effect of parent current SUDs on internalizing and externalizing problems; however, no such mediational effect will be found for parent recovered SUD on child externalizing problems. Finally, these effects will hold over and above covariates.

Method

Participants

Participants ($N = 567$) were drawn from a larger, ongoing longitudinal study of familial alcoholism across three generations (G1s, G2s, and G3s) from a metropolitan area in the Southwest United States between 1988 and 2010. This study utilized data from these 567 G3 children whose parents were interviewed at Wave 5 and/or whose teachers provided data on them at Wave 6 of the larger six-wave project (Waves 5 and 6 were the waves at which G3 data were collected). Of the included G3s, 45.6% were female, 65.0% were non-Hispanic Caucasian, 29.1% were Hispanic, and 5.9% identified as some other race/ethnicity. The average age of G3s in this subsample at the first of these waves (Wave 5) was 6.95 years old (range: 6–13), and 33% had at least one parent with a SUD at Wave 5.

Recruitment

Recruitment of the original sample is described in detail elsewhere (Author et al., 1992). Families including children of alcoholics (COAs) were recruited using court records, health maintenance organization (HMO) questionnaires, and community telephone screenings. DSM-III diagnoses of lifetime parental alcohol abuse or dependence for the original G1 parents were made during a structured diagnostic interview using the DIS-III (Robins, Helzer, Croughan, & Ratcliff, 1981). Of the original G1 parents, 219 biological fathers and 59 biological mothers met DSM-III criteria for alcoholism. Control families were matched on the child's age, family composition, ethnicity, and socioeconomic status. Additionally, neither biological nor custodial parent met DSM-III or FH-RDC lifetime diagnosis of alcohol abuse or dependence.

Recruitment Biases

The two main potential sources of recruitment biases for the larger longitudinal study were selective contact and refusal to participate. Potential participants who were not successfully

contacted were more likely to be from court sources, younger, unmarried, Hispanic, and lower SES. Individuals who refused to participate did not differ from those who participated on SES, age, sex, or alcohol diagnosis, but were more likely than participants to be married and Hispanic.

For the current study analyses, the data of G3 children whose parents were interviewed and provided consistency of support information at Wave 5 and/or whose teachers were interviewed and provided information on internalizing and externalizing problems at Wave 6, were included (N=567). See Figure 1 for more information about those who were included in, and excluded from, the current study.

Regarding potential bias resulting from missingness, parent substance use diagnosis data missingness was unrelated to child gender, age, or in utero exposure to substances. Missingness on parent report of consistency of support at Wave 5 was associated with a lower likelihood of parent other psychopathology ($r=-.117$, $p<.05$), but was not associated with child gender, age, in utero exposure to substances, time elapsed since parent diagnosis, child age since parent diagnosis, or parent comorbid SUD. Missingness on teacher report of internalizing/externalizing problems at Wave 6 was associated with younger child age ($r=.321$; $p<.001$), but not with child gender, in utero exposure to substances, parent other psychopathology, time elapsed since parent diagnosis, child age at time of parent diagnosis, or parent comorbid SUD. This association between older adolescent age and presence of teacher report data was predicted, as G3s had to be at least 11 years old at Wave 6 to have a teacher report on them. Despite these few significant differences, all of these significant effects of missingness were small in magnitude (Cohen, 1992), so they likely had little bias in impacting analyses.

Procedure

Computer-assisted interviews were conducted at the family's home or the university campus. Parents provided informed consent and children provided assent. All procedures met Institutional Review Board (IRB) requirements for protection of human subjects, as well as participation by children, women, and members of minority groups.

Measures

G3 demographics—G3s reported on their age and gender (dummy coded females=−.5, males=.5), and these variables were used as covariates.

Severity of parent SUD—At Wave 5, severity of parent SUD was assessed via number of lifetime dependence symptoms using 21 items from the Diagnostic Interview Schedule (C-DIS; Robins et al., 1981). The range was between 0–11 endorsed.

Parental depression, anxiety, and antisocial personality disorder—At Wave 5, parent DSM-III-R lifetime Major Depression, Anxiety Disorder (social phobia, panic disorder, or generalized anxiety), and Antisocial Personality Disorder were assessed with the Diagnostic Interview Schedule (C-DIS; Robins, et al., 1981). In terms of these parent other psychopathology diagnoses, 27%, 19.7%, and 4.3% of G3s had at least one parent meeting

criteria for depression, anxiety, and ASPD, respectively. Those with a caregiver meeting criteria for one or more of these disorders were coded “.5” and those who did not have a caregiver meeting any of these criteria were coded “-.5.” Collapsing across parent diagnoses resulted in 35.7% of adolescents being classified as having a parent with at least one of these other psychopathology diagnoses.

Parent comorbid substance use disorder—At Wave 5, using DSM-III-R alcohol, marijuana, cocaine, opiates, hallucinogens, inhalants, amphetamines, sedatives, and Phencyclidine (PCP) diagnoses, we determined if parents ever met SUD criteria for at least two substances.

Time in recovery—Parents who had ever been diagnosed with a SUD by Wave 5 indicated the most recent age at which they had experienced a symptom. We subtracted parents’ current age from the most recent age at which they met this criteria, which provided length of time individuals had been in recovery. If parents met diagnostic criteria for more than one substance or the adolescent had two parents with SUDs, the smallest time in recovery was used. Time in recovery ranged from 0–12 years.

Child Age at Time of Parent Recovery—We subtracted the child’s age from the amount of time since the parent experienced an alcohol- or drug-related symptom. Child age at time of parent recovery ranged from 0 (if the parent recovered before the child was born) to 10 years old.

