

Depressive Disorders in Maltreated Children

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Abstract. This study examined the prevalence of depressive disorders in a sample of 56 7- to 12-year-old maltreated children. Overall, 18% of the sample met the diagnostic criteria for major depression, and 25% met the criteria for dysthymia, with the majority of the children who met the criteria for major depression also meeting the criteria for dysthymia. Ratings of the different types of maltreatment children experienced, together with measures of the children's social supports, attributional style, and cortisol secretion were examined to determine which maltreated children were most likely to evidence a depressive disorder. A discriminant analysis conducted using a subset of these measures correctly classified 91% of the sample in terms of their diagnostic status. *J. Am. Acad. Child Adolesc. Psychiatry*, 1991, 30, 2:257-265. **Key Words:** childhood depression, child maltreatment.

Emen is an 8-year-old boy who attended a 1-week day camp established to collect a portion of the data reported in this manuscript. He had a history of physical abuse, emotional maltreatment, and he spent approximately 2 years from age 4 to age 6 separated from his mother and siblings while he was in foster care. The following is a dialogue between Emen and his camp counselor, Michael, immediately after Emen found a quarter.

- Emen: I'm going to buy myself something with this.
Michael: Why don't you save it. If you save your money, some day you can buy something nice like a house for your family.
Emen: I'm not going to need a house.
Michael: Why not?
Emen: Because I'm going to be a bum and live in a cardboard box behind a store.
Michael: You could get hurt living like that.
Emen: I don't care. I don't care if I die right now.
Michael: Why do you say that?
Emen: Because nobody loves me . . . my brothers really hate me.
Michael: Well, I like you, Emen.
Emen: And I love you . . . you are the nicest anyone has ever been to me.

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This dialogue occurred after Emen knew Michael for 3 days. Throughout the week at camp, Emen continued to express suicidal thoughts and often had to be kept out of activities because he was too teary-eyed to participate.

Although it has been recognized for centuries that children often respond to chronically abusive environments with depressive symptoms (Burton, 1624) all of the published investigations of children at risk for developing depressive disorders have studied the offspring of affectively ill parents (e.g., Weissman et al., 1984, 1988; Welner and Rice, 1988). The major premise of the present study is that children with a history of maltreatment comprise another group of children at risk for developing depressive disorders.

Studies of the development of the offspring of affectively ill parents (Gaensbauer et al., 1984; Zahn-Waxler et al., 1984a, 1984b; Radke-Yarrow et al., 1985; Cytryn et al., 1986), and the offspring of maltreating parents (Schneider-Rosen and Cicchetti, 1984; Schneider-Rosen et al., 1985; Kaufman and Cicchetti, 1989; Reider and Cicchetti, 1989) reveal many parallel lines of development in these two groups of high-risk children. Children from both groups have been found to have disturbances in their attachment relationships during infancy, development of self-concept and autonomous functioning in toddlerhood, and peer relations in early childhood. Difficulties in the regulation of affect in response to stressful situations have been noted in both groups of children as well. It is unclear whether these disturbances merely represent stage-salient manifestations of maladaptation apt to be observed in children at risk for all forms of psychopathology or whether they are precursors specific to depression.

Studies of clinic (Kazdin et al., 1985) and nonclinic (Allen and Tarnowski, 1989) samples have found that children with a history of physical abuse are more likely than other children to exhibit depressive symptomatology. Whether or not a disproportionate number of children with a history of abuse meet the diagnostic criteria for any of the depressive disorders has yet to be determined, however.

One of the purposes of this study is to examine the prevalence of depressive disorders in a sample of prepubescent school-aged maltreated children. Epidemiological studies estimate that 2% of prepubescent school-aged children experience episodes of major depression (Kashani and Simonds, 1979; Kashani et al., 1983), and studies of the

offspring of affectively ill parents report present state prevalence rates of approximately 20% (Weissman et al., 1984; Welner and Rice, 1988).

