

An Observational Analysis of Behavior in Depressed Preschoolers: Further Validation of Early-Onset Depression

JOAN L. LUBY, M.D., JILL SULLIVAN, M.S., ANDY BELDEN, M.S., MELISSA STALETTS, M.A.,
SAMANTHA BLANKENSHIP, M.S.W., AND EDWARD SPITZNAGEL, PH.D.

ABSTRACT

Objective: To investigate whether higher levels of negative and lower levels of positive behaviors could be observed in a sample of depressed preschoolers. Support for the validity of preschool depression is now available; however, objective evidence of negative behaviors among depressed preschoolers is needed. **Method:** A structured observational parent-child interaction task was conducted. The behaviors of 152 preschoolers (ages 3.0–5.6) in three study groups (depressed, disruptive, and healthy) were examined with further analyses of depressed subgroups based on severity and comorbidity. **Results:** Anhedonically depressed preschoolers emerged as demonstrating less enthusiasm, more avoidance, more noncompliance, and having a more negative overall experience than healthy controls. This more severe and proposed melancholic anhedonic subgroup also displayed less enthusiasm than nonanhedonically depressed preschoolers. Furthermore, the “pure” anhedonic depressed preschoolers without disruptive comorbidity emerged as the only depressed subgroup that was significantly distinguishable from healthy preschoolers. **Conclusions:** Findings provide the first objective evidence of more negative and fewer positive behaviors among depressed preschoolers. Notably, the finding that anhedonically depressed preschoolers demonstrated significantly less enthusiasm than those with nonanhedonic depression provides the first objective evidence of the manifestation of anhedonia, a key sign of preschool depression. The implications of the finding that the “pure” anhedonic depressed subgroup without disruptive comorbidity was most distinguishable from comparison groups are explored. *J. Am. Acad. Child Adolesc. Psychiatry*, 2006;45(2):203–212. **Key Words:** preschool, depression, observation.

Refuting historical developmental theory suggesting that preschool children are too emotionally immature to experience clinical depression (Rie, 1966), empirical evidence became available demonstrating that children as young as 3 years old could manifest a valid and clinically significant depressive syndrome (Luby et al., 2002, 2003a, 2003b). Validation for preschool depression has been supported by findings of a unique and

stable symptom constellation, family history of related disorders, stability of symptoms and social impairment based on caregiver report (Luby et al., 2002). Neuroendocrine and neuropsychological correlates similar to those known in depressed adults have also been reported in this young clinical group (Luby et al., 2003c; Mrakotsky, 2000, unpublished dissertation). Anhedonia, defined as the inability to enjoy activities and play, emerged as a highly specific marker of depression among preschoolers and was also a characteristic of a more severe and putative melancholic depressed subtype in young children (Luby et al., 2004). Based on these clinical characteristics, this anhedonic subtype is of particular interest as a more severely affected clinical group.

In addition to measures based on parent report, direct and objective observational measures of the behaviors and emotions of young children are of central importance to the further validation of this disorder. This is necessary because of the possible bias and potential

Accepted July 26, 2005.

All of the authors are affiliated with Washington University, St. Louis, MO. Mr. Belden is also affiliated with Saint Louis University.

Funding for the study of preschool depression was provided by National Institute of Mental Health grants K08-MH01462 and R01 MH64769-01; Dr. Luby.

Reprint requests to Dr. Joan L. Luby, Department of Psychiatry, Washington University in St. Louis School of Medicine, 660 S. Euclid Avenue, Campus Box 8134, St. Louis, MO 63110; e-mail: lubyj@msnotes.wustl.edu.

0890-8567/06/4502-0203©2006 by the American Academy of Child and Adolescent Psychiatry.

DOI: 10.1097/01.chi.0000188894.54713.ee

inaccuracy that is well known to be inherent in the sole reliance on parent or other caregiver report (Dumas and Wekerle, 1995). The limitations of the parent/caregiver informant are amplified in internalizing disorders such as depression in which caregivers may be unaware of the child's nondisruptive symptoms (Stevenson-Hinde and Shouldice, 1995).

Observation of children's spontaneous behaviors during interactions with primary caregivers would provide an important and unique window into the functioning and mental state of young children pertinent to the diagnosis of depression. Direct observation of child behavior in a dyadic context is central to any meaningful clinical assessment of a young child and has formally been codified in "practice parameters" for the mental health assessment of young children (American Academy of Child and Adolescent Psychiatry, 1997). Related to this, the observation of play behavior has been widely regarded as a highly valuable clinical tool for decades. Furthermore, empirical evidence is now available supporting the notion that characteristics of play behavior (such as theme, content, and coherence) in young children are related to their mental state and the presence or absence of psychopathology (Warren et al., 1996). Along these lines, Mol Lous et al. (2002) have reported differences and delays in the level and content of play in a sample of preschoolers who were clinically diagnosed with depression and highlight the presence of impoverished play without age-appropriate symbolic complexity. Apart from these highly suggestive findings, to our knowledge there are no published observational data yet available from a depressed preschool population diagnosed with a structured psychiatric interview, representing an important gap in the literature.

