

The Clinical Picture of Depression in Preschool Children

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ABSTRACT

Objective: To investigate the clinical characteristics of depression in preschool children. **Method:** One hundred seventy-four subjects between the ages of 3.0 and 5.6 years were ascertained from community and clinical sites for a comprehensive assessment that included an age-appropriate psychiatric interview for parents. Modifications were made to the assessment of *DSM-IV* major depressive disorder (MDD) criteria so that age-appropriate manifestations of symptom states could be captured. Typical and “masked” symptoms of depression were investigated in three groups: depressed (who met all *DSM-IV* MDD criteria except duration criterion), those with nonaffective psychiatric disorders (who met criteria for attention-deficit/hyperactivity disorder and/or oppositional defiant disorder), and those who did not meet criteria for any psychiatric disorder. **Results:** Depressed preschool children displayed “typical” symptoms and vegetative signs of depression more frequently than other nonaffective or “masked” symptoms. Anhedonia appeared to be a specific symptom and sadness/irritability appeared to be a sensitive symptom of preschool MDD. **Conclusions:** Clinicians should be alert to age-appropriate manifestations of typical *DSM-IV* MDD symptoms and vegetative signs when assessing preschool children for depression. “Masked” symptoms of depression occur in preschool children but do not predominate the clinical picture. Future studies specifically designed to investigate the specificity and sensitivity of the symptoms of preschool depression are now warranted. *J. Am. Acad. Child Adolesc. Psychiatry*, 2003, 42(3):340–348. **Key Words:** preschool, depression, developmental, nosology.

The notion that prepubertal children could experience clinical depression was rejected by developmental theorists for decades because it was believed that prepubertal children would be too immature cognitively and emotionally to experience core depressive affects (Digdon and Gotlib, 1985). Among several issues, developmentalists argued that children younger than age 9 did not have a sufficiently developed self-concept and therefore could not experience the discrepancy between the real and ideal self that is a necessary precursor to guilt, a core emotion

of depression (Cowan, 1978; Harter, 1986). However, in contrast to these theoretical speculations, empirical studies of affect development over the past decade suggested that children as young as preschool age displayed a far more sophisticated understanding and experience of depressive affects than previously recognized (Gobbo and Chi, 1986; Markman, 1989). These findings suggested that development alone would not limit the potential to experience depressive affective states.

Related to the idea that there would be developmental limitations to the expression of depressed affect, the theory that children would not express depression directly but rather indirectly through somatic complaints, aggression, and various other nonaffective symptoms was also asserted. This theory, which is now important for historical perspective only, purported that instead of the “typical” symptoms of depression such as sadness and anhedonia, children would be more likely to express depressive affect in indirect forms as “masked depression” (Lesse, 1983). Carlson and Cantwell (1980) provided the first data refuting this theory. They found that while symptoms of “masked” depression were present in depressed

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children and adolescents, these were often the more obvious superficial presenting complaints in patients for whom typical symptoms of depression could also be identified when thorough interviews were done (Carlson and Cantwell, 1980). These investigators also concluded that these purported “masked” symptoms were not specific to depression and were also found in children with nonaffective disorders (Carlson and Cantwell, 1980). In their landmark paper titled “Unmasking Masked Depression in Children and Adolescents,” these investigators concluded, “the mask [of depression in childhood], if present, is very thin” (Carlson and Cantwell, 1980).

Several empirical studies of depressive phenomenology subsequently provided evidence that depressed prepubertal children could be identified using the adult *DSM* taxonomy criteria (e.g., Puig-Antich et al., 1978; Ryan et al., 1987). Ryan et al. (1987) provided data demonstrating few differences in the frequency and severity of depressive symptoms between child and adolescent age groups. Similarly, in an analysis of three samples of depressive symptoms across the age span, Carlson and Kashani (1988) conclude that although there are some age-related variations, age does not alter the basic phenomenology of major depressive disorder (MDD). Accordingly, the manifestations of depressive symptomatology were shown to be unrelated to Piagetian cognitive development among depressed prepubertal and adolescent children (Kovacs and Paulauskas, 1984). These findings of homogeneity in the clinical presentation of MDD across the age span and the predominance of “typical” rather than “masked” symptoms of depression have been well established for children older than 6. However, there have been no specific investigations of sufficient sample size of the developmental manifestations of depression in children younger than age 6.

