

Preschoolers' Depression Severity and Behaviors During Dyadic Interactions: The Mediating Role of Parental Support

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ABSTRACT

Objective: To investigate the relationship between preschool depression severity, observed behavior, and parental emotional support in a population of 3.0- to 5.6-year-olds and their mothers. **Method:** One hundred fifty preschoolers who underwent a comprehensive mental health assessment during which *DSM-IV* diagnoses were derived were included in this analysis. Child and parent behaviors during challenging structured dyadic tasks were systematically coded. Dyads with preschoolers in three diagnostic groups of interest were explored: depression, disruptive, and healthy. Depression severity sum scores were derived for children in all of the groups. **Results:** Depression severity accounted for a significant ($p < .05$) portion of the variance in preschoolers' persistence, compliance, and enthusiasm during dyadic tasks after controlling for the effects of age and gender. Depression severity was also significantly associated with parental emotional support, which was itself associated with all three preschool behaviors. When the effect of parental support was controlled for statistically, however, preschoolers' depression severity was no longer significantly associated with observed persistence or compliance, whereas the relationship between depression severity and enthusiasm remained significant. **Conclusions:** Maternal emotional support mediated the relationship between preschoolers' depression severity and their persistence and compliance but not the relationship between depression severity and enthusiasm. Findings have important clinical implications because they suggest that both external relational and internal child factors may be operating in preschool depression. *J. Am. Acad. Child Adolesc. Psychiatry*, 2006;45(2):213-222. **Key Words:** preschool, depression, parenting, emotional support.

Based on the increased recognition of affective disturbances, high-risk states, and clinical mood disorders very early in life, it is necessary to investigate the ways in which psychopathology occurring in the preschool period, a time of rapid normative emotional, social, and cognitive development, may influence early developmental trajectories. The present investigation was

conducted in a sample of clinically depressed preschool children, "disruptive," and "healthy" comparison groups. Relationships between preschoolers' depression severity sum scores derived from the Diagnostic Interview Schedule Version 4, Young Children version (DISC-IV-YC) parent report, their behavioral responses during dyadic interactions with their mothers, as well as the quality and frequency of mothers' emotionally supportive strategies displayed during the tasks were examined. In addition, maternal emotional support was tested as a possible mediator of the hypothesized relationships.

Luby et al. (2003a, b) have previously demonstrated that a specific and stable constellation of depressive symptoms can be identified in preschool children between the ages of 3.0 and 5.6 for which discriminant validity from other nonaffective psychiatric disorders has been established. Sensitive and specific symptoms of preschool depression included sadness or irritability,

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anhedonia, whining and crying, as well as excessive self-blame. Anhedonia, defined as the inability to have fun during activities and play, emerged as a highly specific symptom of depression and Luby et al. (2004a, b) have previously provided support for the hypothesis that it may be a marker of a more severe melancholic depressive subtype. These findings demonstrated that there are significant differences between the emotional expressions of depressed and nondepressed preschoolers including those with disruptive psychiatric disorders as reported by parents.

Therefore, empirical evidence is available to support the notion that depression during the preschool years is a valid phenomenon that is associated with significant differences in behavioral and emotional expressions in daily interactions and functioning. Yet, whether the severity of preschool psychopathology (e.g., depression severity) has an effect on emotional and behavioral outcomes when parenting support, a known and important correlate of young child behavior, is considered has never been examined. Maternal support in the present study was conceptualized as the degree to which mothers view and approach their children with positive regard overall as well as their efforts to be emotionally and developmentally supportive of their children's growth and well-being (Maccoby, 1994). Furthermore, parent support includes their ability to facilitate their children's sense of autonomy by supporting and validating their child's intent to lead and strategize to solve problems (Eisenberg et al., 1992). The present study examined whether preschoolers' depression severity was associated with their own behaviors during interactions with their mothers while accounting for the effects of maternal emotional support.