Prenatal substance use exposure—Maternal substance use during pregnancy was assessed with questions asking how often the biological mother drank, smoked cigarettes and used illicit drugs while pregnant with the child. Response options ranged from 0 (not at all) to 7 (everyday) and for alcohol, how many drinks they had on average when they did drink. For ease of interpretation, responses on these three variables were dichotomized into one variable capturing whether the mother used any substance at all (i.e. at least “occasionally, but less than once a month” for any substance). Those whose parents indicated that the mother had used one or more substances at least “occasionally” during pregnancy were given a score of “.5” and those whose did not were given a score of “-.5.” Of those reporting some substance use during pregnancy (parents of 14.8% of children), on average mothers drank alcohol occasionally but less than once a month and when they drank, they had about two drinks. These same mothers smoked on average 1–4 cigarettes a day and used illegal drugs occasionally but less than once a month.

Parental consistency of discipline/rule enforcement—At Wave 5, G2 parents reported on the consistency of discipline (e.g. “usually didn’t find out about child’s misbehavior”) and rule enforcement (e.g. “sometimes allowed child to do things s/he said were wrong”) they provided from the Children’s Report of Parental Behavior Inventory (Schaefer, 1965). Because of the relation between mother and father consistency of rule enforcement/discipline ($r=.390$, $p<.001$), if both parents reported this information, an average was computed. Internal consistency for the mother and father report items was .811.

Perceived parental consistency of support¹—At Wave 5, G2 parents reported on their consistency of support using 2 items from the Network of Relations Inventory (Furman & Burmeister, 1985; e.g., “How much can your child count on you to be there no matter what?”). Because of the relation between G3 report of mother and father support ($r=.377$, $p<.001$), if G3s reported on both parents, an average was computed.

G3 externalizing and internalizing problems²—At Wave 6, teachers reported on G3s’ externalizing and internalizing symptomatology using items from Achenbach’s Teacher Report Form (Achenbach, & Rescorla, 2001). Researchers have found that teachers’ reports of child behavior have good criterion validity (Young et al., 2009).

Rule-breaking (e.g. swears) and aggressive behavior (e.g. explosive) items were summed to form the externalizing score. Anxiety/depression (e.g. cries a lot), withdrawal/depression (e.g. enjoys little), and somatic complaints (e.g. nausea without medical condition) items formed the internalizing score. Response options were 0 (not true), 1 (sometimes true), or 2 (very often true). Internal consistencies were .921 for externalizing and .903 for internalizing.

Past research has found that DSM diagnoses were better predicted by a variable capturing if individuals exceeded clinical cut offs (those scoring at or above the 98th percentile), compared to a continuous symptom count (Achenbach & Dumenci, 2001). This suggests that there is a clinically meaningful difference in terms of impairment between those in the top 2% on behavior problems and those not in this top tier. Therefore, Achenbach and Rescorla’s (2001) criteria for exceeding internalizing and externalizing clinical cut offs was used. We therefore classified those who scored at or above the 98th percentile for their age and gender as displaying internalizing or externalizing problems (and assigned them a score of 1 on the clinical cut-off variables). Those who were below this threshold received a score of 0.

In order to have more confidence that the effects of consistency of parental support in prospectively predicting internalizing and externalizing behavior problems, we used parent reported child internalizing and externalizing behavior problems from Wave 5 as a covariate. Specifically for externalizing problems, we computed a mean of 8 mother- and 8 father-reported items comprising the Disruptive Behavior Rating Scale (DBRS; Barkley & Murphy, 1998; e.g. “argues with adults,” “loses temper”). For internalizing problems, we computed a mean of 16 mother- and 16 father-reported items comprising the Child Behavior Checklist-Anxiety (CBCL-A; Kendall, Henin, MacDonald, & Treadwell, 1998; e.g. “fearful or anxious,” stomach aches,” shy or timid”). Internal consistencies were .889 and .851 for externalizing and internalizing symptoms, respectively.

G2 parent substance use diagnoses³—The DSM-III-R, which was current at the time of the G2 assessment, was used to diagnose alcohol and eight classes of drug disorders. Parent DSM-III-R alcohol and drug disorders were assessed with self-report on the

¹25.6% of study participants were missing data on Wave 5 consistency of parental support.

²18.7% of participants were missing data on Wave 6 teacher report of externalizing and internalizing problems.

³8% of participants had parents with missing data on Wave 5 substance use diagnosis variables (i.e. the two dummy coded variables).

Computerized Diagnostic Interview Schedule (C-DIS; Robins et al., 1981). These classes of drugs are marijuana, cocaine, opiates, hallucinogens, inhalants, amphetamines, sedatives, and Phencyclidine (PCP). Substance Use Disorders from the FH-RDC have been found to have good predictive (Afful, Strickland, Cottler, & Bierut, 2011) and discriminant validity (Fein & Colin, 2011). Of the parents who had ever been diagnosed with a SUD, 42% met criteria for alcohol abuse/dependence, 29% for marijuana abuse/dependence, 17% for amphetamine abuse/dependence, and 12% for cocaine abuse/dependence. Ten percent or less of those with a current or recovered SUD met criteria for abuse/dependence of hallucinogens, opiates, sedatives, PCP, and inhalants.

Two dummy codes were created to compare three groups, those who: 1). had never been diagnosed with a SUD, 2). had at one time been diagnosed with a SUD but had no symptoms in the past year, and 3). had been diagnosed with a SUD, and had experienced at least one symptom in the past year. The first dummy code assigned a value of “0” to the never diagnosed and current groups, and a “1” to the recovered group. The second dummy code assigned a value of “0” to the never diagnosed and recovered groups, and a “1” to the current group. The first dummy code compared those whose parents had never been diagnosed to those whose parents had recovered from a SUD and the second dummy code compared those whose parents were never diagnosed to those with a current SUD.

