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Predictors of Childhood Depressed Mood: A Two-Generational Study

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Abstract

This study tests a model of intergenerational influences on childhood depressed mood that proposes (1) indirect and direct paths from maternal drug use to offspring depressed mood; and (2) pathways from maternal maladaptive personality attributes to offspring depressed mood via adverse child-rearing practices. A cross-sectional two-generational design is employed. Data was obtained utilizing structured questionnaires administered by trained interviewers in the homes of the participants. The sample was comprised of African American and Puerto Rican children (N=210) and their mothers living in New York City. Using structural equation modeling, the analysis showed that maladaptive personality attributes are associated with adverse maternal child-rearing practices, which, in turn, are related to depressed mood in the offspring. Maternal drug use had a direct effect on offspring depressed mood. Maternal drug use also had an indirect path to offspring depressed mood via maladaptive personality attributes and adverse maternal child-rearing practices. The total effects analysis indicated that adverse maternal child-rearing practices was the strongest predictor of childhood depressed mood. This finding was consistent with the proximal position of the latent construct within the model. Maternal personality attributes and drug use were of lesser importance, but still statistically significant. The results suggest that maternal drug use and maladaptive personality attributes pose risks for the future depressive mood

of children. The relative strength of maternal involvement with offspring should be the focus of preventive and therapeutic intervention efforts.

Keywords

Childhood depressed mood; ethnic minorities; maternal child-rearing practices; maternal drug use

Introduction

Adult-onset depression is an often-studied phenomenon with correlates and consequences that have been well-documented (Beydoun, Beydoun, Kaufman, Lo, & Zonderman, 2012). In contrast, childhood and juvenile-onset depressed mood, especially in minority children, is less clearly understood. Only recently has serious attention been paid to depressive symptoms and depressive episodes in African American and Puerto Rican children (Cummings & Druss, 2011; McConley et al., 2011). Recent studies have shown that qualitative differences exist in the risk factors for childhood vs. adult-onset depressed mood (Fernando et al., 2011; Shanahan, Copeland, Costello, & Angold, 2011). These studies have shown that childhood-onset depressed mood, compared with adolescent or adult-onset depressed mood, is more strongly associated with an increased family history of antisocial behaviors, family instability, and an increased likelihood of other co-occurring mental health problems (e.g., Fernando et al., 2011).

The importance of studying childhood depressed mood is manifest in the fact that childhood depressed mood has a risk of continuing into adulthood (Michl, McLaughlin, Shepherd, & Nolen-Hoeksema, 2013). In addition, childhood and adolescent depressed moods have been shown to be associated with an increased risk of co-morbid psychiatric disorders (e.g., ADHD), disruptive behaviors, reduced academic performance, reduced general health, and an increased risk of suicide, especially in adolescent samples (Caserta, Wyman, Wang, Moynihan, & O'Connor, 2011; Günther, Konrad, De Brito, Herpertz-Dahlmann, & Vloet, 2011; Kelleher et al., 2012; Owens, Stevenson, Hadwin, & Norgate, 2012; Reinke, Eddy, Dishion, & Reid, 2012).

A common thread seen throughout the studies examining the correlates of child and adolescent depressed moods is that an unsupportive, conflict-ridden, or unstable rearing environment is strongly related to depressive symptomatology (Abaied & Rudolph, 2014; Corona et al., 2012; Lewis, Rice, Harold, Collishaw, & Thapar, 2011). The findings from these studies are consistent with Family Interactional Theory (FIT) (Brook, Brook, Gordon, Whiteman, & Cohen, 1990), which posits that children raised in a non-supportive family environment, characterized by conflict and a lack of affection, are significantly more likely to develop both internalizing and externalizing disorders. This perspective further details a pathway from parental behavioral personality characteristics to parental child-rearing practices, which in turn influences depressed mood in the child. Furthermore, aside from the parent's personality, parental alcohol and drug use are often associated with depressive symptoms in the child (Clark, Cornelius, Wood, & Vanyukov, 2004; Kelley, Pearson, Trinh, Klostermann, & Krakowski, 2011).