Luby et al. (2002) have demonstrated that *DSM-IV* MDD criteria can be applied to preschool children when the assessment is modified to account for age-appropriate symptom manifestations. These data supported the hypothesis that developmental translations of the core criteria for MDD, as well as setting aside the 2-week duration criterion, were necessary to capture a substantial proportion of preschool children with clinical symptoms of depression (Luby et al., 2002). The issue of the duration of an episode of clinical depression in a preschool child remains unclear and is in need of further investigation. The validity of the *DSM-IV* MDD criteria, based on a developmentally modified assessment, has been supported by a significantly greater family history of related disorders, 6-month sta-

bility, the child’s self-report of negative affect on an age-appropriate puppet interview, and specificity of clinical presentation, as well as ratings on independent measures of psychopathology (Luby et al., 2002). When the assessment was modified to account for age-appropriate manifestations of *DSM-IV* criteria, clinical depression (with or without comorbidity) was identified in 55 preschool children recruited from 473 community and 159 clinical unscreened age-eligible subjects over a 3-year period.

For this investigation, we hypothesized that depressed preschool children, like older depressed children, would manifest a predominance of “typical” symptoms of MDD rather than “masked” symptoms of depression. To investigate this question, we examined the frequency of typical and “masked” symptoms in three groups of preschool children. We compared preschool children who met all *DSM-IV* MDD criteria except the 2-week duration criterion (“depressed” group) with or without comorbid disorders other than pervasive developmental disorders, a psychiatric group of preschool children who had either *DSM-IV* attention-deficit/hyperactivity disorder (ADHD) and/or oppositional defiant disorder (ODD) (“externalizing” comparison), and a “no disorder” comparison group who did not meet *DSM-IV* criteria for any psychiatric disorder.

METHOD

Children between the ages of 3.0 and 5.6 years from mental health and primary care settings were recruited for study. Children were recruited from community pediatricians’ offices using an advertisement about “emotional development” posted in waiting areas with a companion checklist to be filled out by parents, designed to screen for early-onset behavior problems (Preschool Feelings Checklist; Luby et al., unpublished manual). Over a 3-year recruitment period, $n = 540$ checklists were returned and $n = 134$ subjects from this community pediatric sample met all inclusion and exclusion criteria and agreed to participate. One hundred fifty-nine consecutive cases from a specialty mental health clinic (a clinical service exclusively serving children aged 5 and younger) over the same 3-year period were age-eligible, and $n = 40$ met all inclusion/exclusion and agreed to participate. The portion of the sample ascertained from the mental health clinic primarily sought (and received) clinical services and subsequently agreed to participate in the research. While many parents of younger children returned the checklist posted in pediatricians’ offices, these subjects were excluded based on age because of the lower age limitations of the measures used. Subjects who met inclusion/exclusion criteria but did not consent indicated that their refusal was based on time constraints or lack of motivation.

Three groups of preschool children were recruited for study participation based on a telephone interview of inclusion and exclusion criteria conducted by a trained research assistant (that included demographic, medical and developmental information): (1) those with at least two symptoms of depression; (2) those with at least two symptoms of externalizing psychiatric disorders (ADHD and/or ODD); and (3) those without symptoms of psychiatric disorders. Excluded

were children with chronic medical illnesses and/or neurological problems and those with pervasive developmental disorders and/or language and cognitive delays that would prohibit their ability to understand the study questions. All children meeting these criteria and their primary caregivers were invited into the laboratory for a 2-hour comprehensive assessment of "emotional and behavioral development."

While these guidelines were used to recruit study subjects, group status (depressed, externalizing psychiatric comparison, or no-disorder comparison groups) was determined by parent report on the psychiatric interview (DISC-IV-YC). For the diagnosis of MDD, *DSM-IV* criteria were modified so that the strict 2-week duration criterion was not required (see Luby et al., 2002, for detailed description). Children who met these modified MDD criteria were included in the depressed group regardless of comorbid status. Only those with the diagnoses of ADHD and/or ODD (could be comorbid for both disorders but could not have any affective disorder) were included in the "psychiatric comparison group." To be included in the "no disorder" comparison group, the child could not meet criteria for any psychiatric disorder. Both no-disorder and externalizing psychiatric comparison groups were included to determine whether findings were specific to affective disorders.