Comparison of These Three Groups on Confounders

In an effort to characterize and compare participants in the three groups (children whose parents were never diagnosed, had a recovered SUD, had a current SUD), we conducted t-tests, Analyses of Variance (ANOVAs), and Chi Square tests on potential confounding variables. There were significant differences among groups on parent severity (lifetime symptoms), time in recovery, age of child at time of parent recovery, consistency of discipline/rule enforcement, prenatal exposure to substances, and parental other (i.e. Depression, Anxiety and ASPD) psychopathology. There were also differences between groups on percent meeting criteria for alcohol, amphetamines, sedatives, marijuana, cocaine, hallucinogens, and comorbid drug diagnoses. There were no differences among the groups on age, gender, or opiate, PCP or inhalant diagnoses. For additional information on these comparisons, see Table 1.

Data Analytic Plan

The current study sought to determine whether children of parents with current and recovered SUDs were at risk for internalizing and externalizing problems. It also sought to uncover by what mechanisms parent SUDs were related to child behavior problems. We were additionally interested in examining these effects over and above a number of confounders. We used path analysis with logistic regression and mediation, which is the most efficient method of answering current study questions with manifest variables (MacKinnon, 2008). Logistic models were chosen to accommodate the dichotomous outcomes (internalizing and externalizing problems) and the continuous mediator (consistency of parental support).

Models were tested using MPlus version 6 (Muthén & Muthén, 1998–2011). Because participants were nested within families, standard errors were adjusted for non-independence of observations using the complex function. Missing data on endogenous variables were estimated as a function of the observed exogenous variables under the missingness at random assumption (Schafer & Graham, 2002). Although, as Shafer and Graham point out, there is no way to test whether missing at random holds in a dataset without following-up with non-responders, it is possible to examine whether earlier values on a construct predict missingness on that same construct at the next time point (which would suggest a missing not a random pattern). Using variables from the larger dataset, we did not find a significant association between earlier (Wave 4) parent substance use diagnosis and later (Wave 5) missing parent SUD data ($p=.240$). We also did not find that Wave 5 child internalizing and externalizing symptoms were associated with a greater likelihood of missing data on these behavior problems at Wave 6 ($p=.984$ for internalizing; $p=.446$ for externalizing). Therefore, it seems likely that our data are missing at random.

The final model was assessed for goodness of fit using the following fit statistics and their accompanying conventions indicating good fit: Comparative Fit Index (CFI): .95, Root Mean Square Error of Approximation (RMSEA) .06, and Weighted Root Mean Square Residual (WRMR) $<.08$ (Hu & Bentler, 1999; Yu & Muthén, 2002). The mediated effects of parent SUD on child internalizing and externalizing problems through consistency of parental support was tested using Model Indirect and bootstrapped standard errors in Mplus.

Results

Correlations

We began by examining correlations among study variables. See Table 2 for Pearson (between two continuous variables), tetrachoric (two dichotomous variables), and biserial (dichotomous and continuous variables) correlations. Because the recency of parent SUD was represented by two dummy coded variables, all correlations involving one of the dummy coded variables controlled for the effect of the other so that they were interpretable. All correlations not involving one of the dummy codes were zero-order correlations.

Generally, the correlations between and among predictors and outcome variables were as expected. Specifically, children of parents with a current SUD were at higher risk for externalizing and internalizing problems, compared to those whose parents had not been diagnosed. Children whose parents had a recovered SUD were more likely to display externalizing problems, compared to those whose parents had never been diagnosed. However, the relation between parental recovered SUD and internalizing problems was non-significant. Parents with a current SUD provided less consistent support to their children, but parental consistency of support was not related to parent recovered SUD. Also, less consistent support was related to higher risk for externalizing and internalizing problems. Finally, adolescents with externalizing problems were more likely to display internalizing problems as well.

Final Model: Effects of Parent Current and Recovered SUDs

Results of the final model are presented in Table 3. Fit statistics generally indicate good fit to the data, CFI: .980; RMSEA: .043; WRMR: .072. Because we wanted to rule out the possibility that the effects of parental recovered versus current SUD could be explained by other factors, we entered parent number of lifetime symptoms, other psychopathology, prenatal substance exposure, and consistency of discipline/rule enforcement as covariates. Although whether individuals met the 98th percentile cutoff on externalizing and internalizing behavior depended on how “high” they scored relative to their age- and gender-mates, we wanted to ensure that age and gender did not explain additional variance in behavior problems, so we included them as covariates. All non-significant interactions were trimmed from the models. Although only child age, parent number of lifetime symptoms, and consistency of discipline/rule enforcement were significant predictors of parental support or internalizing or externalizing problems, all main effect covariates were included in the model.

For externalizing problems, children whose parents had a recovered SUD were more likely to display externalizing problems, compared to those whose parents were never diagnosed. Additionally, children whose parents had a current SUD were more likely to display externalizing problems, compared to those whose parents were never diagnosed. Children with parents who provided less consistent support were more likely to display externalizing problems.

For internalizing problems, children whose parents had a current SUD were more likely to display internalizing problems, compared to those whose parents were never diagnosed. However, children of parents with a recovered SUD did not differ from those whose parents were never diagnosed. Additionally, more support predicted less risk for internalizing problems, and there was a trend such that younger children were more likely to display internalizing problems.

Parents with more lifetime substance use symptoms reported providing less consistent support to their children. Additionally, parents who provided more consistent discipline/rule enforcement were also more likely to provide more consistent support. Finally, parents who were currently diagnosed with a SUD reported providing less consistent support to their children, compared to children of parents who were never diagnosed.