Based on the high "ecological validity" of the parent-child dyadic context for observing child behavior at this early stage of development, we used structured and mildly challenging dyadic interactions during which the emotions and behavior of the caregivers and children were coded separately by trained raters who were blinded to children's diagnostic status. The observational findings in this study are also unique because they are derived from the first large preschool sample to our knowledge to be characterized as depressed with categorical *DSM-IV* criteria (modified for developmental age) based on parent report on a structured diagnostic interview. We sought to investigate whether objective differences in children's behaviors (based on observational methods)

between depressed preschoolers and other comparison groups could be detected.

It was hypothesized that depressed preschoolers would demonstrate more negative and less positive behaviors than preschoolers in the healthy comparison group in all areas assessed. Specifically, it was hypothesized that the depressed preschoolers would demonstrate the lowest levels of enthusiasm and highest levels of negativity, whereas the disruptive group would show the highest levels of noncompliance and lowest levels of persistence. We also hypothesized that depressed preschoolers would be less persistent than those in the healthy group based on the salience of the symptom of amotivation in depression. Furthermore, we expected that the anhedonically depressed preschoolers (characterized by an inability to enjoy activities and play as reported by parents) would be less "enthusiastic" than children in the nondepressed comparison groups (disruptive and healthy) as well as the nonanhedonically depressed group. This was based on the notion that enthusiasm is a behavioral manifestation of positive hedonic tone, and as such, low levels would represent a manifestation of anhedonia.

If differences in objective ratings of these behaviors could be detected between these groups, then key evidence of the further validation of a preschool depressive syndrome would be provided. If differences in observed enthusiasm could be detected, then this would provide the first objective evidence of the presence of the key sign of anhedonia within this subgroup previously defined by parent report.

METHOD

Sample

Preschool subjects (ages 3.0–5.6) were recruited from primary care and specialty mental health settings for participation in a study of the nosology of depression. One hundred seventy-four preschoolers and their primary caregivers participated in this study and completed a comprehensive emotional and developmental assessment that included parent, child, and dyadic assessments. One hundred fifty-two subjects fell into one of three primary diagnostic groups of interest (and had complete data) for these analyses: depressed ($n = 54$), disruptive (*DSM-IV* ADHD and/or oppositional defiant disorder [ODD]) ($n = 42$), and a "healthy" group with no *DSM-IV* disorder ($n = 56$). The disruptive group was included to inform the question of whether signs, symptoms, and observed behaviors were specific to depressive disorders or more generally related to the presence of Axis I psychopathology. Psychiatric diagnosis and therefore diagnostic group status were determined by parent report on the structured psychiatric interview Diagnostic Interview Survey for Children Version IV–Young Child (Lucas et al., 1998). The

institutional review board approved the study, and appropriate informed consent was obtained from the child's guardian. Preschoolers were deemed too young to formally assent.

Group and Subgroup Diagnostic Classification

For the first set of analyses that follow, we examined differences between children's observed dyadic behaviors between three diagnostic groups: healthy ($n = 56$), depressed ($n = 54$), and the disruptive group ($n = 42$). The second set of analyses examined the same child behaviors but divided the entire depressed group ($n = 54$) into two subgroups, anhedonic ($n = 31$) and nonanhedonic ($n = 23$), and then compared them with the healthy group ($n = 56$). This important distinction between anhedonic and nonanhedonic (previously referred to as "hedonic") depressed subgroups has been previously described and validated (Luby et al., 2004). The depressed anhedonic group ($n = 31$) was a more severe and putative "melancholic" subtype, and the depressed nonanhedonic group ($n = 23$) was composed of preschoolers who met criteria for depression but did not have the symptom of anhedonia. For the third set of analyses, the anhedonic subgroup was broken down further into children who were "pure" anhedonic ($n = 12$) without externalizing comorbidity (could have internalizing comorbidity) and those who were "mixed" anhedonic ($n = 19$) and comorbid with an externalizing disorder. Each of these subgroups was compared to the others and the healthy group in relation to their behavior during dyadic interactions (Fig. 1).

The Teaching Task (Egeland and Hiester, 1995) is a videotaped observational measure of parent-child interaction designed for use in preschool children. In this study, preschoolers and their primary caregivers performed three mildly stressful cognitive tasks from this measure. Primary caregivers were given general instructions to help their children complete each of the tasks, but specific instructions on how to behave were not provided as individual interpretation of the details of their own role was key to the implementation of the task. The first task involved building blocks. Mothers assisted their children in arranging blocks to replicate an already formed three-dimensional shape. The second task required parents to encourage

their children to name as many items with wheels as possible, while the parent provided clues but not answers. Last, mothers helped children navigate a maze using an Etch-a-Sketch pad while the child controlled one knob and the parent controlled the other. Dyads worked on each task until it was complete or until 5 minutes had elapsed, whichever occurred first. Children's behavior during this standardized dyadic teaching task was videotaped and coded using a coding system with previously established reliability and validity (Pianta and Egeland, 1994, Sroufe et al., 1990).

The child behavioral domains (defined and coded in a standardized fashion according to Egeland and Hiester, 1995) were of particular interest to the present investigation. The following dimensions of child behavior were coded: enthusiasm, negativity, persistence, noncompliance, experience of the session, affection (positive orientation) toward mother, and avoidance of mother. Parenting behaviors, considered in detail in a separate set of analyses, were deemed beyond the scope of this investigation; however, analyses were done and are described below to provide a check on their impact on the outcomes of interest here.