Primary caregivers are known to play a key role in the social and emotional development of young children. Because of the substantial amount of time parents spend with preschoolers as well as their emotional maturity relative to their children, parents are in a uniquely influential position to facilitate young children's development of adaptive emotional expressions within dyadic interactions. Along these lines, Denham and Grout (1993) reported that mothers who responded optimally to their children's expressions of emotions such as happiness, sadness, anger, and fear had children who displayed better internal coping skills in the absence of their caregiver. Denham and others have described optimal parenting as parenting that includes discussing

emotions with their preschool children, expressing predominantly positive emotions, and remaining calm and reassuring when reacting to the child's emotional expressions (Denham, 1989). In related research, Eisenberg and colleagues (1992) have shown that parents who responded to their children's sadness by dismissing or criticizing their feelings were more likely to have children who were less sympathetic and who were more prone to anger and negative emotions. In contrast, parents who are more supportive (e.g., empathic, affirming) when their children become upset during challenging situations were more likely to have children that were more able to regulate and express their emotions adaptively, a feature that has been linked to increased peer and academic competency (Gottman et al., 1997). Furthermore, previous studies (e.g., Belden et al., 2005; Kochanska, 1997; Kuczynski, 1984) have found that mothers' who use supportive strategies more frequently during challenging parent-child interactions were more likely to have preschoolers who complied during dyadic interactions.

In sum, there is considerable empirical evidence that supportive parenting strategies play a key influential role in preschoolers' emotional and behavioral outcomes. Few studies, however, have examined the dyadic processes that occur during parent-child interactions and their relationship to preschoolers' developmental psychopathology. The present study aimed to address several gaps in the literature on affective disorders in young children. First, the constructs of interest have never been investigated in a sample of preschoolers for whom categorical *DSM-IV* diagnoses in general have been established or even further in a sample with a diagnosis of *DSM-IV* major depressive disorder specifically. The relationship between preschoolers' depression severity and positive as well as negative behaviors during observed dyadic tasks has not been previously examined. Furthermore, to our knowledge this is the first investigation using structured observational parent-child teaching tasks to examine the relationships between parenting strategies and preschoolers' depression severity sum scores.

Hypotheses

For the present study, it was hypothesized that higher depression severity sum scores among a population of preschool children with depression, preschool children with disruptive psychiatric disorders (in particular

DSM-IV attention-deficit/hyperactivity disorder [ADHD] and/or oppositional defiant disorder [ODD]), and healthy preschoolers with no psychiatric disorder would be associated with lower scores in the observed behavioral dimensions of child persistence, compliance, and enthusiasm during mother-child teaching tasks. Furthermore, it was expected that preschoolers' higher depression severity sum scores would be associated with having mothers who display significantly less emotional support while interacting with their young children. We are unaware of any available studies to date that have examined how parenting depressed preschoolers may influence parental behavior, style, or strategy. Based on research that has investigated parent-child interactions with school-age depressed children, it was expected that parents of depressed preschoolers would display less support during the dyadic tasks (Cole and Rehm, 1986). Finally, the degree to which parents used positive regard and emotional support during parent-child interaction tasks was expected to account for a significant portion of the variance in children's positive behaviors of persistence, compliance, and enthusiasm throughout the tasks.

An a priori hypothesis that the direction of effect went from child depression severity to parenting (i.e., parenting was the mediator) and from parenting to preschoolers' behavioral outcomes was tested in the present analyses. Although not tested, we believe that these associations are most likely bidirectional. Furthermore, the cross-sectional study design does not allow inferences about causality but tests only the association between these variables.

METHOD

Participants

Dyads were recruited for participation in a study of the nosology of preschool depression conducted in the Early Emotional Development Program (EEDP) at the Washington University School of Medicine. Preschool children between the ages of 3.0 and 5.6 years were recruited from community pediatric setting (77%) using a validated screening checklist (Luby et al., 2004a). The remaining 23% of the sample was recruited by consecutive case ascertainment from child mental health clinics. Preschoolers qualified for the study if they had three or more depressive symptoms or three or more disruptive/nonspecific symptoms. Children also qualified for the study if they had one or no symptom of any kind. Preschoolers were excluded from participating if they had a known neurological or developmental disorder; had two symptoms thought to represent normative problems, or if they had an IQ <70. All children who

met inclusion and exclusion criteria were invited for a 2- to 3-hour laboratory assessment at the EEDP. On the basis of parent reports from the DISC-IV-YC, the majority of the sample who had complete observational data fell into one of the following three diagnostic groups of interest: (1) depressed ($n = 52$), (2) disruptive ($n = 43$), and (3) healthy ($n = 55$).

One hundred fifty ($N = 150$) mother-child dyads had data on the variables of interest and were included in the following analyses. Fifty-six percent (56%) of the mothers had achieved the equivalent of a bachelor's or higher degree in education. The children were 73 sons and 77 daughters from 3.0 to 5.6 years of age (mean = 53.8 months). Fourteen percent (14%) of the participants came from a household with a gross annual income of \$0 to \$29,999, 36% were from households with a gross annual income of \$30,000 to 59,999, and 48.7% had a gross annual income >\$60,000. The sample was composed of 131 white, 10 African American, 7 biracial, and 2 Hispanic children. Eighty-two percent of the mothers who participated in the study were married. Ninety percent of participating mothers were biological parents.