Although a disproportionate number of maltreated children are expected to meet the diagnostic criteria for the major depressive disorders, there will inevitably be considerable variation in the degree of depressive symptomatology different children exhibit. Variation in depressive symptomatology is expected to be related to differences in the severity of the maltreatment the children experienced. Most previous research studies on the development of abused and/or neglected children have treated a history of maltreatment as a categorical variable and have often condensed the data on children with different types of maltreatment experiences into a single "abused" group. In this study, children were assigned a severity rating for each type of maltreatment including experiences of physical abuse, sexual abuse, emotional maltreatment, and neglect. Children were additionally assigned a rating to quantify their placement experiences, as out-of-home placements are a common sequelae of maltreatment that may have an independent impact on children's later psychological functioning. No specific hypothesis is proposed concerning the type of maltreatment that is expected to be most strongly associated with the development of depressive disorders, as internalizing symptoms have been noted in children with a history of all types of maltreatment (Kaufman and Cicchetti, 1989).

Variation in depressive symptomatology is also expected to be affected by the quality of the social supports children have available to them. In studies of the offspring of affectively ill parents, children who received more support and nurturing from their mothers (Kauffman et al., 1979) or another adult living outside their home (Kauffman et al., 1979; Pellegrini et al., 1986) were found to be better adapted than those without these supports. For individuals with a history of childhood abuse, the experience of having one parent or foster parent who provided support and love while growing up is associated with better outcomes in adulthood (Egeland and Jacobvitz, 1984). The quality of the social supports of the children in this study, in and out of their homes, is expected to affect their outcome and the likelihood of developing a depressive disorder.

The existence of a depressive disorder in adults and children is associated with the presence of a number of cognitive and neurophysiological abnormalities. Consequently, in this study, measures of the children's attributional style and cortisol secretion were also obtained to determine if the maltreated children who meet the diagnostic criteria for one of the depressive disorders are more likely than the other children in the study to evidence the cognitive and neurophysiological abnormalities often reported in studies of adult and child depressives.

It is presently unknown if measures of parental depression are related to children's depression scores in a sample defined as at risk for depression because of a history of abuse and/or neglect. As less than one third of the sample lived with both their biological parents, and many children had no contact with their biological fathers, in this investigation it was not feasible to obtain data from the children's fathers

in order to completely address the question of familial contributions to the etiology of depressive disorders in maltreated children. Nonetheless, ratings of maternal depression were obtained as a preliminary exploration of the relationship between parental and child measures of depression in this sample defined as at risk because of a history of maltreatment.

In summary, the following hypotheses are examined in this investigation:

1. The rate of depressive disorders observed in this sample is expected to be significantly greater than the base rate observed in the general population.
2. Children with a history of more severe maltreatment experiences are expected to be more likely to develop a depressive disorder than those with a history of less severe experiences.
3. The children in the study with more positive social supports are expected to be less likely to develop a depressive disorder than those with inadequate supports.
4. Children who meet the criteria for one of the depressive disorders are more likely to have a maladaptive attributional style than the other children in the study.
5. Children who meet the diagnostic criteria for one of the depressive disorders are expected to exhibit cortisol secretion and regulatory abnormalities.
6. Measures of maternal depression are expected to be related to measures of children's depression.

Method

Subjects

The sample consisted of 56 7- to 12-year-old maltreated children (29 girls and 27 boys) and their mothers from the greater Waterbury, Connecticut region. The mean age of the children was 9 years and 7 months, and the cohort was approximately evenly distributed across the different ages. Sixty-four percent ($N = 37$) of the children in the study were white, 17% ($N = 9$) black, and 19% ($N = 10$) Hispanic. The majority of the children came from single parent households ($N = 33$), a sizeable number lived with both their biological parents ($N = 16$), and the remainder lived with their biological mother and a stepfather ($N = 7$). All the children were from the lower socioeconomic classes; many were the recipients of welfare ($N = 24$).

The children and their mothers were referred to the study by social workers from the Department of Children and Youth Services, the state agency responsible for the care of abused and neglected children in Connecticut. Children were eligible for the study if they received services because of abuse and/or neglect within the past year, were currently residing with a biological parent, and had not been in out-of-home care during the 6 months before the onset of the investigation. Mothers were offered a \$15 honorarium and a 1-week free camp experience for each of their children who met the study's inclusion criteria. Ninety-two percent of the parents recruited for the study agreed to participate.