Child enthusiasm was a measure of eagerness and confidence to do the tasks. This dimension was designed to capture children's ability to take pleasure in the task and related to this a "sense of agency" as well as the ability to effectively match positive affect and productive behavior.

Child negativity was a measure of the children's anger, dislike, or hostility toward the mother. Children who were high on child negativity exhibited overt or repeated anger, whereas children who scored low in this dimension exhibited neither overt nor covert anger toward the mother.

Child persistence was a measure of the extent to which children were focused on a problem during the three tasks. Children who were lowest on persistence actively attempted to avoid the task. Children scoring high on child persistence worked virtually throughout the session to complete the task. Children with high persistence appear highly motivated to obtain the correct solutions for each part of the task.

Child noncompliance was a measure of the children's lack of willingness to listen to caregivers' suggestions or directives and failure to

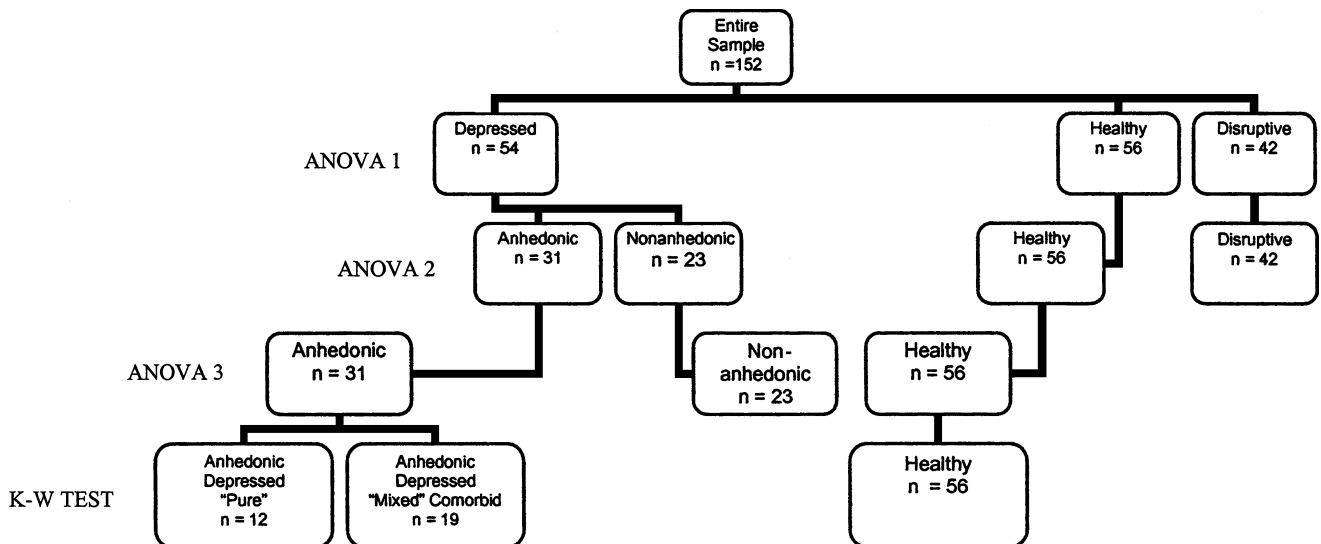


Fig. 1 Flow chart of sequential analyses by group and subgroup.

comply with requests in a reasonable and nonconflictual manner. High child noncompliance indicated that children rejected virtually all directions of caregivers during the session. Low child noncompliance was characterized by the children's compliance with caregivers directions and acceptance of mother's ideas on how to successfully complete the task.

A child's experience of the session was a measure of how the child's experience likely affected his or her feelings of success and competence on the tasks and confidence in having a good relationship with his or her caregiver. Children with a high experience of the session score cooperated with their caregiver, accomplishing tasks successfully while maintaining their autonomy although caregiver assistance was still appropriately provided. Children with a low experience of the session score were argumentative with the caregiver or were dominated or rejected by the caregiver in ways that would have affected the child's experience of the session.

Child affection (positive orientation) was a measure of children's happy feelings and positive attitude toward their caregiver. Children with a high affection score would make frequent eye contact with their caregiver, frequently smile, and attempt to share experiences in the session with her.

Child avoidance of caregiver was a measure used to capture children's tendencies or attempts to avoid interacting with their caregiver. Children with a high avoidance score showed a desire at some point during the session to withdraw from the caregiver by disengaging from the task. Children with a low avoidance score showed no clear efforts to avoid the caregiver.

All of the tapes were coded by raters who were blinded to children's diagnostic status. In addition, double coding was done on 20% of the tapes to assess reliability. Caregivers and children were given global ratings for the focal behavior on each task ranging from 1 to 7. The interclass reliability coefficient for each behavior was as follows: (1) enthusiasm = 0.95, (2) negativity = 0.88, (3) persistence = 0.92, (4) noncompliance = 0.91, (5) experience of sessions = 0.90, (6) affection = 0.96, and (7) avoidance = 0.86. Discrepancies between raters were resolved by discussion and subsequent consensus conference.