Additional Covariate Analyses

We had planned to examine whether study findings held over comorbid SUDs, but because comorbid SUDs and severity were highly correlated ($r=.634$), their effects had to be tested in separate models. Comorbid SUD was a marginally significant predictor of externalizing problems ($\beta=.132$, $p<.1$), but did not predict consistency of support ($\beta=-.126$, $p=NS$) or internalizing problems ($\beta=.097$, NS). These findings indicate that offspring of parents who have more than one SUD are at greater risk for externalizing, but not internalizing, problems, and that parent comorbid SUD is not uniquely related to the consistency of support caregivers provide. Main study findings did not change when we substituted

comorbid SUDs for lifetime symptoms in the prediction of parental consistency of support and child behavior problems.

We also tested whether parent amount of time in recovery from a SUD and child age at time of recovery impacted parenting and child behavior problems. However, children of parents who had never been diagnosed did not have scores on these variables, so we were unable to test them and the two dummy codes capturing parental SUD as competing predictors of parenting and/or child behavior. We tested whether associations between parental consistency of support and child behavior problems held over and above time in recovery and child age at time of parent recovery and all other possible confounders. Consistency of support remained a significant predictor of externalizing ($\beta = -.235$, $p < .01$) and internalizing problems ($\beta = -.190$, $p < .05$) over and above these additional, and main study covariates.

Mediation Analyses

In testing whether the effects of parent current and recovered SUD on externalizing and internalizing problems were mediated by parents' consistency of social support, we used Model Indirect and bootstrap confidence intervals in Mplus. The bias-corrected bootstrap procedure provides more accurate confidence limits and largest statistical power for indirect effects (MacKinnon, Lockwood, & Williams, 2004). These methods provide the 95% confidence intervals for the mediated effect. If the confidence interval included zero, we concluded that the mediated effect was not significant, but if it did not include zero, we concluded that it was significant. Because it is possible to have a significant indirect effect without a significant overall relation (MacKinnon, Fairchild, & Fritz, 2007), even if the effect of the predictor on the outcome is non-significant, it is still possible that the indirect effect (i.e. the effect of the predictor on the outcome through the mediator) may be significantly different from zero. Therefore, even in cases where parental SUD did not significantly predict child behavior problems directly, we still examined the indirect effects through parental consistency of support.

Parent recovered SUD—We first tested whether perceived parental consistency of support mediated the relation between parent recovered SUD and externalizing problems. Although parent recovered SUD did not predict parental support, consistency of support predicted externalizing problems, resulting in a confidence interval of $[-.009-.01]$ for $p < .1$ which does include zero. We conclude that perceived parental consistency of support does not mediate the relation between parent recovered SUD and externalizing problems (p not $< .1$).

In testing whether consistency of support mediated the relation between parent recovered SUD and internalizing problems, parent recovered SUD did not predict parental support. Consistency of support predicted internalizing problems, and the confidence interval of this mediated effect was $[-.007-.008]$. Because this interval includes zero, consistency of support does not mediate the effect of parent recovered SUD on internalizing problems (p not $< .1$).

Parent current SUD—We next tested whether perceived parental consistency of support mediated the relation between parent current SUD and externalizing problems. Parent

current SUD predicted parental support, which predicted externalizing problems, and the confidence interval of this mediated effect was [.007–.056] for $p < .05$. Because the confidence interval for $p < .05$ does not include zero, we conclude that perceived parental consistency of support is a significant mediator of parent current SUD on externalizing problems ($p < .05$).

In testing whether perceived consistency of support mediated the relation between parent current SUD and internalizing problems, parent current SUD predicted parental support, which predicted internalizing problems. The confidence interval of this mediated effect was [.005–.041] at the $p < .05$ level. Because the confidence interval for $p < .05$ does not include zero, consistency of support is a significant mediator of parent current SUD on internalizing problems at $p < .05$.

Alternative Analyses

Predicting Continuous Child Symptomatology—We chose clinical levels of symptomatology and parent psychopathology diagnoses to maximize clinical relevance, and because of our hypothesis about the link between parental SUD and offspring behavior problems (as opposed to the count of symptoms). To test whether the same effects would be found with number of symptoms, we re-analyzed the data using number of externalizing and internalizing symptoms as the outcomes. Using Poisson regression in SPSS, we found that all but one effect shown in Table 3 remained; recovered SUD became a non-significant predictor of externalizing behavior. For externalizing behavior, only parent current SUD and perceived parental support were significant predictors. For internalizing behavior, current SUD and parental support were significant predictors. Consistency of support remained a significant mediator of the relations between parent current SUD and internalizing and externalizing problems (both $p < .05$).

Potential Alpha Inflation

Because of the large number of tests, there was an increased chance of Type I errors. We addressed family-wise alpha inflation by calculating a modified Bonferroni adjustment (Holm, 1979), and first ordering p-values from smallest to largest. The smallest p-value is multiplied by k (i.e. number of tests), and the second smallest p-value is multiplied by $(k-1)$. This procedure is repeated until we found a non-significant p-value. Using this method did not change the results.

Discussion

The current study examined whether children of parents with current and recovered SUDs were at greater risk for externalizing and internalizing problems compared to those whose parents were never diagnosed. We examined consistency of parental support as a mediator of the relations between parent SUDs and child behavior problems. It was hypothesized that children of parents with current SUDs would be at risk for internalizing and externalizing problems, and that these effects would be mediated by parental consistency of support. It was also hypothesized that children of parents with recovered SUDs would be at risk for externalizing, but not internalizing problems.

Results demonstrated that parent current SUD was related to both child externalizing and internalizing problems. Parent recovered SUD was associated with child externalizing, but not internalizing problems. Additionally, consistency of support mediated the relations between parent current, but not recovered, SUDs and both externalizing and internalizing behavior problems.