It is also possible that maladaptive parental personality characteristics as well as parental emotional difficulties associated with maladaptive child rearing can be passed directly to the child via genetic mechanisms. Research in this area has found that children who suffer from child-onset depressed mood had a family history of depressed mood or another affective disorder (Goodman et al., 2011).

Most of the literature cited above regarding child and adolescent-onset depressed mood has focused on major depressive disorder. Recent work by Hankin, Fraley, Lahey, and Waldman (2005) using taxometric analysis has proposed that youth depressed mood is a dimensional phenomenon, and thus may be considered as a continuous variable. The results based on 845 nine to seventeen year-old youths showed that symptoms of depressed mood were continuously represented for both males and females. These findings suggest that examining a range of depressive symptoms in children, as opposed to only assessing the presence of major depressive disorder itself, would result in an additional useful sensitive measure of depressed mood. Therefore, we have used a dimensional assessment of depressed mood.

This study has a number of unique features. First, it is based on a non-clinical sample drawn from the community. Second, the sample includes both African American and Puerto Rican mothers and children, which are relatively understudied minority groups. Third, it assesses measures of depressed mood, which are related to later psychiatric disorders, poor physical health, and reduced academic performance. Fourth, it is the only study to our knowledge to employ a structural equation model to examine the pathways to depressed mood in African American and Puerto Rican children.

The current study examines the psychological symptoms of depressed mood and physical signs of depressed mood in a sample of 8 to 12 year-olds, in the context of the family environment, including maternal drug use and adverse maternal child-rearing practices. This study was performed in an attempt to gain a clearer understanding of the interrelationship of the domains of maternal personality characteristics, maternal child-rearing practices, and maternal drug use, as they relate to depressed mood in childhood using a two-generation sample. This clearer understanding of the interrelationship of the domains that influence depressed mood in childhood may be attained by testing the following hypothesized model: first, maladaptive maternal personality attributes are associated with maternal drug use which in turn is related to depressed mood in the child; second, maladaptive personality attributes are related to adverse maternal child-rearing practices which in turn are associated with depressed mood in the child.

Method

Participants

The mother-child pairs who participated in this study were drawn from a sample of African American and Puerto Rican adults who have been participating in a longitudinal study that began in 1990. These adults were first interviewed when they were in 7th, 8th, or 9th grade in 1990, and attending high schools serving the East Harlem area of New York City. At that time the interviews were conducted within the classroom using personal tape players in the adolescent's language of choice, either English or Spanish. These participants were re-

interviewed for a second time in 1994-1997 and again for a third time in 2000-2001. These interviews were conducted at these times in each participant's home, in private, and in English, the choice of all participants.

The present sample of 210 mother-child pairs was drawn from participants who had a family with a child in the age range of 8 to 12, when the mothers were interviewed for a fourth time. 97% of the mothers were the biological parents of the study children, and the remaining 3% were either step, foster, adoptive parents or another relative serving as the mother. Also, 94% of the mothers were living with their children at the time of the study, and for the remaining 6%, three-quarters spoke with their child at least several times a week, while the remainder spoke every few weeks.

At the time of the interview the average age of the children was 8.6 (SD=0.9) and 80% of the mothers were between the ages of 25 and 29. As regards the child in the study, 51.4% were male, and the self-reported ethnicity was 41% African American, 55% Puerto Rican, 2% other Latin American, and 2% combined Latin American and African American. The self reported ethnicity of the mothers differed slightly with 41% reporting being African American, 56% Puerto Rican, 2% other Latin American, and 1% reported as "other." At the time of the interview 66% of the mothers were either co-habiting or married and living with their partners, 8% were divorced or separated, and 26% were never married. Approximately 20% of the mothers had some college education, 49% had a high school diploma (including a GED), and 31% of the mothers had less than a high school diploma. In addition, 45% of the mothers reported working full time, 14% part-time, and the remainder were not working for pay. The median reported household income was between \$12,000 and \$19,000 a year before taxes.

Procedure

Individual, in-person interviews were conducted by trained interviewers after obtaining consent. Informed written consent was obtained from the mother prior to getting assent in writing from the child. After obtaining consent, mother and child were interviewed separately. Whenever possible, interviewers and subjects were matched on gender and ethnicity, but males never interviewed female respondents.