Observed child enthusiasm, negativity, persistence, noncompliance, experience of the session, affection, and avoidance were assigned 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. An average score was calculated by dividing the total score in each domain by 3 (the number of tasks). Averaged scores were used in the data analyses to capture a more global representation of children's behaviors across tasks because the tasks were conceptually related, each having been designed to be challenging and to elicit cooperative problem solving.

Analyses

Nonparametric, Kruskal-Wallis (K-W) and parametric one-way analyses of variance (ANOVAs) were conducted as appropriate to determine whether preschoolers' observed behaviors during parent-child interactions differed on the basis of diagnostic group status. The following three diagnostic groups were included in the first set of analyses: (1) healthy group, preschoolers with "no disorder" according to the *DSM-IV*, (2) disruptive group, preschoolers who met *DSM-IV* criteria for either ADHD and/or ODD only, and (3) depressed group, preschoolers who met all *DSM-IV* criteria for major depressive disorder (with the exception of the 2-week

duration criterion). Analyses were conducted in a logical sequence from this broad-spectrum group membership to more specific subgroup distinctions as described above and shown in Figure 1. When broad diagnostic group differences were found between the depressed group and the healthy group in specific behavioral dimensions, this directed follow-up analyses examining the possibility of significant differences between subgroups of the depressed group (Fig. 1).

In each of the three group comparisons described above, when the one-way ANOVA or K-W was significant, the appropriate post hoc tests (with corrections) were done to test for differences between each of the groups. For those behaviors and tasks in which a subsequent three-group K-W comparison among pure anhedonic and mixed anhedonic depressed subgroups versus the healthy group (Fig. 1) was significant, Scheffé-like post hoc tests (Siegal and Castellon, 1988) that take into account combined variance across groups were conducted to determine which specific diagnostic groups differed from each other. This approach was deemed more conservative and more appropriate than a standard nonparametric post hoc test because of its ability to take into account all of the groups' mean ranks simultaneously.

RESULTS

There were no significant demographic differences found between categorical diagnostic groups and subgroups (Table 1).

Diagnostic Group Comparisons: Depressed Versus Disruptive Versus Healthy

One-way ANOVAs were conducted to evaluate the relationship between diagnostic group and preschoolers' behaviors (persistence, enthusiasm, negativity, noncompliance, avoidance, affection, and experience) during parent-child teaching tasks. Diagnostic groups for the present analyses were depressed, disruptive, and healthy (Fig. 1; ANOVA 1). Four of the seven ANOVAs demonstrated significant differences among diagnostic groups in the following domains: enthusiasm ($F_{2,149} = 5.28$, $p = .006$), noncompliance ($F_{2,149} = 7.19$, $p = .001$), avoidance ($F_{2,149} = 5.43$, $p = .005$), and experience ($F_{2,149} = 7.12$, $p = .001$). There were no significant diagnostic group differences in the areas of persistence, negativity, or affection.

Scheffé post hoc tests were conducted to evaluate pairwise differences among diagnostic group means. Preschoolers in the depressed ($p = .02$) and disruptive ($p = .01$) groups were significantly less enthusiastic than children in the healthy group (Fig. 2). Preschoolers in the disruptive group were significantly more noncompliant ($p = .001$) than children in the healthy group. No other group differences were found related to

TABLE 1Demographic Characteristics of the Study Sample ($N = 152$)

Demographic Variable	No Disorder ($n = 56$)	ADHD/ODD ($n = 42$)	“Mixed” Comorbid Anhedonic ($n = 19$)	“Pure” Anhedonic ($n = 12$)	Nonanhedonic ($n = 23$)
Mean age, yr (SD)	4.07 (0.77)	3.84 (0.84)	4.11 (0.80)	4.58 (0.79)	4.29 (0.69)
Gender, no. female (%)	25 (31)	22 (20)	8 (11)	4 (8)	12 (11)
Family income (%)					
<\$30,000	8.8	9.1	15.8	25	33.3
<\$60,000	29.8	45.5	36.8	33.3	29.2
>\$60,000	59.6	45.5	47.4	41.7	37.5
Refused	1.8				
Child’s ethnicity					
White	82.5	91.1	89.5	91.7	79.2
African American	8.8	2.2	0	0	16.7
Hispanic	1.8	0	5.3	0	0
Mixed	5.3	4.4	0	8.3	4.2
Other	1.8	2.2	5.3	0	0
Maternal marital status (%)					
Married	86	88.9	78.9	81.8	62.5
Separated/divorced/single	12.3	11.1	21.1	18.2	37.5
Refused to answer	1.8				

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

noncompliance. Results also indicated that children in the disruptive group were significantly more avoidant than children in the healthy group ($p = .004$). No other group differences related to preschoolers’ observed avoidance were found. Last, preschoolers in the depressed group were rated as having a significantly ($p = .01$) less positive experience with their parent during the

teaching task than dyads that included healthy children. Similarly, preschoolers in the disruptive group were rated as having a significantly less ($p = .009$) positive experience when compared to healthy children. No group differences were found in pairwise comparisons between the depressed and disruptive groups in any of the four behavioral dimensions (Fig. 2).