Measures. Mothers were interviewed about their preschoolers' moods and behaviors with a comprehensive structured diagnostic interview, a version of the DISC-IV (Shaffer et al., 1998) modified for young children (DISC-IV-YC) (Lucas et al., 1998). In addition to diagnostic classification into depressed, disruptive, and healthy as described above, depression severity sum scores based on this measure was also of interest. Depression severity sum scores were created by adding together the 19 core *DSM-IV* symptoms of depression (not including duration items) from the major depressive disorder module from the DISC-IV-YC. These 19 core symptoms are as follows: sad or unhappy, nothing fun, grouchy, lost weight, ate less, gained weight, ate more, trouble sleeping, sleeping more during the day, moving slower, restless/moved a lot, less energy, blames self, feel bad about self, not thinking clearly, trouble concentrating, trouble making choices, death play, talked about killing self. All depressive symptom items were included to create the depression severity sum score. Similar to previous findings using weighted depression severity scores (Luby et al., 2004b), in which a statistically significant hierarchy among the three diagnostic groups was found, unweighted depression severity sum scores resulted in a similar statistically significant hierarchy. Furthermore, the Pearson correlation between the weighted depression severity score and sum score was $r = 0.98$. In this hierarchy, the no disorder group had the lowest depression severity sum scores (symptoms endorsed: mean = 1.78, SD = 1.71, range 0-5). The disruptive group endorsed significantly more ($p = .002$) depression symptoms (mean = 3.38, SD = 1.91, range 0-7) than the no disorder group. The depression group endorsed significantly more depressive symptoms (mean = 9.75, SD = 2.86, range = 5-16) than the no disorder group ($p = .000$) as well as the disruptive group ($p = .000$). It is also important to note that the disruptive group was by definition not comorbid with any other internalizing disorder (Luby et al., 2004b). Thus, in the present study, findings that indicated a significant effect for having higher depression severity sum scores are also associated with a diagnosis of *DSM-IV* major depressive disorder.

Teaching Tasks. Child behavior during standardized dyadic teaching tasks were videotaped and coded using standardized methods known to be reliable and valid (Pianta and Egeland, 1994; Sroufe et al., 1990). The Teaching Task (Egeland and Hiester, 1995) is a semistructured videotaped observational measure of parent-child interaction designed for use in preschool-age children in which children and their primary caregivers perform three mildly stressful cognitive tasks.

Procedure. Mothers were given some general directions for how their children should complete each of the tasks, but caregiver interpretation of the details of their own role was essential to the utility of the measure. The first task was a building-blocks task in which mothers instructed their children how to replicate an already formed three-dimensional shape. The second task required mothers to encourage their children to name as many items that had wheels as they could think of with the parent providing clues but not answers. Last, mothers had to help children navigate a maze using an Etch-a-Sketch pad with the child controlling one knob and the parent controlling the other. Dyads worked on each task until it was complete or until 5 minutes had passed, whichever came first.

Videotaped interactions were coded for the three child behaviors and one parental behavior. Child persistence was a measure of the extent to which the child was focused on a problem during the three tasks. Children who were low on persistence actively tried to avoid the task. Children who scored high on child persistence worked virtually throughout the session to complete the task. Children with high persistence were highly motivated to obtain the correct solutions for each part of the task. Child compliance was a measure of children's willingness to listen to their mothers' suggestions or directives and to comply with requests in a reasonable and nonconflictual manner. Low child compliance indicated that children rejected virtually all directions of the caregiver during the session. High child compliance was characterized by compliance with virtually all caregiver directions, and acceptance of mothers' ideas on how to successfully complete the task. Although children's ratings of persistence and compliance were expected to be highly correlated, they were analyzed as separate variables. Conceptually, it was thought that some children may lack persistence during the parent-child tasks but behave in a highly compliant manner. The absence of empirical research examining persistent and compliant behaviors in depressed preschoolers further supported the decision to keep the two variables separate until empirical data suggest that they be combined.

Child enthusiasm was a measure of children's eagerness and confidence to perform the tasks. This dimension was designed to capture the children's "sense of agency" and their ability to effectively match positive affect and behavior. Low child enthusiasm indicated that the children displayed little eagerness and confidence and high child enthusiasm illustrated that the children eagerly wanted to be involved in the task and made it apparent that they thought they could perform well on task.