Procedure

The data reported in this paper represent a subset of data

that was collected as part of a larger study designed to identify risk and protective factors relevant to understanding the effects of maltreatment on children's social, emotional, and cognitive development. The data for this study was derived from six primary sources: social workers, medical records, teachers, research assistants, parents, and children.

The child portion of the data was collected at a day camp set up specifically for the purposes of this study, replicating a methodology used by Kaufman and Cicchetti (1989). The camp was held at a local college in Waterbury during the week of Christmas vacation. The children attended the camp for 5 days, 7 hours a day. The camp was free to the children who participated in the study, and transportation and two meals were provided daily.

The 56 maltreated children were divided into six same-sexed, same-aged groups of nine to 10 children each. Three counselors were hired to work with each group of nine to 10 children, and 12 research assistants were utilized to collect the different measures obtained throughout the week. Most staff had advanced training in a mental health discipline.

Children attended assessment sessions twice daily and participated in recreational activities such as art, swimming, and gym during the remaining five periods of the day. Children were observed in structured and unstructured settings, interacting with peers and staff. In order to minimize biases in data collection procedures, all staff, except the author who acted as project director, were told that half the children attending the camp were maltreated, and half were demographically matched comparison children.

The extensive observations of the children made throughout the week at camp were utilized in making diagnostic assignments. Over the course of the week, children exhibited a wide array of behaviors. Monday was a honeymoon period. Children were somewhat apprehensive about the new environment and were typically on their best behavior. By Tuesday, the children's behavior problems became more apparent. Many children required firm limit setting by staff, which in numerous instances escalated into situations in which physical restraints were required. A few children expressed suicidal ideation, and one boy tried to jump from a second floor window. Children talked with staff about things that made them happy, and things that caused them pain. The staff was well equipped to handle the clinical situations that arose during the week at camp, and the goal of keeping the children safe and helping them to have a fulfilled week was achieved. The last day of camp was marked by a visit from Santa Claus and an awards assembly in which each child received a certificate recognizing something they were good at.

Measures

Childhood depression. The affective disorders section of the Present Episode of the Schedule for Affective Disorder and Schizophrenia for School-Aged Children (Kiddie-SADS-P) (Chambers et al., 1985) was used to assess children's depression. The Kiddie-SADS-P is a semistructured clinical interview that utilizes the accepted *DSM-III-R* criteria to make diagnoses. Parents and children are asked

about the presence and severity of depression related experiences, and summary ratings, using data collected from both sources, are used to diagnose major depression (MDD) and dysthymia (DD). Diagnoses obtained using the Kiddie-SADS-P have adequate test-retest reliability (Chambers et al., 1985) and good criterion validity (Puig-Antich et al., 1985).

The parent portion of the Kiddie-SADS-P was administered to the mothers during a 2½ hour interview in their homes, and the child portion was administered individually to the children on the fourth day of camp, once the children had time to establish rapport with the research assistant they were assigned to work with throughout the week. Research assistants had, on average, 2.5 years of graduate training.

All Kiddie-SADS-P summary ratings were reviewed by the author and a child psychiatrist (James Leckman, M.D.). To resolve discrepancies in diagnostic impressions derived by reviewing the Kiddie-SADS-P data and to obtain an independent assessment of child psychopathology, teacher Child Behavior Checklist (CBCL) (Achenbach and Edelbrock, 1979) data were reviewed. The CBCL is a 112-item survey of externalizing and internalizing symptoms with excellent psychometric properties. Final diagnoses were based on observations of the children made during the week at camp, parent's reports of the children's symptomatology, children's self-report, and teacher's reports of the children's behavior in school. The Kappa reliability coefficients for the diagnoses MDD and DD were 0.83 and 0.93, respectively.

Child maltreatment ratings. For the purposes of this study, physical abuse included incidents of severe physical punishment or intentionally inflicted injuries; experiences of being called unworthy, ignored, abandoned, exposed to parental drug abuse, and/or spousal violence were scored in the emotional maltreatment category. Incidents of inadequate supervision, inadequate nutrition, and/or the children's medical needs not being met were considered neglect, and experiences of being fondled or subjected to anal, oral, or vaginal intercourse were scored in the sexual abuse category.