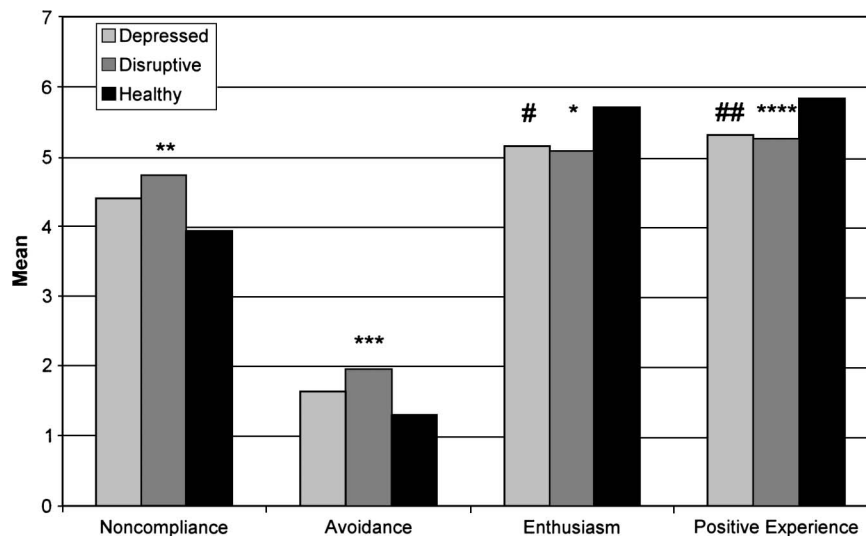


Fig. 2 Child behaviors during dyadic interactions: variation by diagnostic group. # = Significant difference with healthy group, $p = .02$; ## = significant difference with healthy group, $p = .01$; * = significant difference with healthy group, $p = .01$; ** = significant difference with healthy group, $p = .001$; *** = significant difference with healthy group, $p = .004$; **** = significant difference with healthy group, $p = .009$.

Depressed Subgroups: Anhedonic Depressed, Nonanhedonic Depressed Versus Comparison Groups

Based on these findings, one-way ANOVAs were conducted on the four behavioral dimensions (enthusiasm, noncompliance, avoidance, and experience of sessions) in which differences emerged among the three basic diagnostic groups. These ANOVAs were done comparing the two depressed subgroups of interest (anhedonic versus nonanhedonic) with the disruptive and healthy groups (Fig. 1; ANOVA 2). Results indicated that there were no significant differences between either depressed subgroup and the disruptive group in any of these areas. Based on this, the disruptive group was removed from further analyses so that differences between depressed subgroups (our primary focus) and the healthy group could be explored further.

The following groups were included in the subsequent analysis: anhedonic depressed, nonanhedonic depressed, and healthy (see Figure 1; ANOVA 3). Additional one-way ANOVAs indicated a significant main effect of diagnostic group status within each of the four behavioral dimensions: enthusiasm ($F_{2,107} = 8.28, p < .001$), noncompliance ($F_{2,107} = 5.23, p = .007$), avoidance ($F_{2,107} = 6.04, p = .003$), and experience ($F_{2,107} = 6.39, p = .002$).

Scheffé post hoc analyses revealed that preschoolers in the anhedonic diagnostic group were significantly less enthusiastic than preschoolers in both the nonanhedonic

($p = .01$) and healthy groups ($p = .001$). Preschoolers in the anhedonically depressed diagnostic group were also significantly more avoidant than the children in the nonanhedonic group ($p = .02$) and the healthy group ($p = .007$). Furthermore, anhedonically depressed preschoolers were significantly more noncompliant than the healthy group ($p = .007$) and were rated as having significantly lower positive experiences during the tasks than the healthy group ($p = .003$). No differences between the depressed nonanhedonic subgroup and healthy groups were found (Fig. 3).

Differences Among “Pure” Anhedonic, “Mixed” Anhedonic, and Healthy Groups

For this set of analyses, K-W tests were conducted because of the unequal and small group sizes that affect the robustness of the normal theory test (Fig. 1, K-W test). One-way ANOVAs using χ^2 statistics revealed that the following dimensions of observed preschool behaviors/emotions differed on the basis of diagnostic group status: enthusiasm ($\chi^2 [df = 2, N = 87] = 12.23, p = 0.008$) and noncompliance ($\chi^2 [df = 2, N = 87] = 10.53, p = .02$); avoidance ($\chi^2 [df = 2, N = 87] = 19.11, p < .001$); experience of the session ($\chi^2 [df = 2, N = 87] = 10.82, p = 0.01$). Preschoolers’ observed affection toward the mothers during parent-child interactions did not differ by group status.