The interviewer read the questionnaire aloud to the subject and recorded her/his responses. For questions of a sensitive nature (e.g., substance use), mothers were given the instrument and requested to record the answers themselves. The questionnaire took approximately two hours to complete for the mothers and 1½ hours for the children (breaks were provided as necessary). Less than 5% of the participants who were asked to participate in the study refused to do so. At the end of the interviews, the mothers and children were each reimbursed \$50 for their time and effort. A Certificate of Confidentiality was obtained from the National Institute on Drug Abuse to ensure confidentiality. All procedures and consent forms were approved by the Institutional Review Boards of both the New York University School of Medicine and the Mount Sinai School of Medicine.

Measures

The measures used in our questionnaires were derived from validated scales and our previous work. In addition, many of these measures have been used in previous studies and have been found to be predictive of both psychopathology and drug use, including smoking (Brook, Brook, Zhang, Cohen, & Whiteman, 2002). The measures used for this study come from four domains: maladaptive maternal personality attributes, maternal adverse child-rearing practices, maternal drug use, and depressed mood in the child.

The mother questionnaire contained questions regarding demographics, personality, child-rearing, and a variety of behaviors including substance use. Scales from the mother questionnaire were grouped according to each of the domains. The domain of maternal personality attributes was composed of five measures: responsibility, ego-integration, impulsivity, coping ability, and internalizing behaviors. Maternal child-rearing was also composed of five measures: child-centeredness, communication with the child, satisfaction with the child, parent-child conflictual relations, and the degree to which the mother encouraged the child's ideas. Maternal drug use was composed of frequency of cocaine use and self-reported problems with the use of tobacco, marijuana, and alcohol. Cocaine use was singled out among the illicit drugs due to the strong relationship observed between maternal cocaine use and depressed mood in children in correlational analyses of this study.

The dependent measure for this study, depressed mood in the child, was assessed through the use of the child questionnaire. Depressed mood in the children was derived using two separate measures: psychological symptoms of depressed mood (e.g., feeling sad or blue); and physical symptoms of depressed mood (e.g., extreme dietary changes). All of the measures used are described in Table 1, which includes the number of questionnaire items, the source of the scale, a sample item, and the observed Cronbach's alpha for each measure.

Statistical Analysis

Mplus (Version 6) was used to calculate the measurement model for the sample. Structural equation modeling (SEM) was then performed (Muthén & Muthén, 2010). The Comparative Fit Index (CFI), the Root Mean Square Error of Approximation (RMSEA), and the Standardized Root Mean Square Residual (SRMR) were used to assess the fit of the model. For the CFI, values between 0.90 and 1.0 indicate an adequate fit (Muthén & Muthén, 2010). Values of the RMSEA and SRMR below 0.10 indicate an adequate fit (Byrne, 1998; Diamantopoulos & Siguaw, 2000; Kelloway, 1998). In order to test for mediation effects (Baron & Kenny, 1986; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002), the standardized total effects and total indirect effects were calculated using the Model Indirect command in Mplus. The standardized total effects equal the sum of the direct and the indirect effects of each earlier latent variable (estimated in the analysis) on depressed mood in the child. The total indirect effects of a latent construct on depressed mood in the child are the mediated effects via the intermediate variables that are depicted in the model (see Figure 1).

Results

The means, standard deviations, and inter-quartile ranges of the variables used in this study are presented in Table 2.

SEM was applied to test our hypothesized developmental model (see Introduction). For the measurement model, all factor loadings were significant ($0.37 < \text{standardized coefficient} < 0.86$, $p < .001$). For the structural model, the following statistics were obtained: CFI = 0.90, RMSEA = 0.07, and SRMR = 0.06. These statistics indicated an adequate fit. The standardized coefficients and associated z -statistics of the structural model are presented in Figure 1.