Based on information derived from social workers, parents, medical records, and research assistants, each child in the study was assigned five ratings. One for experiences of physical abuse, neglect, emotional maltreatment, and sexual abuse and one to characterize the child's out-of-home placements. The specific criteria associated with each rating scale are available upon request from the author, together with a complete description of the information provided by each of the data sources.

Each type of maltreatment experience and the rating of the children's out-of-home placement were scored from 0 to 4. With each scale, a score of 0 implied that there had been no experiences relevant to the category being rated. Within the physical abuse category, ratings of 1 were assigned to children who experienced severe forms of punishment such as being hit with a paddle, ratings of two required the child to have suffered bruises as a result of parental action, ratings of three required the child to have experienced more severe injuries or moderately severe in-

juries throughout most of his/her life, and ratings of four were reserved for children who suffered serious injuries that required medical intervention, such as burns or bone fractures. The ratings for the other categories of maltreatment were similarly graduated, and there were specified criteria for considering the duration, frequency, number of perpetrators involved, and the child's developmental age when assigning ratings. In making the out-of-home placement ratings, the quality, duration, type, and number of placements were considered, together with the child's developmental age at placement and information about separations from siblings. The Kappa reliability coefficients for the physical abuse, neglect, emotional maltreatment, sexual abuse, and out-of-home placements were: 0.88, 0.73, 0.90, 0.83 and 0.94, respectively, and no discrepancies between raters were greater than one scale point (Kaufman, 1990b, manuscript in preparation).

Children's social networks. The Arizona Social Support Interview Schedule (ASSIS) (Barrera, 1980) for adults was adapted and individually administered to the children in the study on the third day of camp. Before its use in this study, the language and focus of the interview was pilot tested and adapted for its use with school-aged children. When the measure is administered to adults, it has good reliability and predictive validity (Barrera, 1980). During the ASSIS interview, children are asked to name: (1) people they talk to about very personal things, (2) those they count on to buy the things they need, (3) people they share good news with, (4) the adults and children they get together with to have fun, (5) those they go to if they need advice, and (6) the people who make them angry or upset. Using a five-point Likert scale with a graduated heart pictorial aid, children were also asked to rate how much they feel each source of support cares about them, and how much they care about each one. Five scores were derived from the ASSIS interview: (1) Total Supports, the sum of the people listed in the positive support categories, with each support weighted by the number of times they were listed; (2) Negative Relationships, the number of people listed in the antagonistic relationship category; (3) Conflictual Relationships, the number of people listed in one of the positive support categories and the antagonistic relationship category; (4) Perceived Affection from Supports, the average of the ratings of how much the children felt each support cared for them; and (5) Reported Affection for Supports, the average of the ratings of how much the children stated they cared about each support. As a preliminary test of the reliability of the ASSIS when it is used with children, a split-half reliability coefficient was computed for the Total Support scores obtained using data provided on the first two and last three positive support categories. Correlations computed separately for older and younger children were not significantly different (Fisher's $p > 0.05$), and the split-half correlation coefficient obtained for the entire sample was 0.72 ($p < 0.01$).

Child Attribution Style Questionnaire. The Child Attributional Style Questionnaire (CASQ) (Kaslow et al., 1978, unpublished manuscript) assesses the typical ways in which children attribute causality for good and bad events. On the

second day of camp, the CASQ was administered in groups of nine or 10 children, with one primary research assistant and three camp counselors available to provide assistance as needed. With the CASQ, children choose the attributions that best describe why each of 48 events happened to them. Each item includes a situation (e.g., "You get good grades") and two possible attributions to explain why the situation occurred (e.g., "I am a hard worker" versus "School work is simple"). Children are instructed to pick the one sentence from the pair that describes why the event happened to them.