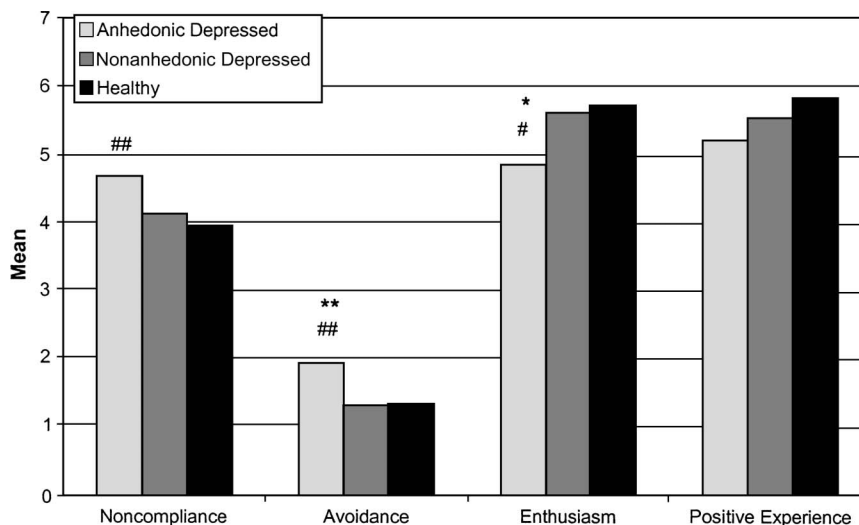


Fig. 3 Child behaviors during dyadic interactions: depressed subgroups versus healthy group. * = Significant difference with nonanhedonic depressed group, $p = .01$; ** = significant difference with nonanhedonic depressed group, $p = .02$; # = significant difference with healthy group, $p = .001$; ## = significant difference with healthy group, $p = .007$; ### = significant difference with healthy group, $p = .003$.

Dimensions of Observed Behaviors/Emotions: Anhedonic Depressed Comorbid Subgroups

Scheffé-like post hoc comparisons revealed that preschoolers in the “pure” anhedonic depressed group were significantly less enthusiastic, more noncompliant, and more avoidant and had a more negative experience of the session than the healthy group ($p < .05$ for all comparisons). These “pure” anhedonic preschoolers were also significantly more avoidant than those in the “mixed” comorbid anhedonic group during the tasks ($p < .05$). No other differences were found (Fig. 4).

Role of Parenting Behaviors in Child Behaviors and Child Outcomes

All observed preschool behaviors of interest were significantly correlated with concurrent observed parenting behaviors, including maternal support, intrusiveness, and quality of instruction (Pearson correlations ranged from 0.18 to 0.49) as would be expected. Additional analyses were conducted as a cautionary step and to further test the hypothesis that children’s behavioral outcomes were a result of their diagnostic status rather than parenting strategies used during the interaction. Multivariate analyses of variance revealed that mothers’ use of supportive strategies, intrusiveness, or quality of instructions did not differ significantly ($p < .05$) as a function of children’s diagnostic group status.

DISCUSSION

Findings indicated that both depressed and disruptive (ADHD and/or ODD) preschoolers were significantly less enthusiastic and had a less positive experience with their caregiver as compared with healthy children. However, only the disruptive, and not the depressed, preschoolers were significantly more noncompliant and avoidant when compared with healthy children, suggesting that these two relational impairments are more pronounced in disruptive as opposed to depressive disorders. Consistent with our initial hypotheses, these differences between the disruptive and healthy groups were expected, but contrary to expectations, we did not find the disruptive groups to be more noncompliant than either depressed subgroup.

The overall finding that blind ratings of child behaviors were significantly related to independent *DSM-IV* diagnostic classifications based entirely on parent report was particularly noteworthy. These findings represent an important addition to the available empirical database validating the construct validity of preschool depression. Furthermore, the findings confer convergent validity to the *DSM-IV* disruptive disorders (ADHD and ODD) investigated as well. The finding that parenting behaviors did not differ as a function of categorical definitions of diagnostic group supports the conclusion that, although children’s behaviors took

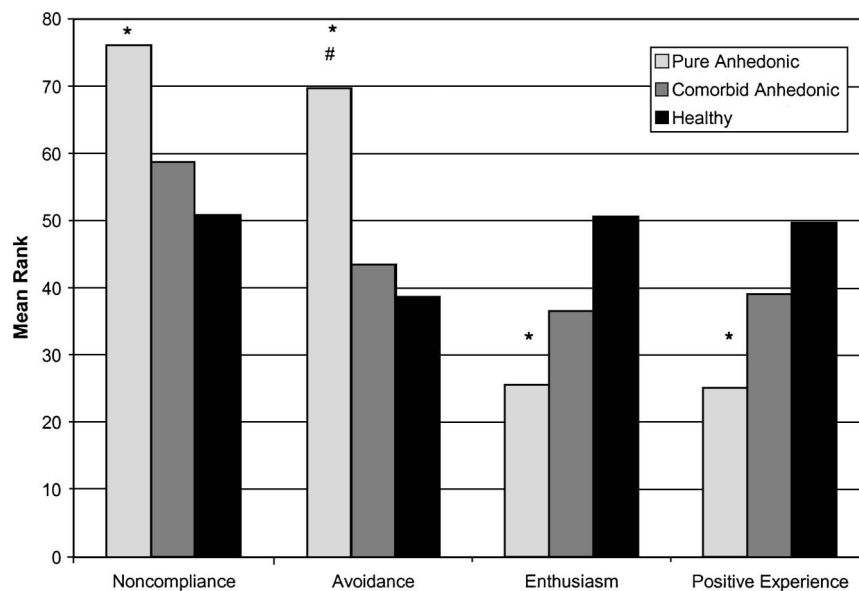


Fig. 4 Child behaviors in dyadic interactions: anhedonic depressed subgroups versus healthy group. * = Significant difference with healthy group, $p < .05$; # = significant difference with comorbid anhedonic group, $p < .05$.

place within dyadic interactions and were likely to have been influenced by parenting behavior, the main effects of parenting behaviors and children's diagnostic status had separate and unique influences on children's behavioral outcomes. Taken together, these general findings further suggest that the *DSM* principle that these particular disorders are internal features of the individual (without drawing any inferences about the social or relational etiological factors) apply as early as the preschool period. Underscoring the role of relational factors, however, it was notable that when dimensional scores of depression severity were investigated, unique findings emerged elucidating the role of parenting behaviors (Belden and Luby, 2005).