One hundred seventy-four preschool children have undergone a comprehensive baseline assessment in the Early Emotional Development Program at the Washington University School of Medicine (a research program focusing on preschool affective disorders). This sample represents an expansion of the study sample from which preliminary validation of this preschool depressive syndrome was previously reported based on data from the first 136 subjects (Luby et al., 2002). The assessment included an age-appropriate structured psychiatric interview for the parents of young children that included all diagnostic modules with known relevance to young children (e.g., schizophrenia and substance abuse modules were not used). To develop this interview, the first author and colleagues collaborated with the authors of the Diagnostic Interview Schedule for Children (DISC) to create this modified version of the DISC-IV-parent (Shaffer et al., 1998) for the parents of young children, the DISC-IV Young Child (DISC-IV-YC) (Lucas et al., 1998). Several DISC-IV items were modified in the DISC-IV-YC to account for their age-appropriate developmental manifestations. This was deemed necessary at face value because some items as they were described in the DISC-IV did not apply to the life experiences of preschool children. The most obvious were the items that applied to school behavior across all modules. Because preschool children are not in academic school settings, all items that addressed schoolwork were modified to address "activities and play" (e.g., difficulty focusing on "activities and play" rather than schoolwork). A more subtle modification was that the term "sad or depressed" on the DISC-IV was changed to "sad or unhappy" to better express how parents tend to view the negative mood state of a young child. Along these lines, for the assessment of concentration "decisions" were described as "choices." Furthermore, because preschool children are less verbally competent than older children, items that addressed preoccupation with death and suicidality were modified to account for the possibility that these symptoms might be manifested as persistent themes in play (in addition to the possibility that they might be verbally expressed). All items pertaining to anhedonia in the DISC-IV (described as "nothing was fun"), were unchanged in the DISC-IV-YC. All remaining MDD items on the DISC-IV were also unchanged.

To assess the presence of "masked" symptoms and other possible manifestations of early-onset depression, an additional structured questionnaire, the Preschool Symptom Module (PSM) (Luby et al., unpublished manual) was developed for the study and administered to the parent about the child. The PSM addresses several additional symptoms commonly observed in preschool children (based on the clinical experience

of the first author, J.L.L., and clinically experienced preschool clinicians) but not included in the DISC-IV-YC. The PSM items were designed using the same format as the DISC-IV to enhance its compatibility with that measure. Among other measures, the age-appropriate version of the Child Behavior Checklist (CBCL) (Achenbach and Edelbrock, 1995), which addresses depression and anxiety, withdrawal, and somatic symptoms, was also completed by the parent informant at this time. All parent measures were filled out by the same parent informant in all cases (96% were mothers) except one in which the CBCL was filled out by father and the mother was the respondent on the DISC-IV-YC.

Analysis

Frequency of symptoms on the DISC-IV-YC and PSM were compared between the three groups using the χ^2 statistic. For symptoms that had differential frequencies between three groups, post hoc comparisons were made again using the χ^2 statistic to determine where there were differences between individual groups. A one-factor independent-measures analysis of variance was used to compare *t* scores from subscales on the CBCL between the three study groups. Post hoc comparisons were made using independent *t* tests to determine where there were differences between diagnostic groups.

To determine the differential sensitivity and specificity of the various signs and symptoms to differentiate depressed children from those in the no-disorder and psychiatric comparison groups, a receiver operating characteristics (ROC) plot was generated. The ROC is a geometric method that is the basis of the "signal detection" approach for evaluating the utility of medical tests to identify clinically significant disorders. To do this, the ROC derives the point of maximal sensitivity (true positive) and specificity (true negative). The utility of a medical test in a public health system is based on its ability to optimize both of these features. For individual symptoms, sensitivity on the vertical axis is plotted against specificity on the horizontal axis, in the "QROC" methodology described by Kraemer (1992). This methodology has been applied to diagnostic algorithms in psychiatry for the purpose of determining the specificity and sensitivity of diagnostic criteria (Kraemer, 1992).

To estimate further the differential risk of having depression based on the presence of any individual symptom, odds ratios (and confidence intervals) were calculated for each typical and masked symptom comparing the depressed group to the no-disorder group. A logistic multiple regression equation combining a specific constellation of symptoms was also generated to derive a weighted formula for those symptoms most predictive of the diagnosis relative to the no-disorder controls. The resulting index function was used to generate a QROC curve (described above) depicting the tradeoff between sensitivity and specificity for the depressed versus the no-disorder groups.

In the current set of data, it was not possible to include all symptoms in the logistic regression equation. This is because some of the symptoms were perfect linear combinations of others. If those symptoms are included in the logistic regression, it is impossible to estimate a predictive model. We therefore used stepwise regression to select a parsimonious predictive model. Masked symptoms were not included because four of them had infinite odds ratios, and many of the others were much weaker predictors than the typical symptoms.