The resulting model supported our hypotheses and is consistent with FIT (see Figure 1). First, a significant pathway was found linking maternal maladaptive personality attributes to child-rearing practices (standardized coefficient = .42, $p < .001$). Second, adverse maternal child-rearing practices had a direct effect on the child's depressed mood (standardized coefficient = .39, $p < .001$). Third, maternal drug use had a significant direct effect on the child's depressed mood (standardized coefficient = .38, $p < .01$). In addition, the latent constructs of maternal drug use and maternal maladaptive personality attributes were significantly correlated ($r = .57$, $p < .001$). Although not hypothesized, we tested the pathway from maternal maladaptive personality attributes to the child's depressed mood and the pathway from maternal drug use to adverse maternal child-rearing practices. Neither pathway was statistically significant.

Table 3 shows the total effects, z -values, and significance levels for each domain as related to the child's depressed mood. The total effect analysis indicated that adverse maternal child-rearing practices was the strongest predictor of childhood depressed mood.

Finally, we tested the pathways separately for the number of children in the family. Independent models were tested for one-child families vs. other families (i.e., two and three child families). The results of the analysis showed no major differences between the group-specific models.

Discussion

This study expands our knowledge of the pathways to depressed mood in African American and Puerto Rican children by employing structural equation modeling to examine the influence of maternal maladaptive personality attributes, adverse child-rearing practices, and maternal drug use upon child depressive symptoms. The results clearly support our hypothesized model and suggest a temporal ordering of four important latent constructs. As predicted, maternal maladaptive personality attributes were associated with adverse child-rearing practices, which, in turn, were related to depressed mood in the child. In addition, maternal drug use was found to be directly related to depressed mood in the child and was also correlated with maladaptive maternal personality attributes. This is the first study to investigate the interconnection of maternal personality attributes, drug use, and child-rearing practices as related to depressed mood in African American and Puerto Rican children.

Our results identify several important variables underlying maternal maladaptive personality. The specific variables that constitute the latent construct of maladaptive maternal personality attributes include low ego integration, impulsivity, poor coping skills, internalizing behaviors, and irresponsibility. Many of these personality attributes and skills are necessary for creating a stable and supportive environment for child-rearing. Also, many of the mothers' maladaptive traits may be reflected in the rearing environment created by the mother. It is possible that mothers who have a poorly integrated ego and therefore lack self-confidence and self-esteem, also appear to lack confidence in their children's ideas, and report being very dissatisfied with their children. In addition, mothers with characteristics of impulsivity and irresponsibility are inconsistent in handling parenting issues, resulting in a lack of communication and conflictual relations between the mother and the child. These findings are in accord with FIT (Brook et al., 1990) and extend the empirical literature (Dwairy, 2010; McDonald, Dodson, Rosenfield, & Jouriles, 2011).

It is likely that neurobiological and genetic factors help mediate the relationships between maternal personality attributes and depressed mood in the child. With regard to neurobiological factors, some research has identified dysfunction of neurotransmitters (e.g., serotonin) in the onset of depressed mood. Depressed mood may also be related to adverse interactions between neurotransmitters. Hormonal influences may also play a role in childhood depressed mood; including dysfunction of the HPA axis as well as dysfunctional effects of growth hormones. Imaging studies have revealed a number of dysfunctions in several areas of the brain (Goh, Dong, Zhang, DiMauro, & Peterson, 2014). Genetic factors are also involved in childhood depressed mood, as shown in both twin and adoption studies (Kendler & Gardner, 2014; Kendler et al., 2012; Otowa, Gardner, Kendler, & Hettema, 2013).

Our findings also indicate that adverse child-rearing practices in the mother had the strongest total effect on increased depressed mood in the child. Although much of the research efforts examining the causes of childhood-onset depressed mood focus on more extreme noxious stimuli such as sexual abuse (Asgeirsdottir, Sigfusdottir, Gudjonsson, & Sigurdsson, 2011; Bebbington et al., 2011; Pérez-Fuentes et al., 2013), the present findings show that even less severe adverse maternal experiences can still influence depressed mood in children. One possible explanation for the link between adverse maternal child-rearing practices and depressive symptoms in the child may be the child's low perception of self-competence. This has been proposed by Cole's competency-based model of depressed mood (Cole, 1990). In short, if the rearing family shows dissatisfaction with the child or the child's performance, it will likely affect the child's self-esteem and self-image, and low self-esteem and poor self-image often occur in conjunction with depressive symptoms.