When the depressed subgroups were examined in relation to the healthy group, significant differences in objective observational ratings of positive and negative behaviors and emotions along the expected lines were found among the "pure" anhedonically depressed preschoolers compared with those with no disorder in all four domains assessed: enthusiasm, noncompliance, avoidance, and negative overall experience. Of note was that the "pure" anhedonically depressed group was found to be significantly more avoidant than the "mixed" comorbid anhedonically depressed group (in addition to the healthy group). Surprisingly, the "mixed" comorbid anhedonically depressed group functioned at levels comparable to the "healthy" no disorder group in multiple domains.

These findings suggest that externalizing comorbidity occurring in combination with depression may serve as a protective factor in the area of avoidance in particular. It stands to reason that the presence of ADHD and/or ODD, considering its stimulus-seeking characteristics, may compensate for or minimize the withdrawal and related avoidance that is a primary feature of depressive illness. Furthermore, in a relative fashion, a comorbid disruptive disorder in the presence of depression may serve as a protective factor in other domains assessed based on the finding that this "mixed" comorbid group was not significantly more impaired than the healthy group in any domain of dyadic child behavior investigated.

We have previously proposed that the more severely affected depressed group characterized by anhedonia may be a "melancholically" depressed subgroup in which greater impairments in emotional and behavioral functioning, and higher familial loading would be expected (Luby et al., 2004). Along these lines, a pattern of greater negative emotions and behaviors and fewer

positive emotions and behaviors was most apparent for the "pure" anhedonic depressed group in all areas, suggesting that this characteristic pattern of observed behaviors/emotions is associated more strongly with depression than with the comorbid externalizing disorders. This finding contrasts with differences expected and found between "mixed" and "pure" depressed groups in symptom domains measured by the Child Behavior Checklist in which depressed groups with comorbidity were more symptomatic in externalizing areas than those without comorbidity (Luby et al., unpublished data).

To our knowledge, these data provide the first objective evidence (e.g., observational ratings by raters blinded to diagnostic status) that is not based on parent or teacher judgment of differences in emotional and behavioral functioning along the expected lines in a sample of preschoolers with a categorical *DSM-IV* diagnosis of depression. Therefore, findings fill an important gap in the evidence base and demonstrate that negative behaviors and emotions consistent with a depressive syndrome are observable in children as young as 3 years of age and significantly differentiate these young children from healthy preschoolers.

Clinical Implications

The finding of a characteristic pattern of observable behaviors and emotions among depressed preschoolers supports the importance of clinical observation in the assessment of depressive disorders in young children. The behavioral dimensions measured in this study could be readily observed by the clinician in a clinical setting and thus underscores the importance of direct observation of the child's behavior either in free play or using structured assessment tools during a dyadic interaction with the primary caregiver as a key part of the clinical examination. There are numerous parent-child assessments available in addition to the one used in this investigation that could be used in the clinical setting (e.g., Clark et al., 1993, Crowell et al., 1998, Kelly and Barnard, 2000)

The finding of lower levels of enthusiasm among the "pure" anhedonically depressed group compared with those with no disorder is notable and provides further evidence of the presence and importance of the sign of anhedonia in this more severely depressed group. The objective observation of lower levels of enthusiasm, a behavioral manifestation or correlate of the emotion

of anhedonia, substantiates the presence of this key sign among “pure” depressed preschoolers, demonstrates that it is observable in appropriate circumstances, and lends additional validation to parental reports of this important phenomenon. The absence of this finding in the “mixed” comorbid group also suggests that a disruptive comorbidity may mitigate the observable manifestation of anhedonia.

The finding that the “pure” anhedonic depressed group demonstrated a more consistent pattern of impairments across all domains relative to the “mixed” comorbid anhedonic depressed group (in comparisons with the healthy group) was unexpected and has important clinical implications. These data would suggest that this “pure” internalizing subgroup demonstrates a high level of behavioral difficulty, and at the same time, given the absence of any disruptive features, is a group at particularly high risk of underidentification of the need for clinical services. This finding also suggests the more general need to consider comorbidity in the clinical assessment of depression in the young child.

Conversely, the overall finding that the “mixed” comorbid anhedonically depressed preschoolers demonstrated fewer differences compared with the healthy group than the “pure” group suggests that the presence of externalizing disorders in addition to depression may enhance adaptive behavior and mitigate impairments in specific areas of functioning. A similar phenomenon has been described in a sample of older youths with conduct disorder (Ollendick et al., 1999). In particular, the presence of comorbid anxiety appeared to mitigate impairment from conduct disorder symptoms. Similar conclusions are suggested by treatment data indicating that children with ADHD and comorbid anxiety disorders are more responsive to behavioral treatment interventions alone (without pharmacotherapy) than those without comorbid anxiety disorders (MTA Cooperative Group, 1999). These data could suggest that the balance of internalizing and externalizing symptoms may have a protective rather than an exacerbating effect in specific areas of functioning, as may be expected based on the increased number of symptoms that is a result of comorbidity in general.