Predicting Externalizing Problems

In terms of externalizing problems, the current findings indicate that having a parent with either a recovered or a current SUD each uniquely predicted externalizing behavior. The pathways by which SUD influenced adolescent's externalizing symptoms also varied by recovery status. These findings suggest multiple mechanisms by which offspring of parents with SUDs may be at risk for externalizing problems.

Specifically, parents with current SUDs may not provide consistent support to their children which may contribute to elevated rates of children's externalizing problems. However, the fact that perceived support did not mediate the relation between recovered SUD and externalizing problems may support previous literature implicating a genetically transmitted vulnerability to externalizing spectrum disorders among children of parents with SUD. For example, King et al. (2009) observed strong relations between parent alcohol dependence and higher levels of child behavioral disinhibition within biological but not adoptive families. Alternatively, externalizing problems may arise in response to disrupted parenting associated with parental SUD but then become functionally autonomous and persist even after a parent recovers. For example, less consistent parenting may allow children to associate with deviant peers (Dishion & Owen, 2002), who maintain children's externalizing behaviors following a parent's recovery from a SUD and, presumably, improved parenting. More research is needed to test these multiple possibilities underlying the link between parent recovered SUD and child externalizing problems.

Another nuanced finding in the prediction of externalizing behavior was that parental recovered SUD did not predict externalizing symptoms when examined as a continuous outcome, although it did predict clinically significant elevations in externalizing behavior in younger children. Research examining the prediction of externalizing behavior problems suggests that the heritability of externalizing outcomes increases as problems become more severe (Rhee et al., 2003). The current study supports the idea that genetic influences may be more powerful when predicting disorder, compared to continuous symptoms, particularly among younger children.

Predicting Internalizing Problems

In predicting internalizing problems, results indicated that children of parents with current SUDs, but not recovered SUDs, were at elevated risk, and identified consistency of parental support as a mediator of the effect of current SUD on child internalizing problems. Previous research has supported that parent SUDs impair caregiving and the quality of the home environment, and that some of the impact of parent SUDs is caused by this environmental disruption (Ehringer et al., 2006). This potential mechanism implicates the need to treat both parental SUD and parenting deficits associated with parental SUD, as recovery for parents

could have broader benefits for their children through improvements in parenting and family environment.

Although the current study did not directly test this relation, some have found that when parent substance abuse improves, parenting and other family environment variables improve as well (Luthar, Suchman, & Altomare, 2007), with others not finding this effect (DeLucia, Belz, & Chassin, 2001). It may be the case that particular subtypes of parent SUDs (e.g., those with comorbid mental health problems or whose substance use problem are more severe) are both less likely to recover and also more likely to cause child internalizing problems. Although this explanation cannot be ruled out by the current data, it is rendered less likely given that the effects of parental recovered versus current SUD could not be explained by parents' co-occurring psychopathology or severity of their SUDs.

Limitations

Although this study addressed important gaps in the literature on parent recency of SUDs and child risk for externalizing and internalizing problems, it is important to recognize its limitations. First, prenatal substance exposure was assessed using retrospective self and partner report, and report was categorized into "any exposure" or "no exposure." It is certainly possible that mothers and/or their partners had difficulty remembering whether the mother used any substances while pregnant, and also possible that minimal prenatal exposure would be less problematic for long-term child behavior outcomes, compared to more prenatal exposure during this time.

Additionally, because of the nature of the current study's dummy codes, it was not possible to examine the effect of amount of time in recovery or child age at time of parent recovery as predictors in the final study model. However, we were able to rule out the possibility that the association between parental consistency of support and child behavior problems could be accounted for by either of these confounders.

Finally, recruitment methods for the original, larger study resulted in a bias towards including participants who were older, and more likely to be Caucasian and higher SES. The current study analyses were biased towards including children with parents less likely to have some other (Anxiety, Depression, ASPD) psychopathology and children who were younger (because of the age requirement for teacher report). Although the significant effects of missingness in the current study were small in magnitude, there is a chance that the differences could limit the generalizability of these effects.

Conclusions

The present study adds to prior work by examining whether parental consistency of support mediates the effects of parental recovered and current SUDs on internalizing and externalizing problems. The study provides compelling evidence that not all children of parents with SUDs are at equal risk for both internalizing and externalizing behavior problems, suggesting multiple mechanisms by which these children come to be at risk. Specifically, parents with current SUDs may provide less consistent support to their children, increasing children's risk for both internalizing and externalizing problems. Children of parents who have recovered remain at risk for externalizing problems, but in this

case, the risk may be transmitted via a genetic mechanism. Taken together, these results suggest that there are multiple pathways into the prediction of internalizing and externalizing behavior problems via hereditary and environmental factors, with children of current substance-abusing parents comprising a particularly risky group. Intervention efforts aimed at promoting parental recovery from SUDs and improving the parenting in these families may be especially important in decreasing their risk for internalizing problems, and perhaps externalizing problems as well.