RESULTS

Demographic Characteristics

There were no significant differences between the three diagnostic groups in demographic variables such as gen-

TABLE 1
Demographic Characteristics of the Study Sample ($n = 155$)

Demographic Variable	Depressed ($n = 55$)	ADHD/ODD ($n = 43$)	No-Disorder Comparison ($n = 57$)
Mean age: months (SD)*	55.57 (8.23)	51.14 (9.68)	54.16 (8.59)
Gender: % female	55.6	43.2	54.4
Family income: %			
< \$30,000	25.9	9.1	8.8
< \$60,000	32.5	43.2	29.8
≥ \$60,000	38.9	47.7	59.6
Ethnicity: %			
White	85.2	90.9	80.7
African American	7.4	2.3	8.8
Hispanic	1.9	0	1.8
Other	5.6	6.8	8.8
Marital status: %*			
Married	71.7	88.6	87.5
Separated/divorced/single	28.3	11.4	12.5
Stressful life events*	20.7	13.5	15.0

Note: ADHD = attention-deficit/hyperactivity disorder; ODD = oppositional defiant disorder.

* $p < .05$.

der, household income per year, ethnicity, and parental education (Table 1). However, groups differed in age ($F_{2,151} = 3.119, p < .05$), with the depressed group being significantly older than the psychiatric comparison group ($t = 2.41, p < .05$). Age was controlled (factored in as a covariate) in analyses between these two groups. There were no age differences between the depressed and no-disorder comparison groups.

Groups also differed in marital status ($\chi^2[2, N = 153] = 6.356, p < .05$), with the depressed group having more single parents compared with the no-disorder comparisons ($\chi^2[1, N = 109] = 4.221, p < .05$), with no significant differences found between the other groups. Consistent with this finding, significant differences in stressful life events on the Coddington scale were found between the three groups ($F_{2,139} = 3.35, p < .05$). Two-way post hoc comparisons revealed that the depressed group experienced more stressful life events than the externalizing psychiatric group ($F_{1,88} = 3.84, p < .05$).

Comorbidity

While preschool children in the externalizing psychiatric group could not have comorbidity with any affective disorder by design, the depressed group demonstrated high levels of comorbidity with ADHD (42%) and ODD (62%), and 41% were comorbid with both disorders. Twenty-eight percent of depressed preschool children had comorbid anxiety disorders.

Symptom Frequencies: Comparison Between Groups

The frequency of *DSM-IV* symptoms of MDD (developmentally translated as assessed by the DISC-IV-YC) within the three study groups (depressed versus externalizing psychiatric versus no-disorder comparison groups) was compared (Fig. 1).

All *DSM-IV* "typical" symptoms of MDD (translated for developmental manifestations when indicated) occurred significantly more frequently in the depressed group compared with the two other groups (χ^2 ranges from 26.135 to 72.609, $p < .001$), for all three-way comparisons. Two-way post hoc comparisons were then also done for each symptom. For every "typical" symptom of MDD, the depressed group had significantly higher frequencies than each comparison group ($p < .001$) including problems with sleep and "trouble thinking or concentrating" ($p < .01$).

Figure 2 displays the frequency of additional nonaffective symptoms, some of which were hypothesized to be "masked" symptoms of depression or "depressive equivalents."

In a three-way comparison, significant differences between groups were also evident for all symptoms with the exception of "regression in development" and "afraid to leave home" in which no significant group differences were evident. Post hoc two-way comparisons revealed that the depressed group had significantly higher frequencies than the no-disorder comparisons among all symptoms in which there were group differences. There