Maternal supportive presence was a measure of a mother's expression of positive regard and emotional support to the child during the tasks. A mother who received a low support rating completely failed to be supportive of the child and was characterized as aloof or emotionally unavailable. A mother who received a high rating of support encouraged her child on a contingent basis, appropriately sensing when this was needed, while respecting the child's desire for autonomy.

Three trained raters who were blinded to the child's diagnostic status independently coded videotapes. Coders were trained with a master coder until interrater reliability between the master coder and trainee as well as reliability between trainees had reached a value of ≥ 0.80 . Once coders were reliable, they each coded half of the videos. In addition, the master coder double coded 20% of the tapes to assess reliability. Parents and children were given a global rating for the focal behavior on each task ranging from 1 to 7. Pearson correlations were high in all categories and for each behavior they were as follows: persistence = 0.92, compliance = 0.91, enthusiasm = 0.95, and maternal support = 0.93. All of the discrepancies between raters were resolved by discussion and subsequent consensus.

Data Analyses. Cronbach's α for all major depressive disorder items from the DISC-IV-YC was 0.85, which represents a high level of association of these symptoms. Depression severity sum scores were computed for each study subject by adding all 19 depression symptoms that were from the major depressive disorder module from the DISC-IV-YC.

Average scores were constructed for each of the child behaviors as well as maternal supportiveness. Children's use of persistence, compliance, and enthusiasm received a rating from 1 to 7 on each of the teaching-oriented parent-child tasks. Thus, the same behavior types were summed across the three tasks, with the highest possible sum for each behavior being 21 and the lowest being 3. Then the three summed scores (e.g., persistence, compliance, enthusiasm) were divided by the number of tasks (tasks = 3). The same steps were taken to derive an average score for maternal support across the three tasks. Averaged scores were used in the data analyses to capture a more global representation of parent and child behaviors across numerous tasks instead of looking at ratings individually for each task. Furthermore, preschoolers' observed persistence (r ranged from 0.21 to 0.44), compliance (r ranged from 0.34 to 0.42), and enthusiasm (r ranged from 0.39 to 0.51) were significantly ($p < .01$) correlated across all three tasks (i.e., blocks, maze, wheels) in addition to being conceptually related because they were designed to be challenging and elicit for cooperative problem solving, which further supported the decision to combine scores across tasks.

RESULTS

Overview

We addressed three central questions: (1) Is greater preschoolers' depression severity (based on parent report) associated with lower observed child persistence, compliance, and enthusiasm during mother-child teaching interactions? (2) Is a mother's less frequent display of emotional support associated with a child having a higher depression severity sum score? (3) Do higher ratings of observed maternal support account for a significant portion of the variance in preschoolers' observed persistence, compliance, and/or enthusiasm during dyadic teaching tasks?

Relationships Between Depression Severity Sum Scores and Preschool Behaviors/Emotions

Three separate hierarchical regression analyses were conducted to examine the amount of variance that preschoolers' depression severity sum scores accounted for in relation to children's observed persistence, compliance, and enthusiasm after controlling for age and gender. Only those variables that were significantly correlated (Table 1) with the three outcome variables or the predictor variable were entered into the hierarchical regression analyses. Table 2 contains results for the three hierarchical regression analyses conducted for depression

TABLE 1
Correlations Between Depression Severity, Behaviors, and Parents' Emotional Support

	1	2	3	4	5	6
Child's gender	—					
Child's age	0.18*	—				
Depression severity	0.05	0.12	—			
Parents' support	0.01	0.05	-0.19*	—		
Persistence	0.11	0.42***	-0.16*	0.26**	—	
Enthusiasm	0.01	0.25**	-0.19**	0.25**	0.59***	—
Compliance	0.13	0.37***	-0.15*	0.31***	0.79***	0.62***

* $p < .05$; ** $p < .01$; *** $p < .001$.

severity and three child behavioral outcomes. In the first regression analysis, children's age and gender accounted for approximately 23% of the variance in preschoolers' observed persistence in step 1 of the model. When preschoolers' depression severity sum scores were added to the model in step 2 and after controlling for the effects of age and gender on children's persistence, the total variance accounted for significantly increased ($p = .008$) to 27% for the entire model. Next, preschoolers' compliance during the parent-child tasks was regressed on child age and gender in the first step of the equation, accounting for 17% of the variance. Next, preschoolers' depression severity sum scores were added into the equation in step 2, significantly increasing the amount of total variance accounted for by the entire model to 20%. Last, children's observed enthusiasm score was regressed on preschoolers' age and gender in step 1, accounting for 8% of the variance. When preschoolers' depression severity sum score is added to the model in step 2, there was a significant increase in variance accounted for with the entire model, accounting for

12% ($p = .011$) of the variance in children's observed enthusiasm.