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References

- Achenbach TM, Dumenci L. Advances in empirically based assessment: Revised cross-informant syndromes and new DSM-oriented scales for the CBCL, YSR, and TRF. *Journal of Consulting and Clinical Psychology*. 2001; 69:699–702. [PubMed: 11550735]
- Achenbach, TM.; Rescorla, LA. *Manual for the ASEBA school-age forms and profiles: An integrated system of multi-informant assessment*. Burlington, VT: Research Center for Children, Youth, and Families; 2001.
- Afful S, Strickland J, Cottler L, Bierut L. Exposure to trauma: A comparison of cocaine-dependent cases and a community-matched sample. *Drug and Alcohol Dependence*. 2011; 112:46–53. [PubMed: 20599330]
- Andreas JB, O'Farrell TJ. Longitudinal associations between fathers' heavy drinking patterns and children's psychosocial adjustment. *Journal of Abnormal Child Psychology*. 2007; 35:1–16. [PubMed: 17089075]
- Barkley, RA.; Murphy, KR. *Attention-Deficit Hyperactivity Disorder: A Clinical Workbook*. 2. Guilford Press; NY: 1998.
- Bornovaiova M, Hicks B, Iacono W, McGue M. Familial transmission and heritability of childhood disruptive disorders. *American Journal of Psychiatry*. 2010; 167:1066–1074. [PubMed: 20634367]
- Brennan PA, Hammen C, Katz AR, Le Brocque RM. Maternal depression, paternal psychopathology, and adolescent diagnostic outcomes. *Journal of Consulting and Clinical Psychology*. 2002; 70:1075–1085. [PubMed: 12362958]
- Clark DB, Cornelius J, Wood D, Vanyukov M. Psychopathology risk transmission in children of parents with substance use disorders. *American Journal of Psychiatry*. 2004; 161:685–691. [PubMed: 15056515]
- Cohen J. A power primer. *Psychological Bulletin*. 1992; 112:155–159. [PubMed: 19565683]
- Cui M, Donnellan MB, Conger RD. Reciprocal influences between parents' marital problems and adolescent internalizing and externalizing behavior. *Developmental Psychology*. 2007; 43:1544–1552. [PubMed: 18020831]
- DeLucia C, Belz A, Chassin L. Do adolescent symptomatology and family environment vary over time with fluctuations in paternal alcohol impairment? *Developmental Psychology*. 2001; 37:207–216. [PubMed: 11269389]
- Dishion T, Owen L. A longitudinal analysis of friendships and substance use: Bidirectional influence from adolescence to adulthood. *Developmental Psychology*. 2002; 38:480–491. [PubMed: 12090479]
- Dixon L, Hamilton-Giachritsis C, Browne K. Attributions and behaviors of parents abused as children: a mediational analysis of the intergenerational continuity of child maltreatment (Part II). *Journal of Child Psychology and Psychiatry*. 2005; 46:58–68. [PubMed: 15660644]

- Ehringer MA, Rhee SH, Young SE, Corley RP, Hewitt JK. Genetic and environmental contributions to common psychopathologies of childhood and adolescence: A study of twins and their siblings. *Journal of Abnormal Child Psychology*. 2006; 34:1–17. [PubMed: 16465480]
- Eiden R, Edwards EP, Leonard KE. A conceptual model predicting internalizing problems in middle childhood among children of alcoholic and nonalcoholic fathers: The role of marital aggression. *Journal of Studies on Alcohol and Drugs*. 2007; 70:741–750. [PubMed: 19737499]
- Fein G, Colin A. Event-related potentials during visual target detection in treatment-naïve active alcoholics. *Alcoholism: Clinical and Experimental Research*. 35:1171–1179.
- Furman W, Buhrmester D. Children's perceptions of the personal relationships in their social networks. *Developmental Psychology*. 1985; 21:1016–1024.
- Grusec J, Goodnow J. Impact of parental discipline methods on the child's internalization of values: A reconceptualization of current points of view. *Developmental Psychology*. 1994; 30:4–19.
- Hale WW, Engels R, Meeus W. Adolescent's perceptions of parenting behaviors and its relationship to adolescent Generalized Anxiety Disorder symptoms. *Journal of Adolescence*. 2006; 29:407–417. [PubMed: 16169585]
- Hammen C, Brennan P. Severity, Chronicity, and Timing of Maternal Depression and Risk for Adolescent Offspring Diagnoses in a Community Sample. *Archives of General Psychiatry*. 2003; 60:253–258. [PubMed: 12622658]
- Hayward RA, Depanfilis D, Woodruff K. Parental methamphetamine use and implications for child welfare intervention: A review of the literature. *Journal of Public Child Welfare*. 2010; 4:25–60.
- Hicks BM, Krueger RF, Iacono FW, McGue M, Patrick CJ. The family transmission and heritability of externalizing disorders: A twin-family study. *Archives of General Psychiatry*. 2004; 61:922–928. [PubMed: 15351771]
- Holm S. A simple sequentially rejective multiple test procedure. *Scandinavian Journal of Statistics*. 1979; 6:65–70.
- Hu L, Bentler A. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*. 1999; 6:1–55.
- Hussong AM, Cai L, Curran PJ, Flora DB, Chassin LA, Zucker RA. Disaggregating the distal, proximal, and time-varying effects of parent alcoholism on children's internalizing symptoms. *Journal of Abnormal Child Psychology*. 2008; 36:335–346. [PubMed: 17891557]
- Hussong AM, Huang W, Curran PJ, Chassin L, Zucker RA. Parent alcoholism impacts the severity and timing of children's externalizing symptoms. *Journal of Abnormal Child Psychology*. 2010; 38:367–380. [PubMed: 20084453]
- Kendall, PC.; Henin, A.; MacDonald, JP.; Treadwell, KRP. Unpublished Manuscript. Temple University; 1998. Parent ratings of anxiety in their children: Development and Validation of the CBCL-A.
- Kendler KS, Jacobson KC, Prescott CA, Neale MC. Specificity of genetic and environmental risk factors for use and abuse/dependence of cannabis, cocaine, hallucinogens, sedatives, stimulants, and opiates in male twins. *American Journal of Psychiatry*. 2003; 160:687–696. [PubMed: 12668357]
- Kessler RC, Chiu WT, Demler O, Walters EE. Prevalence, severity, and comorbidity of twelve-month DSM-IV disorders in the National Comorbidity Survey Replication (NCS-R). *Archives of General Psychiatry*. 2010; 62:617–627. [PubMed: 15939839]
- King SM, Keyes M, Malone SM, Elkins I, Legrand LN, Iacono WG, McGue M. Parental alcohol dependence and the transmission of adolescent behavioral disinhibition: A study of adoptive and non-adoptive families. *Addiction*. 2009; 104:578–586. [PubMed: 19215604]
- Kumpfer KL, Alvarado R, Whiteside HO. Family-based interventions for substance use and misuse prevention. *Substance Use and Misuse*. 2003; 38:1759– 87. [PubMed: 14582577]
- Luthar SS, Suchman NE, Altomare M. Relational psychotherapy mothers' group: A randomized clinical trial for substance abusing mothers. *Developmental Psychopathology*. 2007; 19:243–261.
- MacKinnon, DP. Statistical mediation analysis. New York: Erlbaum; 2008.
- MacKinnon DP, Fairchild AJ, Fritz MS. Mediation Analysis. *Annual Review of Psychology*. 2007; 58:593–614.