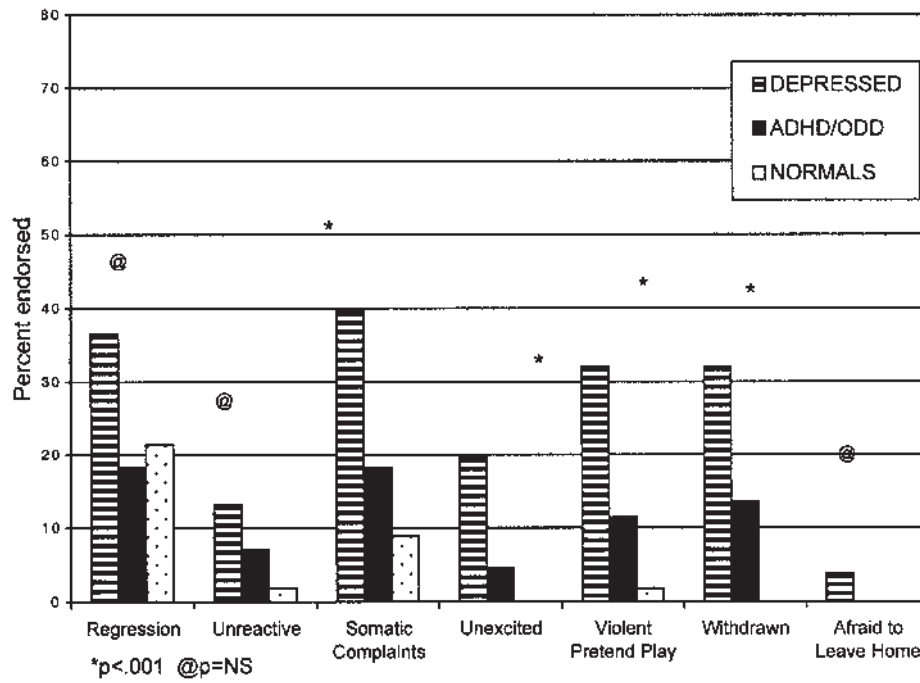


Fig. 1 Typical symptoms of major depressive disorder. ADHD = attention-deficit/hyperactivity disorder; ODD = oppositional defiant disorder; NS = not significant.

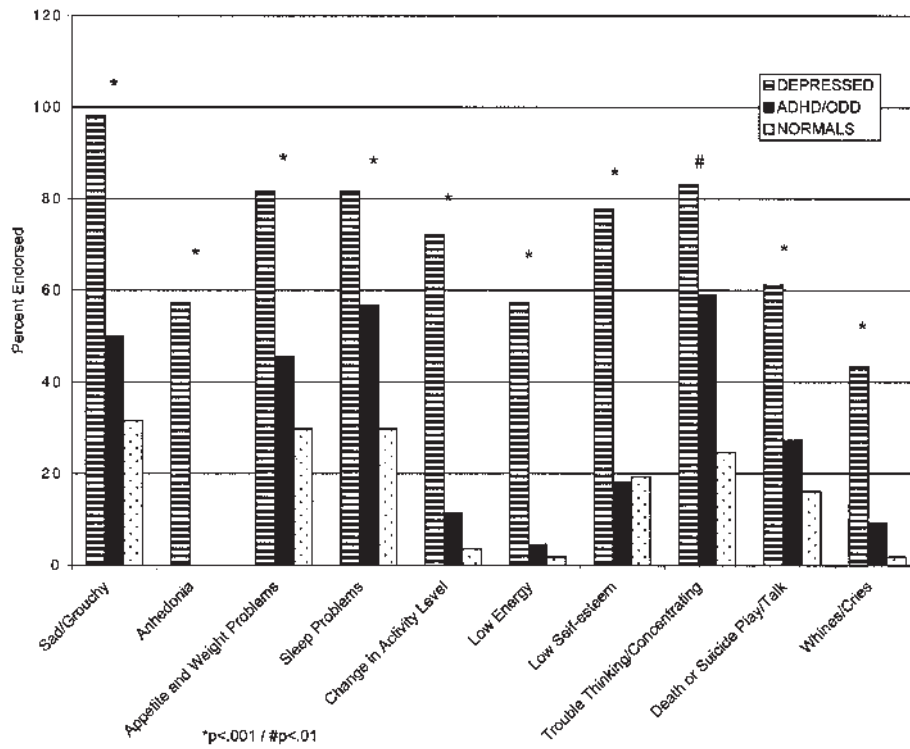


Fig. 2 Masked symptoms of major depressive disorder. ADHD = attention-deficit/hyperactivity disorder; ODD = oppositional defiant disorder.