Relationship Between Preschoolers' Depression Severity and Emotional Support

Simple linear regression was used to test whether preschoolers' depression severity sum scores accounted for a significant portion of the variance in mothers' supportive behavior during the parent-child interaction tasks. Correlational matrices (Table 2) indicated that no other variables were correlates of maternal support or preschoolers' depression severity; thus, no covariates were entered into the analysis. As expected, preschoolers' depression severity sum scores were significantly related to mothers' observed emotional support during the teaching tasks ($R^2_{adjusted} = 0.03$, $F_{1,148} = 5.53$, $p = .02$). Specifically, mothers observed using the least amount of emotional support during the dyadic tasks was associated with preschoolers' having higher depression severity sum scores.

TABLE 2
Depression Severity Predicting Preschoolers' Persistence, Compliance, and Enthusiasm

Predictor/Step	Criterion	Model R^2	β	t	p	ΔR^2	F
Gender/1			0.002	0.025	ns		
Age/1		0.23	0.480	6.50	.000	0.23	21.99***
Depression severity/2	Persistence	0.27	-0.192	-2.69	.008	0.04	17.60***
Gender/1			0.033	0.425	ns		
Age/1		0.17	0.406	5.30	.000	0.17	15.12***
Depression severity/2	Compliance	0.20	-0.177	-2.37	.019	0.03	12.20***
Gender/1			-0.059	-0.731	ns		
Age/1		0.08	0.285	3.53	.001	0.08	6.22**
Depression severity/2	Enthusiasm	0.12	-0.203	-2.59	.011	0.04	6.48**

Note: ns = not significant.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Relationships Between Parental Support and Preschool Behaviors/Emotions

Three hierarchical regression analyses were conducted to examine the relationship between maternal supportiveness and preschoolers' displays of persistence, compliance, and enthusiasm during mother-child interaction tasks while controlling for the effects of preschoolers' age and gender. Table 3 contains results for the three hierarchical regression analyses conducted for maternal support and three child outcome variables. For all of the outcome variables (i.e., persistence, compliance, enthusiasm), preschoolers' age and gender were entered into the equation at step 1 as covariates; maternal support was entered into the model at step 2. Preschoolers' observed persistence was regressed on age and gender in the first step of the model and accounted for 23% of the variance. Maternal support was entered into the model equation at step 2 significantly increasing the total amount of variance accounted for with the full model, accounting for 30% of the total variation. For the next analyses, preschoolers' compliance was regressed on age and gender in step 1 of the equation, accounting for 17% of total variance. In step 2, maternal support was added to the model, accounting for a significant increase in the total variance explained (26%). Last, preschoolers' observed enthusiasm during the parent-child tasks was regressed on age and gender and accounted for 8% of the variance. When maternal support was added to the model in step 2, the total amount of variance accounted for significantly increased to 15%. Analyses indicated that mothers' expressing positive regard and emotional support with greater frequency while interacting with their preschoolers was associated with having children who were significantly

more likely to be persistent, compliant, and enthusiastic during dyadic tasks after controlling for age of child. In other words, supportive parenting was significantly associated with preschoolers' positive behavioral outcomes.

Mediating Processes

Following procedures outlined by Baron and Kenny (1986), evidence of maternal support as a mediator of the expected relationship between preschoolers' depression severity and their observed behaviors during dyadic interactions would be provided by the following conditions: (1) a significant relationship between child's depression severity sum score and maternal support, (2) a significant relationship between severity sum score and children's persistence, compliance, and/or enthusiasm during the mother-child interaction tasks, (3) a significant relationship between maternal support and children's behaviors during the interaction tasks, and (4) a reduction in the overall relationship (i.e., standardized β coefficient) between preschoolers' depression severity sum scores and children's persistence, compliance, or enthusiasm during mother-child interactions when the effects of maternal support were accounted for statistically.

We tested these effects in a series of multiple regression analyses (Table 4). Support for the first three conditions necessary to establish a mediation relationship are described above. Support for condition 4 was provided by the reduced effect of childhood depression severity sum scores on children's persistence and compliance when the effect of maternal support was accounted for statistically. That is, the effect of early childhood depression severity on children's persistence and compliance was no longer statistically significant when the effect of maternal support was statistically controlled.