- MacKinnon D, Lockwood C, Williams J. Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research*. 2004; 39:99–128. [PubMed: 20157642]
- Marmorstein NR, Iacono WG, McGue M. Alcohol and illicit drug dependence among parents: Associations with offspring externalizing disorders. *Psychological Medicine*. 2009; 39:149–155. [PubMed: 18410699]
- Mayes, LC.; Truman, SD. Substance abuse and parenting. In: Bornstein, M., editor. *Handbook of parenting, Vol 4. Social conditions and applied parenting. Vol. 2.* Mahwah, NJ: Lawrence Erlbaum Associates; 2002. p. 329-359.
- Muthén, L.K.; Muthén, B.O. *Mplus User's Guide*. 6. Los Angeles, CA: Muthén & Muthén; 1998–2011.
- Ohannessian C, Hesselbrock V, Kramer J, Kuperman S, Bucholz K, Schuckit M, Nurnberger J. The relationship between parental alcoholism and adolescent psychopathology: A systematic examination of parental comorbid psychopathology. *Journal of Abnormal Child Psychology*. 2004; 32:519–533. [PubMed: 15500031]
- Preuss UW, Schuckit MA, Smith TL, Barnow S, Danko GP. Mood and anxiety symptoms among 140 children from alcoholic and control families. *Drug and Alcohol Dependence*. 2002; 67:235–242. [PubMed: 12127194]
- Rhee SH, Hewitt JK, Young SE, Corley RP, Crowley TJ, Stallings MC. Genetic and environmental influences on substance initiation, use, and problem use in adolescents. *Archives of General Psychiatry*. 2003; 60:1256–1264. [PubMed: 14662558]
- Robins LN, Helzer JE, Croughan J, Ratcliff KS. National Institute of Mental Health Diagnostic Interview Schedule. *Archives of General Psychiatry*. 1981; 38:381–390. [PubMed: 6260053]
- Schafer JL, Graham JW. Missing data: Our view of the state of the art. *Psychological Methods*. 2002; 7:147–177. [PubMed: 12090408]
- Thornberry TP, Freeman-Gallant A, Lizotte AJ, Krohn MD, Smith CA. Linked lives: The intergenerational transmission of antisocial behavior. *Journal of Abnormal Child Psychology*. 2002; 31:171–184. [PubMed: 12735399]
- Young S, Gudjonsson G, Misch P, Collins P, Carter P, Redfern J, Goodwin E. Prevalence of ADHD symptoms among youth in a secure facility: The consistency and accuracy of self and informant-report ratings. *The Journal of Forensic Psychiatry & Psychology*. 2009; 21:238–246.
- Yu CY, Muthen B. Evaluation of model fit indices for latent variable models with 42 categorical and continuous outcomes. Technical Report. 2002

Figure 1.
 Information and included and excluded participants.

Table 1

Exploring differences on confounders between the three groups: children whose parents were never diagnosed with a SUD, those whose parents had recovered from a SUD, and those whose parents had a current SUD.

Confounder	Mean (for continuous variables)	T or F value (p-value)	% meeting criteria (for dichotomous variables)	Chi Square (p-value)
Age	Never: 6.781 ^a ; Recovered: 6.823 ^a ; Current: 6.842 ^a	.022 (p=.978)	--	--
Parent Severity (lifetime symptoms)	Never: 0.331 ^a ; Recovered: 2.543 ^b ; Current: 4.292 ^c	42.638 (p<.001)	--	--
Time in Recovery	Never: NA; Recovered: 5.054 ^a ; Current: 0.575 ^b	5.306 (p<.001)	--	--
Child Age at Time of Parental Recovery	Never: NA; Recovered: 1.572 ^a ; Current: 5.164 ^b	-5.228 (p<.001)	--	--
Consistency of Discipline/Rule Enforcement	Never: 3.831 ^a ; Recovered: 4.083 ^b ; Current: 4.111 ^b	4.083 (p<.05)	--	--
Gender	--	--	Never: 53.4% female ^a ; Recovered: 53.1% female ^a ; Current: 50% female ^a	.203 (p=.904)
Prenatal Exposure	--	--	Never: 9.7% exposed ^a ; Recovered: 23.9% exposed ^b ; Current: 38.2% exposed ^c	29.814 (p<.001)
Parent Other Psychopathology (Anxiety, Depression, ASPD)	--	--	Never: 28.6% ^a ; Recovered: 38.8% ^b ; Current: 63.6% ^c	24.390 (p<.001)
Confounder: Lifetime Substance Use Diagnoses				
Alcohol	--	--	Never: 0% ^a ; Recovered: 79.5% ^b ; Current: 93.9% ^c	175.746 (p<.001)
Amphetamines	--	--	Never: 0% ^a ; Recovered: 20.5% ^b ; Current: 36.4% ^c	49.427 (p<.001)
Opiates	--	--	Never: 0% ^a ; Recovered: 0.0% ^a ; Current: 0% ^a	--
Sedatives	--	--	Never: 0% ^a ; Recovered: 0.0% ^a ; Current: 3% ^b	5.571 (p=.062)
Marijuana	--	--	Never: 0% ^a ; Recovered: 38.5% ^b ; Current: 36.4% ^b	61.786 (p<.001)
Cocaine	--	--	Never: 0% ^a ; Recovered: 10.3% ^b ; Current: 6.1% ^b	13.508 (p<.01)
Hallucinogens	--	--	Never: 0% ^a ; Recovered: 2.6% ^b ; Current: 6.1% ^b	7.680 (p<.05)
Phencyclidine (PCP)	--	--	Never: 0% ^a ; Recovered: 0% ^a ; Current: 0% ^a	--
Inhalants	--	--	Never: 0% ^a ; Recovered: 0.0% ^a ; Current: 0% ^a	--
Comorbidity between any two substances	--	--	Never: 0% ^a ; Recovered: 25% ^b ; Current: 41.5% ^c	45.491 (p<.001)