Three summary scores are derived from the CASQ: (1) Good Composite Score, which is composed of the sum of the internal, stable, and global attributions made to explain the outcome of the good events; (2) Bad Composite Score, which is composed of the sum of the internal, stable, and global attributions made to explain the outcome of the bad events; and (3) Difference Score, obtained by subtracting the Bad Composite Score from the Good Composite Score. Internal attributions are those in which a child relates the cause of an event to a personal attribute rather than a situational factor; stable attributes are those that are apt to persist over time; and global attributes are those that are apt to be relevant in a variety of situations. There are 16 questions that apply to each of the three attributional dimensions (internality, stability, globality), with half of the events for each dimension associated with a positive event and half with a negative event. The CASQ composite scores have been found to have good test-retest reliability, internal consistency, and predictive validity (Kaslow et al., 1978, unpublished manuscript; Seligman et al., 1984).

Salivary cortisol. Saliva was sampled for cortisol determination five times during the week at camp. On the second and fourth days of camp, saliva samples were collected when the children first arrived at camp at 9:00 A.M. On the second, third, and fourth days, samples were collected at 3:00 P.M. Before the collection of the afternoon samples, all children were engaged in an identical task each day to control for the effects of physical activity on cortisol excretion. Whenever possible, 500 μ l of clear saliva was collected. Samples were stored for less than 24 hours in a standard freezer of a refrigerator and then placed at -20° C until assayed.

Salivary samples were assayed in batches, with all samples for the same child in the same batch to control for interassay variation. Samples of saliva were analyzed for unbound cortisol using the GammaCoat^{125I} Cortisol Radioimmunoassay kit, and samples were assayed in duplicate.

Two measures were obtained from the cortisol specimens: (1) Diurnal Drop and (2) Cortisol Level. A dichotomous variable was used to indicate the normalcy of children's diurnal rhythm secretion patterns, with children who failed to show the expected diurnal rhythm drop in cortisol secretion scored as 0 and children whose average afternoon cortisol secretion values were less than the average of their morning assessments given the score of 1. The Cortisol Level value was computed by averaging the values of the afternoon samples.

Maternal depression. The Center for Epidemiological Studies — Depression Scale (CES-D) (Radloff, 1977) was

TABLE 1. Analysis of Covariance Results: F-values, Least-Squares Means, and Standard Errors

	Depressed		Nondepressed		F-value
	\bar{X}	SD	\bar{X}	SD	
Maltreatment-related experiences					
Physical abuse ratings	2.40	0.30	1.66	0.18	4.32*
Emotional maltreatment	3.53	0.21	2.99	0.12	4.64*
Neglect ratings	2.01	0.36	1.75	0.21	0.37
Sexual abuse ratings	0.58	0.38	0.91	0.23	0.62
Out-of-home placements	1.85	0.35	0.66	0.21	7.69**
Social networks					
Total supports	11.36	1.57	15.31	0.96	4.05*
Negative relationships	1.86	0.21	1.52	0.21	0.65
Conflictual relationships	1.25	0.27	0.40	0.18	6.10*
Perceived affection from supports	3.44	0.18	3.98	0.11	5.75*
Reported affection for supports	3.59	0.17	4.08	0.11	5.14*
Attributional style					
Good composite score	12.12	0.75	14.65	0.48	7.33**
Bad composite score	10.55	0.82	7.94	0.53	6.56*
Difference score	1.57	1.04	6.71	0.67	15.75**
Salivary cortisol					
Afternoon secretion value	0.34	0.10	0.30	0.06	0.13
Maternal depression					
CES-D scores	27.84	3.19	18.41	1.90	5.91*

Note: CES-D = Center for Epidemiological Studies-Depression Scale.

* $p < 0.05$, ** $p < 0.01$.

used to assess maternal depression. The CES-D is a self-report scale of depressive symptomatology widely used in epidemiological studies. It consists of 20 items that are rated on a four-point scale where 0 implies that the symptom described is true none of the time or rarely, and 3 implies that the symptom is true most or all of the time. The CES-D has been used successfully by subjects of diverse backgrounds with adequate reliability and good discriminant validity (Weissman and Klerman, 1977; Radloff and Locke, 1985).