TABLE 3
Predicting Preschoolers' Persistence, Enthusiasm, and Compliance From Parental Support

Predictor/Step	Criterion	Model R^2	β	t	p	ΔR^2	F
Gender/1			0.002	0.025	ns		
Age/1		.23	0.480	6.50	.000	0.23	21.99***
Parental support/2	Persistence	.30	0.255	3.66	.000	0.07	13.42***
Gender/1			0.033	0.425	ns		
Age/1		0.17	0.406	5.30	.000	0.17	15.12***
Parental support/2	Compliance	0.26	-0.174	-2.34	.021	0.09	17.63***
Gender/1			-0.059	-0.731	ns		
Age/1		0.08	0.285	3.53	.001	0.08	6.22**
Parental support/2	Enthusiasm	0.15	-0.211	-2.71	.008	0.07	11.67***

* $p < .05$; ** $p < .01$; *** $p < .001$.

TABLE 4
Parental Support as a Mediator of the Relationship Between
Preschoolers' Depression and Behavior

Predictor/Step	Criterion	Adjusted R^2	β	t	p
Depression severity/1		0.025	-0.159	-1.95	.026
Depression severity/2			-0.110	-1.36	.08
Parental support/2	Persistence	0.088	0.255	3.16	.001
Depression severity/1		0.035	-0.186	-2.29	.011
Depression severity/2			-0.139	-1.74	.042
Parental support/2	Enthusiasm	0.093	0.246	3.07	.001
Depression severity/1		0.021	-0.146	-1.79	.037
Depression severity/2			-0.09	-1.12	.131
Parental support/2	Compliance	0.107	0.298	3.74	.000

Although the strength of the relationship between depression severity and preschoolers' observed enthusiasm was also reduced when the effect of maternal support was accounted for, the relationship between depression and enthusiasm remained statistically significant.

Additional analyses were conducted to test whether maternal support mediated the expected relationship between children's disruptive symptom sum scores and their observed behaviors during the parent-child interaction tasks. Preschoolers' ODD sum scores were not related to maternal support, nullifying the possibility of maternal support being a mediator between ODD and child behaviors. When ADHD sum scores were tested, maternal support did not mediate the relationship between ADHD sum scores and children's behavioral persistence or compliance. Thus, when ODD and ADHD were tested in the originally hypothesized mediation model using depression sum scores, a different and unique set of findings emerged.

DISCUSSION

The findings from this study demonstrated that preschoolers' depression severity sum scores based on parents' report of symptoms were associated with their objectively observed use of persistence, compliance, and enthusiasm during dyadic teaching tasks. Analyses from the same study have also shown that the categorical diagnosis of depression was also associated with alterations in observed behaviors along the same lines (Luby et al., 2006). Consistent with available data (e.g., Kuczynski, 1984; Maccoby, 1994; 2002) demonstrating the influence of parenting strategies on children's behavior during mother-child interactions, preschoolers' with mothers who were observed using more emotionally

supportive parenting strategies were themselves observed to be more persistent, more compliant, and more enthusiastic. Furthermore, higher preschoolers' depression severity sum scores were associated with less frequent use of emotionally supportive parenting strategies. Although the cross-sectional study design does not allow for causal inferences pertaining to preschoolers' depression severity, child behavioral outcomes, and mothers' emotional support, the findings confirmed our initial hypotheses about the expected relationships between these three constructs as well as the mediating role of supportive parenting strategies within the hypothesized relationships. The established relationships between these variables suggest the need for further investigation of directionality and causal mechanisms.

As hypothesized, preschoolers with higher depression severity sum scores were observed exhibiting significantly less enthusiasm during dyadic tasks. Preschoolers characterized by the symptom of anhedonia and with a presumptive melancholic subtype as described above have been shown to have the highest weighted depression severity scores (Luby et al., 2003b). Along these lines, this finding is consistent with and expands on previous study findings in which the presence of anhedonia was identified as a robust and specific marker of preschool depression (Luby et al., 2002, 2004b). This finding of lower levels of observed child enthusiasm associated with higher depression severity sum scores provides additional construct validity for the symptom of anhedonia ascertained by parental report in preschool depression. The finding that lack of enthusiasm was identifiable during the dyadic interactions using an objective rating system by coders blinded to other components of the child's psychiatric history has clinical relevance as well because the detection of symptoms of depression by observation of behavior is critical to the identification of this disorder.