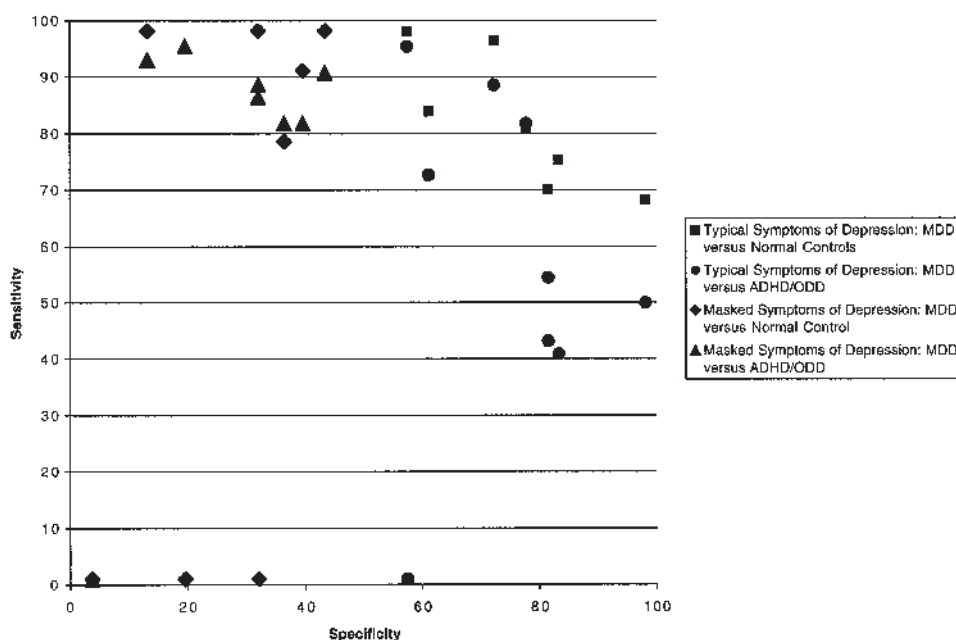


Fig. 3 QROC plot of typical and masked symptoms. MDD = major depressive disorder; ADHD = attention-deficit/hyperactivity disorder; ODD = oppositional defiant disorder.

were significant differences between the depressed group and the psychiatric comparisons for “violent pretend play” ($F_{2,148} = 12.149, p < .001$). It is notable that these “masked” symptoms occurred at a lower frequency than the “typical” symptoms of MDD as assessed by the DISC-IV-YC (Fig. 1). There were no significant differences in the frequency of any symptom of depression (either typical or masked) as a function of gender with the exception of “violent or destructive play themes” which was more frequent in boys ($\chi^2[1, N = 53] = 9.825, p < .005$).

Internalizing and externalizing *t* scores and subscale scores from the 2- to 4-year-old and 4- to 18-year-old versions of the CBCL were combined to create means for each diagnostic group. This was deemed appropriate because these subscale scores represent identical constructs (although some items are slightly different to reflect age-appropriate manifestations). These CBCL scores revealed a specific symptom pattern that differentiated the depressed group from the two comparison groups. Luby et al. (2002) have provided data demonstrating that depressed preschool children had significantly higher internalizing *T* scores compared with both comparison groups and higher externalizing *T* scores compared with the no-disorder comparisons. In addition, a unique pattern was also found on several pertinent CBCL subscales. Significant differences between groups were found on the subscales mea-

suring depression/anxiety ($F_{2,146} = 40.888, p < .001$), withdrawal ($F_{2,145} = 21.160, p < .001$), and somatization ($F_{2,146} = 37.902, p < .001$). In all areas, the depressed group showed higher levels of these symptoms than both comparison groups ($p < .001$).

TABLE 2
“Typical” and “Masked” Symptoms of MDD
(Depressed vs. No Disorder)

Symptom	Odds Ratio (95% CI)
Sad/grouchy	114.83 (14.70–896.82)
Weight/appetite problems	10.35 (4.25–25.23)
Sleep problems	10.35 (4.25–25.23)
Change in activity	71.5 (15.46–330.66)
No energy	75.48 (9.72–586.05)
Low self-esteem	14.64 (5.84–36.69)
Troubles thinking/concentrating	15.36 (6.02–39.15)
Death/suicide play or talk	8.21 (3.34–20.16)
Anhedonia	Infinite
Whined/cried	42.17 (5.42–327.85)
Sad, scary, traumatic play	14.40 (1.79–14.73)
Violent pretend play	25.97 (3.31–203.80)
Unreactive ^a	8.59 (1.02–72.49)
Regression ^a	2.11 (0.90–4.94)
Somatic ^a	6.69 (2.29–19.53)
Unexcited ^a	Infinite
Withdrawn ^a	Infinite
Afraid to leave home ^a	Infinite

Note: MDD = major depressive disorder; CI = confidence interval.
^a “Masked” symptoms.

TABLE 3
Logistic Multiple Regression (Depressed vs. No Disorder)

Symptom	Coeff.	SE	Z	$P> z $	Odds Ratio (95% CI)
Weight/appetite problems	1.91	1.04	1.83	.07	6.74 (0.87–52.05)
Changes in activity	3.98	1.46	2.73	.01	53.71 (3.08–935.41)
No energy	4.31	1.74	2.47	.01	74.25 (2.44–2,257.89)
Low self-esteem	2.70	1.03	2.63	.01	14.92 (1.99–111.64)
Trouble thinking/concentrating	2.80	1.19	2.35	.02	16.47 (1.59–170.32)
Suicidal/death play/talk	2.97	1.09	2.71	.01	19.50 (2.28–166.49)

Note: CI = confidence interval.

Specificity and Sensitivity of Symptoms of Depression

The results of the QROC analysis are plotted in Figure 3. For each symptom, the point of maximal sensitivity and specificity was calculated and plotted on the basis of the difference between the depressed and each comparison group.