As noted above, our research highlights the importance of maternal child-rearing practices as predictors of depressive symptoms, as well as the specific nature of these adverse child-rearing practices. The specific variables that make up the construct of adverse child-rearing practices suggest a number of dimensions that contribute to the child's depressed mood. These include low child-centeredness, lack of satisfaction with the child, little encouragement of the child's ideas, and a lack of confidence in the child, which are then associated with symptoms of depressed mood. Other researchers find that familial factors

such as maternal avoidance of closeness, family conflict, and overall difficult family experiences (Abaied & Rudolph, 2014; Corona et al., 2012; Lewis et al., 2011) are related to depressed mood and internalizing symptoms.

Our findings suggest that maternal drug use is related to childhood depressed mood. Drug use is a destabilizing force within the household, and maternal substance use often affects the behavior and emotions of children growing up in such settings (Richardson, Goldschmidt, Larkby, & Day, 2013). Being raised in an environment where the mother is actively using substances and sometimes is visibly intoxicated, fosters instability in the household and causes distress in the child, potentially leading to depressive symptoms (Kelley et al., 2011). Researchers report that maternal drug use is related to depressive symptoms using a sample of older children (Clark et al., 2004; Kelley et al., 2011). We add to the literature by demonstrating that maternal drug use also predicts depressed mood in younger children. In addition, we have identified two mechanisms through which maternal drug use relates to their offspring's depressed mood. One mechanism is via maternal personality attributes. The second mechanism is through maternal child-rearing practices. Several researchers have found that maternal drug use is related to adverse maternal child-rearing practices (Dubowitz et al., 2011).

Limitations

Several limitations exist in this study. First, data from the mother and child were obtained simultaneously, which limits our capability to make statements about the causal direction among the examined domains. For example, it is possible that having a child with depressed mood may affect the maternal child-rearing style (e.g., lack of satisfaction and communication with the child) (Brook et al., 1990). However, there is evidence that the relationship is stronger from child-rearing practices to depressed mood in the child, rather than the reverse (Piko & Balázs, 2012). Second, further research should include the father or father substitute in examining the predictors of depressed mood in the child. Third, we are unable to rule out genetic influences that may be taking place, such as the more direct transfer of the mother's internalizing behavior to childhood depressed mood. Further, there may be an interaction between genetic and environmental factors as they relate to depressed mood in the child.

Clinical Implications

As noted above, we are cautious about implications about causality. However, the findings based on the SEM analyses suggest that the maternal rearing environment is related to the development of depressed mood during childhood. Maladaptive maternal personality traits are associated with adverse child-rearing practices, which correlate with increased depressed mood in children. Clinicians treating depressed children need to include mothers in the treatment plan and focus on the specific nature of the mother's child-rearing practices. In addition to highlighting broad concepts such as warmth and control, attention should be directed to such specific dimensions as communication, respect for the child's ideas, and expressions of satisfaction with the child. Furthermore, eliminating substance use, whether legal or illegal, from the home environment may have a positive effect upon the mood of the child, while also minimizing the maladaptive elements of the mother's personality and

contributing to an improvement in her child-rearing practices. A focus on the mother's child-rearing practices is warranted since it serves as a mediator between maternal personality attributes and depressed mood in the child as well as having a direct effect on the child's depressed mood.

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Fig. 1.

Note: ** $p < .01$; *** $p < .001$; CFI=0.90; RMSEA=0.07; SRMR=0.06; The first child's gender and ethnicity were statistically controlled.