Mothers' Emotional Support as a Mediator

The degree to which preschoolers' depression severity sum scores accounted for the variance within preschoolers' observed behaviors (e.g., persistence, compliance) during dyadic interactions was significantly associated with the amount of emotional support displayed by their mothers. Furthermore, when the effect of maternal support was accounted for statistically, the relationship between depression severity and preschoolers' persistence and compliance was no longer

statistically significant. These findings support the hypothesis that maternal emotional support is at least a partial mediator of the relationship between children's depression severity and observed behavior. These findings are especially interesting when considering results from Luby et al. (2006) that indicated maternal support did not differ significantly between the broad group diagnostic classifications (i.e., no disorder, disruptive, depression). When taken together, there may be important differences that become evident when comparing categorical definitions of depression versus the dimensional measurement of depression severity within a broader population of well and disordered preschoolers.

Contrary to our original hypotheses and highly notable was the finding that mothers' use of emotional support did not mediate the relationship between depression severity and preschoolers' levels of enthusiasm throughout the dyadic tasks. The absence of a mediating relationship in this emotional domain raises several points. There is a possibility that preschoolers' diminished expressions of enthusiasm were influenced more heavily by unique internal (i.e., temperament) rather than external relational factors (i.e., maternal support). Relational factors are more clearly operational in the child's expression of compliance and persistence. Although we would expect all three child behaviors of interest to be driven by both external and internal factors, these findings could suggest that enthusiasm was predominantly driven by internal forces and was less dependent on and/or reactive to external maternal regulation or support. For instance, mothers could have employed numerous parenting strategies both positive and negative to successfully elicit compliance and persistence from their preschool-age child. Along these lines, parenting research supports the notion that caregivers who use more encouragement and praise during parent-child interactions are more likely to have children who will persist at tasks (Kochanska, 1997). In contrast, enthusiasm is conceptualized as an emotion that may be a feature of inherent "hedonic tone" that is often unresponsive to external events (Luby et al., 2004b). These data would support the hypothesis that increased depression severity inhibits a preschooler's capacity to experience pleasure and display enthusiasm during joyful tasks independent of the amount of emotional support parents are offering, suggesting that enthusiasm may be a core internal feature of depression in young children.

The finding that mothers' emotional support mediated the relationship between preschoolers' depression severity and their observed persistence and compliance during dyadic tasks is noteworthy for several reasons. First, our results illustrated that preschoolers' *DSM-IV*-based dimensional depressive psychopathology was associated with the type and frequency of supportive parenting strategies used by caregivers during parent-child interactions. Although it seems logical to expect that a preschooler's depressive severity may be associated with parenting strategies during interactions with their young child, this is one of the few studies to examine and empirically support such a claim in a sample that contains young children with psychiatric disorders (as well as healthy controls). Second, significant associations were found between preschoolers' depression severity sum scores and their persistent, compliant, and enthusiastic behaviors during dyadic tasks with their mothers. The finding that parental support mediated the relationship between preschoolers' depression severity and their observed use of persistence and compliance suggests that supportive parenting may be a key factor in the degree to which depressive symptom severity affects the child's adaptive behaviors and functioning. Furthermore, testing the same path model replacing depression severity with dimensional ODD and ADHD sum scores reveals a different set of relationships among the key variables, suggesting that the mediation model is specific to preschoolers' depressive symptoms.

The findings of the present study should not be interpreted as suggesting that "optimal" parenting strategies alone can nullify the deleterious effects of early childhood psychopathology on emotional and behavioral outcomes. However, our study indicated that within the domain of mother-child interaction tasks, when emotionally supportive parenting strategies were included in the model, preschoolers' depression severity sum scores were no longer significantly associated with their own compliant or persistent behaviors. In contrast, the significant association between preschoolers' psychopathology and observed enthusiasm remains significant independent of mothers' emotional supportiveness during the dyadic tasks.

Limitations and Future Directions

The majority of dyads that participated in this study were white and middle class. All were mother-child dyads. Thus, the homogeneity of the present sample

limited the conclusions that could be drawn, such as whether similar results would have emerged in a sample that included primarily father-child dyads or dyads from diverse cultural and ethnic backgrounds. Further studies are needed to explore these relationships in culturally diverse samples and within other dyadic relationships. Another limitation was the cross-sectional study design that limited our conclusions to establishing relationships and testing directions of associations, but could not address the more complex issue of causality. That is, based on the present data, one cannot draw conclusions about whether mothers' support caused preschoolers to be less depressed or vice versa nor does it shed light on more complex reciprocal relationships that are likely to be operational. It is possible that unsupportive parenting is a strong environmental risk factor that may eventually result in preschoolers' developing depression. It is also possible that the experience of having a severely depressed preschooler may result in the development of unsupportive parenting. Although the present study did not assess bidirectional influences within parent-child dynamics, the mediation model that was examined did test child effects on parents as well as parent effects on children concurrently. Thus, the present model tested is thought to more closely reflect the circular nature of parent-child interactions but undoubtedly does not capture the more detailed complexity and causality of these relationships.