Results

Depressive Disorders in Maltreated Children

Prevalence. Ten (18%) of the 56 children, at the time of the study, met the diagnostic classification for MDD, and 14 (25%) of the children met the unmodified criteria for DD. Of the 10 children who met the criteria for MDD, eight (80%) also met the criteria for DD. In total, 16 (27%) of the children met the unmodified criteria for MDD and/or DD.

Factors Associated with the Presence of a Depressive Disorder

Demographic factors. A series of chi-square analyses was conducted to determine if the following demographic factors were equally distributed among the depressed and nondepressed children: Race (white versus black versus Hispanic, $\chi^2 = 4.88$, $df = 2$, $p < 0.10$); Sex (male versus female, $\chi^2 = 3.78$, $df = 1$, $p < 0.10$); Maternal Marital Status (married versus divorced or separated versus single, $\chi^2 = 1.17$, $df = 2$, $p = NS$); Father Presence (biological father versus stepfather or boyfriend versus no male, $\chi^2 = 1.12$,

$df = 2$, $p = NS$); and Welfare Status (Aid to Families with Dependent Children (AFDC) versus non-AFDC, $\chi^2 = 0.07$, $df = 1$, $p = NS$). All analyses failed to meet traditional significance levels, but boys were found to be somewhat more likely to be depressed than girls, and Hispanic children were less likely to be depressed than the other children. Analyses of Variance (ANOVAs) were conducted to determine if there were age or IQ differences between the depressed and nondepressed children. The depressed children were found to be significantly older, $F(1,54) = 5.25$, $p < 0.05$, with the mean age of the depressed and nondepressed children 10 years 3 months, and 9 years 3 months, respectively. There were no differences between the two groups in terms of IQ $F(1,54) = 0.00$, $p > 0.05$, with the mean IQ of the depressed and nondepressed children 88.5 and 88.3, respectively.

Child maltreatment ratings. Group differences between the depressed and nondepressed children on each of the maltreatment ratings and the out-of-home placements rating were examined with a Multivariate Analysis of Covariance (MANCOVA). A MANCOVA was used to control for the effects of children's age, sex, and race, as the two groups were not matched on these demographic variables. Significant differences emerged using Wilks's Lambda criterion, $F(5,47) = 4.17$, $p < 0.005$. A series of follow-up univariate ANCOVAs was then performed to examine group differences on each of the rating scales, again controlling for children's age, sex, and race. The F-values, least-squares means, and standard errors that resulted from these analyses are presented in Table 1. Least-squares means are the means of the dependent variables adjusted for the covariates. The results of these analyses indicate that the depressed children

TABLE 2. Pearson Correlations among Variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1. Age	—	-0.06	-0.11	0.14	-0.02	0.25*	-0.21	0.08	-0.23*	-0.23*	-0.16	-0.22	0.06	-0.32**	-0.03
2. Race	—	—	0.18	-0.47***	-0.53***	-0.24*	0.04	-0.04	-0.19	-0.10	-0.12	0.17	-0.20	0.14	0.07
3. Sex	—	—	—	-0.13	-0.24*	0.33**	0.35***	-0.02	0.25*	0.28**	0.07	-0.19	0.19	0.37***	0.15
4. Physical abuse	—	—	—	—	0.24*	0.20	-0.22	0.05	0.04	-0.04	-0.04	0.20	-0.17	-0.10	0.20
5. Emotional maltreatment	—	—	—	—	—	0.14	-0.10	0.27*	0.08	-0.01	-0.18	0.10	-0.19	-0.07	0.06
6. Out-of-home placements	—	—	—	—	—	—	-0.09	-0.01	-0.21	-0.14	-0.28**	-0.04	-0.15	-0.28**	0.03
7. Total supports	—	—	—	—	—	—	—	-0.03	0.12	0.12	0.11	0.02	0.06	0.05	-0.18
8. Conflictual relations	—	—	—	—	—	—	—	—	-0.13	-0.15	-0.05	0.06	-0.08	-0.01	0.07
9. Perceived affection	—	—	—	—	—	—	—	—	—	0.88***	0.24*	-0.21	0.31**	0.28**	-0.24*
10. Reported affection	—	—	—	—	—	—	—	—	—	—	0.12	-0.23	0.25*	0.27**	-0.18
11. Good CASQ score	—	—	—	—	—	—	—	—	—	—	—	-0.03	0.67***	0.19	-0.17
12. Bad CASQ score	—	—	—	—	—	—	—	—	—	—	—	—	-0.76***	0.05	0.01
13. CASQ difference score	—	—	—	—	—	—	—	—	—	—	—	—	—	0.08	-0.13
14. Diurnal drop	—	—	—	—	—	—	—	—	—	—	—	—	—	—	-0.12
15. Maternal depression	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Note: CASQ = Child Attributional Style Questionnaire.