The odds ratios for each “typical” and “masked” symptom of depression are listed in Table 2. For symptoms in which there were no occurrences in the no-disorder group, the odds ratio appears to be infinite (as it cannot be approximated).

The results of the logistic multiple regression demonstrating the weighted combination of symptoms that optimized sensitivity and specificity for the diagnosis (comparing depressed group to no-disorder comparisons) are listed in Table 3.

It is important to note that the most specific symptom (anhedonia) and the most sensitive symptoms (sad-

ness/irritability) could not be included in this equation because of the infinite or very high odds ratios and therefore the mechanical limits of this computation.

The resulting index function was used to generate a ROC curve depicting the tradeoff between sensitivity and specificity for the depressed group as distinguished from the no-disorder comparisons (Fig. 4). From the logistic regression equation in Table 3, sensitivity on the vertical axis was plotted against 1 minus specificity on the horizontal axis as shown in Figure 4, following the convention of signal detection theory (McNeil et al., 1975). This can be considered to be a plot of signal on the vertical axis versus noise on the horizontal axis. The ideal case is that in which the curve passes through the point whose coordinates are $y = 1, x = 0$, or equivalently, the area beneath the curve is exactly equal to 1. The area beneath the actual curve, 0.99, is very close to the maximum possible value of 1. A similar analysis was per-

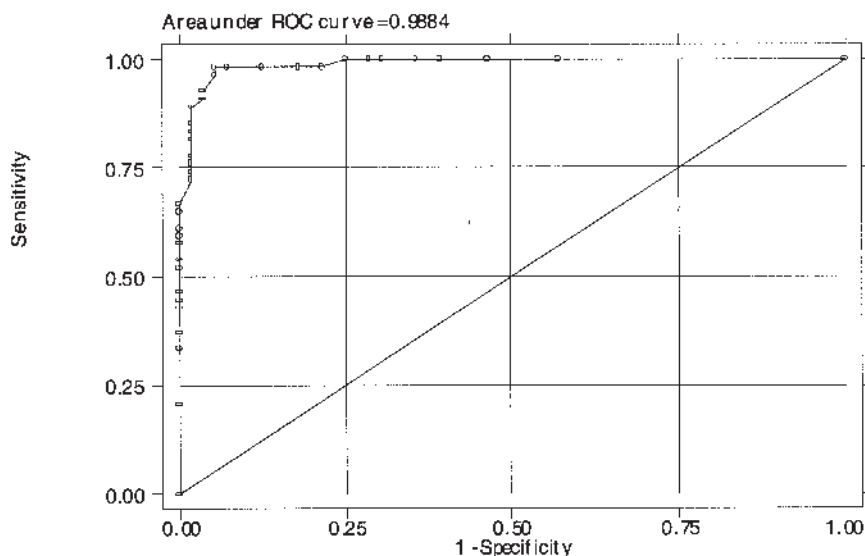


Fig. 4 Receiver operating characteristics (ROC) curve: Specificity and sensitivity of depression.

formed (not depicted) relative to the psychiatric comparison group, and the area beneath the curve remained quite high (0.98), indicating that preschool children with other psychiatric disorders can be successfully distinguished from depressed preschool children on the basis of these symptoms.

DISCUSSION

Findings from this study provide empirical support for the hypothesis that depression in preschool children is characterized predominantly by “typical” *DSM-IV* symptoms of MDD. In keeping with the findings of Carlson and Cantwell (1980), some “masked” symptoms were found in the depressed group, however at lower frequencies than “typical” symptoms. These findings are consistent with data in older children and adolescents and the conclusion that while “masked” symptoms of depression do occur in young children and may be helpful to identify depressed preschool children from children without psychiatric disorders, the core typical symptoms of MDD predominate the clinical picture of depression in preschool children and appear to be more robust markers of the disorder. Key to capturing these typical symptoms of depression in young children appears to be the need for developmental “translations” of the symptom states in the assessment for *DSM* criteria. This is necessary to capture the age-equivalent manifestations of these symptoms as items on standard assessment tools lack face validity for preschool children because they do not address the life experiences of young children. These findings are the first to demonstrate that the clinical picture of depression in the preschool period also manifests predominantly as “typical symptoms” such as sadness/irritability and is associated with neurovegetative signs rather than with a predominance of “masked” nonaffective symptoms.