Along these lines, future research designs may examine a broader variety of parenting strategies as well as parent-child exchanges (e.g., conflict) and whether they also mediate the relationship between young children's psychopathology and behavioral outcomes. Last, to understand the bidirectional processes that likely take place among psychopathology, parenting, and child outcomes, longitudinal designs that explore the changes in these relationship over time are imperative.

Clinical Implications

Detailing age-specific manifestations of depression in dyadic interactions as outlined may be useful for clinicians to rely on as a method of detecting depressive symptoms in young children in addition to or in the absence of reliable parent reporting. Also, finding convergent validity between parent-reported symptoms of depression and objectively observed behavioral manifestations of depression in preschoolers suggests that clinicians may be able to identify depression in very young nonverbal children by observing

their behaviors and affective responses during interactions with their primary caregivers.

These findings underscore the central importance of the dyadic relationship in young child behavioral and emotional functioning, suggesting that this context is also central to the dynamics of depressive psychopathology. Future longitudinal investigations that address the mechanism of influence and bidirectionality between parent and child behaviors are now warranted. Such data could have implications in understanding potential relational etiologies and influences as well as in informing the design of prevention/intervention strategies for early onset depressive disorders. In addition and perhaps most important, findings suggest that both internal hedonic tone and external relational factors are influential in the early manifestation of depressive disorders. The salience of both of these phenomena suggests that clinicians should assess and intervene with attention to both of these domains with a young child population.

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Clown Doctors as a Treatment for Preoperative Anxiety in Children: A Randomized, Prospective Study Laura Vagnoli, PhD, Simona Caprilli, PhD, Arianna Robiglio, BA, Andrea Messeri, MD

Background: The induction of anesthesia is one of the most stressful moments for a child who must undergo surgery: it is estimated that 60% of children suffer anxiety in the preoperative period. Preoperative anxiety is characterized by subjective feelings of tension, apprehension, nervousness, and worry. These reactions reflect the child's fear of separation from parents and home environment, as well as of loss of control, unfamiliar routines, surgical instruments, and hospital procedures. High levels of anxiety have been identified as predictors of postoperative troubles that can persist for 6 months after the procedure. Both behavioral and pharmacologic interventions are available to treat preoperative anxiety in children. **Objective:** The aim of this study was to investigate the effects of the presence of clowns on a child's preoperative anxiety during the induction of anesthesia and on the parent who accompanies him/her until he/she is asleep. **Methods:** The sample was composed of 40 subjects (5-12 years of age) who had to undergo minor day surgery and were assigned randomly to the clown group ($N=20$), in which the children were accompanied in the preoperative room by the clowns and a parent, or the control group ($N=20$), in which the children were accompanied by only 1 of his/her parents. The anxiety of the children in the preoperative period was measured through the Modified Yale Preoperative Anxiety Scale instrument (observational behavioral checklist to measure the state anxiety of young children), and the anxiety of the parents was measured with the State-Trait Anxiety Inventory (Y-IN-2) instrument (self-report anxiety behavioral instrument that measures trait/baseline and state/situational anxiety in adults). In addition, a questionnaire for health professionals was developed to obtain their opinion about the presence of clowns during the induction of anesthesia, and a self-evaluation form was developed to be filled out by the clowns themselves about their interactions with the child. **Results:** The clown group was significantly less anxious during the induction of anesthesia compared with the control group. In the control group there was an increased level of anxiety in the induction room in comparison to in the waiting room; in the clown group anxiety was not significantly different in the 2 locations. The questionnaire for health professionals indicated that the clowns were a benefit to the child, but the majority of the staff was opposed to continuing the program because of perceived interference with the procedures of the operating room. The correlation between the scores of the form to self-evaluate the effectiveness of the clowns and of the Modified Yale Preoperative Anxiety Scale is significant for both the waiting room and induction room. **Conclusions:** This study shows that the presence of clowns during the induction of anesthesia, together with the child's parents, was an effective intervention for managing children's and parents' anxiety during the preoperative period. We would encourage the promotion of this form of distraction therapy in the treatment of children requiring surgery, but the resistance of medical personnel makes it very difficult to insert this program in the activity of the operating room. *Pediatrics* 2005;116:908-916.

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