Note: Letters shared in common between or among the groups indicate no significant differences between/among them at the $p < .05$ level. Bolded text indicates significant differences between groups on that confounder.

Table 2
Zero-order and partial Pearson, Tetrachoric, and Biserial correlations among confounder and study variables.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1. Child age	--														
2. Child gender	.002	--													
3. Parent other psychopathology diagnosis	-.015	-.036	--												
4. Parent lifetime substance symptoms	.065	.007	.228***	--											
5. Comorbidity of SUD	.102	-.007	.212***	.686***	--										
6. Prenatal substance exposure	.043	-.011	.136**	.319***	.321***	--									
7. Time in recovery	.027	-.030	-.212***	-.136**	-.055	-.124**	--								
8. Child age at time of parental recovery	.263***	-.120*	.031	.165**	.064	-.076	-.489***	--							
9. Wave 5 Consistency of discipline/rule enforcement	-.150**	.055	-.150**	-.242***	-.116*	-.066	-.001	-.150*	--						
10. Wave 5 Internalizing Symptoms	.030	-.097*	.129**	.103*	.033	.079	.093*	-.030	-.292***	--					
11. Wave 5 Externalizing Symptoms	-.150*	.106*	.160**	.147**	.354***	.130*	.111*	-.150**	-.226***	.371***	--				
12. Dummy code 1 (recovered versus never diagnosed) parent SUD	.063	.016	.148**	.011	.031	.128**	-	-	.032	-.084	.177**	--			
13. Dummy code 2 (current versus never diagnosed) parent SUD	-.040	.033	.160**	.367***	.265**	.330***	-	-	-.184*	.092	.134**	-	-		

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
14. Wave 5 Consistency of parental support	-.204**	-.002	-.131**	-.300***	-.172**	-.066	.061	-.204**	.362***	-.298***	-.065	-.109	-.278***	--	
15. Wave 6 Clinically elevated child externalizing problems	-.021	.034	.160**	.142**	.009	.028	-.059	-.021	-.057	.072	.149*	.182**	.215***	-.137***	--
16. Wave 6 Clinically elevated child internalizing problems	-.071	-.040	.129**	.108*	.073	.036	-.054	-.071	-.092*	.149*	.072	-.041	.213***	-.185***	.436***

Notes:

* p<.05,

** p<.01,

*** p<.001.

Bolded numbers are partial correlations. Correlations between time in recovery and other variables only pertain to children in the recovered and current groups.

Table 3

Path coefficients for all paths included in the final model.

Predictor	Consistency of Parental Support	Externalizing Problems	Odds Ratio (95% Confidence Interval) for Externalizing Problems	Internalizing Problems	Odds Ratio (95% Confidence Interval) for Internalizing Problems
Child Age	-.049(.030)	.032(.070)	1.033(.895–1.170)	-.322(.071) ***	.725(.586–.864)
Child Gender	-.032(.025)	.039(.046)	1.039(.950–1.130)	-.032(.050)	.969(.871–1.067)
Parent Other Psychopathology	-.024(.030)	.087(.076)	1.091(.942–1.240)	.053(.087)	1.054(.884–1.225)
Parent Lifetime Substance Symptoms (severity of SUD)	-.239(.075) **	-.078(.114)	.925(.702–1.148)	.103(.141)	1.108(.832–1.384)
Prenatal substance exposure	-.048(.034)	-.042(.046)	.959(.869–1.050)	-.041(.045)	.960(.872–1.048)
Consistency of parental discipline/rule enforcement	.125(.030) **	.060(.068)	1.061 [.929–1.195]	-.010(.083)	.990(.827–1.153)
Dummy Code 1 (recovered versus never diagnosed) parent SUD	-.002(.025)	.124(.058) *	1.132[1.018–1.246]	-.024(.057)	.976(.865–1.088)
Dummy Code 2 (current versus never diagnosed) parent SUD	-.119(.046) *	.177(.063) **	1.194[1.071–1.317]	.166(.059) **	1.118[1.065–1.296]
Consistency of Parental Support	--	-.246(.044) *	.782(.696–.782)	-.178(.034) **	.837(.770–.904)

Notes:

† $p < .1$,

* $p < .05$,

** $p < .01$,

*** $p < .001$.

All betas reported are standardized. Standard errors are reported in parentheses. OR=odds ratio, CI=confidence interval. Reported odds are for one unit change in the predictor. Marginally significant or significant effects are bolded.