Limitations

A relatively small sample size and an ethnically homogeneous sample limit the generalizability of these findings. Furthermore, the cross-sectional nature of the

observations conducted on only one occasion is also a limiting factor.

Disclosure: Dr. Luby has received grant/research support from Janssen, has given occasional talks sponsored by AstraZeneca, and has served as a consultant for Shire Pharmaceutical. The other authors have no financial relationships to disclose.

REFERENCES

- American Academy of Child and Adolescent Psychiatry (1997), Practice parameters for the psychiatric assessment of infants and toddlers (0–36 months). *J Am Acad Child Adolesc Psychiatry* 36:21S–36S
- Belden A, Luby J (2006). Preschoolers’ depression severity and behaviors during dyadic interactions: The mediating role of parental support. *J Am Acad Child Adolesc Psychiatry* 45:213–222
- Crowell J, Feldman S, Ginsburg N (1998), Assessment of mother-child interaction in preschoolers with behavior problems. *J Am Acad Child Adolesc Psychiatry* 27:303–311
- Clark R, Paulson A, Conlin S (1993). Assessment of developmental status and parent-infant relationships: the therapeutic process of evaluation. In Zeanah CH Jr., ed. *Handbook of Infant Mental Health*, pp 191–209 New York: The Guilford Press
- Dumas J, Wekerle C (1995), Maternal reports of child behavior problems and personal distress as predictors of dysfunctional parenting. *Dev Psychol* 7:465–479
- Egeland B, Hiester M (1995), The long-term consequences of day-care and mother-infant attachment. *Child Dev* 66:474–485
- Kelly JF, Barnard KE (2000). Assessment of parent-child interaction: implications for early intervention. In: *Handbook of Early Childhood Intervention*, Shonkoff JP, Meisels SJ, eds. New York: Cambridge University Press, pp 258–289
- Luby J, Heffelfinger A, Mrakotsky C, Brown K, Hessler M, Spitznagel E (2003c), Alterations in stress cortisol reactivity in depressed preschoolers relative to psychiatric and no-disorder comparison groups. *Arch Gen Psychiatry* 60:1248–1255
- Luby J, Heffelfinger A, Mrakotsky C, Brown K, Hessler M, Wallis J, Spitznagel E (2003a), The clinical picture of depression in preschool children. *J Am Acad Child Adolesc Psychiatry* 42:340–348
- Luby J, Heffelfinger A, Mrakotsky C, Hessler M, Brown K, Hildebrand T (2002), Preschool major depressive disorder: preliminary validation for developmentally modified DSM-IV criteria. *J Am Acad Child Adolesc Psychiatry* 41:928–937
- Luby J, Mrakotsky C, Heffelfinger A, Brown K, Hessler M, Spitznagel E (2003b), Modification of DSM-IV criteria for depressed preschool children. *Am J Psychiatry* 160:1169–1172
- Luby J, Mrakotsky C, Heffelfinger A, Brown K, Spitznagel E (2004), Characteristics of depressed preschoolers with and without anhedonia: evidence for a melancholic depressive sub-type in young children. *Am J Psychiatry* 161:1998–2004
- Lucas CP, Fisher P, Luby J (1998), *Young-Child DISC-IV Research Draft: Diagnostic Interview Schedule for Children. Division of Child Psychiatry, Joy and William Ruane Center to Identify and Treat Mood Disorders*. New York: Columbia University
- Mrakotsky C, Luby J (2000), *The Facial Affect Comprehension Evaluation (FACE): A Test for Emotion Perception and Emotion Recognition in the Preschool Age*. St. Louis: Washington University School of Medicine
- Mol Lous A, de Wit C, De Bruyn E, Riksen-Walraven M (2002), Depression markers in young children’s play: a comparison between depressed and nondepressed 3- to 6-year-olds in various play situations. *J Child Psychol Psychiatry* 43:1029–1038
- MTA Cooperative Group (1999), Moderators and mediators of treatment response for children with attention-deficit/hyperactivity disorder. *Arch Gen Psychiatry* 56:1088–1096

- Ollendick T, Seligman L, Butcher AT (1999), Does anxiety mitigate the behavioral expression of severe conduct disorder in delinquent youths? *J Anxiety Disord* 13:565-574
- Pianta R, Egeland B (1994), Predictors of instability in children's mental test performance at 24, 48 and 96 months. *Intelligence* 18:145-163
- Rie H (1966), Depression in childhood: a survey of some pertinent contributions. *J Am Acad Child Psychiatry* 5:653-685
- Siegel S, Castellan J (1988), *Nonparametric Statistics for the Behavioral Sciences*. New York: McGraw-Hill
- Sroufe L, Egeland B, Kreutzer T (1990), The fate of early experience following developmental change: longitudinal approaches to individual adaptation in childhood. *Child Dev* 61:1363-1373
- Stevenson-Hinde J, Shouldice A (1995), 4, 5, to 7 years: fearful behaviour, fears and worries. *J Child Psychol Psychiatry* 36:1027-1038
- Warren S, Oppenheim D, Emde RN (1996), Can emotions and themes in children's play predict behavior problems? *J Am Acad Child Adolesc Psychiatry* 35:1331-1337