Somatic complaints have been proposed as a key symptom of “masked” depression in childhood (Lesse, 1983). Somatization was the ninth most common symptom of MDD in this preschool sample and the most common “masked” symptom found. However, it is notable that this symptom appeared to be relatively less specific as it was not found significantly more frequently in the depressed compared with the psychiatric comparison group. Somatization is a known manifestation of depression in older children and adults, especially among those for whom cultural or individual factors make the expression of depressed affect unacceptable (Katon et al., 1982).

Carlson and Kashani (1988) have suggested that somatic complaints are more common in samples of prepubertal children in comparison with adolescents or adults. They further conclude that the frequency of these symptoms appears to increase with younger age (Carlson and Kashani, 1988). They reported a 100% incidence of somatic complaints among nine “severely impaired” preschool children who met *DSM-III* criteria for MDD (Carlson and Kashani, 1988). In contrast, a much lower frequency of somatic complaints was found in our sample (38%). Therefore, our data do not support the conclusion that somatization is a symptom of MDD that has increasing frequency in younger groups. In keeping with our findings, McCauley et al. (1991) also failed to find higher rates of somatization with younger age within a sample of depressed children 10–14 years old. Further studies in which samples of preschool and school-age children are studied concurrently with comparable measures are warranted to definitively address this issue.

Clinical Implications

The findings suggest that the clinical picture of depression in preschool children is characterized predominantly by “typical symptoms” such as sadness and/or irritability. The syndrome is also associated with vegetative signs and anhedonia evidenced by lack of pleasure in activities and play described as “no fun.” Depressed preschool children also displayed significantly more destructive and or suicidal play themes compared with psychiatric and no-disorder comparison groups. Anhedonia emerged as a highly specific (with an infinite odds ratio as it was not found in any comparison child) symptom of depression, suggesting that a preschool child presenting with this symptom is extremely likely to have a clinical depression. Sad or irritable mood emerged as a highly sensitive symptom, with 98% of depressed preschool children having this symptom. “Masked” symptoms (such as somatization), while significantly more frequent in depressed children than the no-disorder group, appeared as less sensitive and specific manifestations of depression in young children. However, it should be noted that some masked symptoms may be more obvious presenting features and could be helpful in identifying depressed children in community settings. This suggests that clinicians should be alert to these typical symptoms and particularly the presence of sadness (the most sensitive symptom) and anhedonia (the most specific symptom) when considering MDD in the differential diagnosis of a young child.

Limitations

The most important limitation to the data presented is the tautology inherent in the investigation of frequency rates between study groups when the *DSM-IV* MDD symptoms were used to define the depressed group. That is, the depressed group was defined on the basis of *DSM-IV* symptoms (although they were ascertained for entry into the study using an independent checklist), making them more likely to be more common in this group compared with the two comparison groups. The same tautology is inherent in the ROC analyses that demonstrated the pattern of specificity and sensitivity of symptoms. However, despite this bias, and consistent with findings in older depressed children, the depressed group was highly comorbid with other *DSM-IV* disorders (subjects were not excluded from the depressed study group when comorbid with other disorders), potentially minimizing this effect. Furthermore, not all depressive symptoms were found to be sensitive or specific. For this reason, these findings elucidate the age-specific phenomenology of preschool depression. However, future studies specifically designed to investigate the specificity and sensitivity of symptoms utilizing standardized diagnostic interviews and best-estimate clinician diagnoses are needed to shed further light on this issue. Findings are also important and notable given that a substantial number of preschool children were found ($n = 55$) who displayed the constellation of *DSM-IV* MDD symptoms (with the exception of the 2-week duration criterion). The use of a clinically enriched sampling strategy is also a limitation of the study as clinically referred preschool children may not be a representative group since these symptoms so often go unrecognized in very young children. The use of a modified version of the DISC-IV (DISC-IV-YC) that has not yet been independently tested for reliability and validity is also a limitation.

The lack of ethnic diversity in the study sample limits the generalizability of the findings. Future studies that investigate symptoms of depression from community-based, and more ethnically diverse, samples are warranted and are now feasible for study based on the age-specific clinical characteristics derived in the current study.

The sole use of parent-report data for these analyses is also a limitation of the study findings. While data on clinical diagnosis of maternal depression were obtained, mothers did not undergo detailed psychiatric interviews; thus the possibility that maternal mental state biased reporting of the child's symptoms cannot be ruled out. Luby

et al. (2002) previously reported that depressed preschool children reported significantly more negative affect (using age-appropriate puppet interviews) than the no-disorder comparison group; however, no differences in child self-report were found between the "depressed" and "psychiatric" groups. Observational data on "emotional reactivity" were obtained in this investigation, and coding is currently under way. When available for analysis, these objective data will be helpful to further validate and define this clinical depressive syndrome in preschool children.

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