Table 1
Psychosocial measures by domain: Cronbach's alphas, number of items, and sample Items

Measure	Alpha	# of items	Sample item
<i>Maladaptive maternal personality attributes</i>			
Low ego integration	0.72	7	I feel like losing my temper at people. (Original)
Low responsibility	0.64	5	It is all right to get around the law if you don't actually break it. (Gough, 1957)
Impulsivity	0.68	3	I often act on the spur of the moment without stopping to think. (Gough, 1957)
Poor coping skills	0.54	3	There is really no way to solve some of the problems you have. (Pearlin, Menaghan, Lieberman, & Mullen, 1981)
Internalizing behavior	0.92	17	Over the last few years, how much were you bothered by feeling nervous or shaky inside? (Achenbach, 1991)
<i>Maternal adverse child-rearing practices</i>			
Low child-centeredness	0.71	6	You do not like talking to your child and being with him/her much of the time. (Schaefer, 1965)
Lack of communication	0.59	5	You are not very easy to talk to. (Schaefer, 1965)
Does not encourage child's ideas	0.60	3	It is not all right for your child to disagree with you. (Schaefer, Edgerton, & Comstock, 1976)
Conflictual relations	0.86	6	He/she does not show enough gratitude for what you have done. (Schaefer & Finkelstein, 1975)
Lack of satisfaction with child	0.82	7	How often are you dissatisfied with your child's intellectual ability? (Original)
<i>Maternal drug use</i>			
Problems with the use of tobacco, alcohol, and marijuana	0.66	3	Have you ever had a problem with marijuana use? (Johnston, Bachman, & O'Malley, 1994)
Cocaine use	--	1	How many times have you used cocaine in the last 5 years? (Original)
<i>Depressed mood in the child</i>			
Physical symptoms of depressed mood	0.69	5	Over the last few years, on average, how much were you troubled by: 1) eating much less than usual? 2) not doing anything when you were not sick? 3) concentrating on things? 4) difficulty in sleeping? 5) difficulty in making up your mind? (Costello, Edelbrock, Kalas, Kessler, & Klaric, 1982)
Psychological symptoms of depressed mood	0.63	3	How much were you troubled by: 1) feeling sad or blue? 2) feeling no interest in things? 3) feeling hopeless? (Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974)

Table 2
Means, Standard Deviations (SD), and Inter-quartile ranges for the continuous variables
or percentages for the dichotomized variables

Variables	Mean	SD	Inter-quartile range	Answer options
<i>Maladaptive maternal personality attributes</i>				
Low ego integration	2.63	0.57	2.29-3.00	False (1) to True (4)
Low responsibility	2.80	0.55	2.40-3.20	False (1) to True (4)
Impulsivity	2.19	0.88	1.33-3.00	False (1) to True (4)
Poor coping skills	1.89	0.53	1.67-2.33	Strongly disagree (1) to Strongly agree (4)
Internalizing behavior	1.90	0.69	1.29-2.35	Not at all (1) to Extremely (5)
<i>Maternal adverse child-rearing practices</i>				
Low child-centeredness	2.53	0.26	2.33-2.67	Not at all like you (1) to Very much like you (4)
Lack of communication	1.88	0.33	1.60-2.00	Not at all like you (1) to Very much like you (4)
Does not encourage child's ideas	0.70	0.69	0.00-1.33	Strongly disagree (1) to Strongly agree (4)
Conflictual relations	1.99	0.73	1.50-2.50	Not at all like child (1) to Very much like child (4)
Lack of satisfaction with child	1.39	0.50	1.00-1.57	Never (1) to All the time (5)
<i>Maternal drug use</i>				
Problems with the use of tobacco, alcohol, and marijuana	16.7% tobacco 10.5% alcohol 9.5% marijuana		NA	No (1) Yes (2)
Cocaine use	1.10	0.70	1.00-1.00	None (1) to 40 times or more (7)
<i>Depressed mood in the child</i>				
Physical symptoms of depressed mood	1.94	0.77	1.20-2.40	Not at all (1) to Extremely (5)
Psychological symptoms of depressed mood	2.06	0.91	1.33-2.67	Not at all (1) to Extremely (5)

Table 3
Standardized coefficients, total effects, and associated z-values for pathways to depressed mood

Domain	Total effects	z-value for total effects
Maladaptive maternal personality attributes	0.16	3.0**
Adverse maternal child-rearing practices	0.39	3.9***
Maternal drug use	0.38	3.1**

**
p<.01;

p<.001