* $p < 0.10$.

** $p < 0.05$.

*** $p < 0.01$.

were more likely to receive more severe scores on the physical abuse, emotional maltreatment, and out-of-home placements ratings than the nondepressed children.

Social networks. The scores children received on each of the different social network measures were also subjected to a MANCOVA, again using the variables age, sex, and race as covariates. Significant differences emerged using Wilks's Lambda criterion, $F(5,47) = 2.54, p < 0.05$. A series of univariate ANCOVAs was then performed to examine group differences on each of the individual social network scores. The results of these analyses are similarly reported in Table 1. Depressed children reported that they had fewer total supports, more conflictual relationships, perceived their supports to care less for them than nondepressed children and reported less affection for their supports as well. Depressed children were also less likely than nondepressed children to list their mothers ($\chi^2 = 10.24, p < 0.01$) and fathers ($\chi^2 = 5.97, p < 0.05$) as positive supports and more likely to list their mothers ($\chi^2 = 6.32, p < 0.05$) and fathers ($\chi^2 = 5.88, p < 0.05$) in the antagonistic relationship category. There were no differences in the frequency with which nonparent adult supports ($\chi^2 = 0.10, p > 0.05$) or peer supports ($\chi^2 = 2.13, p > 0.05$) were listed by both groups of children. The demographic variables were not controlled statistically in examining group differences on these dichotomous measures, as the cells required to conduct the analyses would have been prohibitively small, making the chi-square test invalid.

Attributional style. All three attributional style scores were also subjected to a MANCOVA. Significant group differences again emerged using Wilks's Lambda criterion, $F(3,49) = 7.75, p < 0.01$. Table 1 depicts the results of the follow-up ANCOVAs. Depressed children tend to attribute the outcome of positive events to external, unstable, and specific causes and attribute the outcome of negative events to internal, stable, and global qualities. The depressed children had lower difference scores than the nondepressed children, and the lower the difference score, the more maladaptive the attributional style.

Salivary cortisol. In order to determine if the children who met the diagnostic criteria for MDD and/or DD were less likely than the children who failed to meet the criteria for either diagnosis to show the expected diurnal rhythm drop in cortisol secretion, a χ^2 analysis was performed. The results of this analysis were consistent with predictions ($\chi^2 = 3.93, df = 1, p < 0.05$).

Average cortisol secretion values, based on the three afternoon specimens, were transformed (log 10) to help normalize the distribution, and then an ANCOVA was computed. The results of this analysis were not significant.

Maternal depression. An ANCOVA utilizing mother's depression ratings as the dependent variable and children's depression status as the independent variable was conducted, with children's age, sex, and race used as covariates. Mothers of depressed children had significantly higher depression scores than the mothers of nondepressed children.

Classifying children as depressed. Each of the measures on which depressed and nondepressed children differed were

entered into a discriminant analysis to classify children as depressed and/or dysthymic or failing to meet the criteria for either diagnosis. Variables used as predictors included: children's age, sex, and race, ratings of physical abuse, emotional maltreatment, out-of-home placements, the social supports total support index and the measures of conflictual relations, perceptions of affection from supports, reported affection for supports, all of the attributional style composite scores, the cortisol diurnal drop measure, and the measure of maternal depression. Correlations among these variables are presented in Table 2.

With regard to the associations between the demographic covariates and the other dependent measures, the correlations depicted in Table 2 suggest that older children were more likely to show cortisol secretion abnormalities than younger children; white children were more likely to receive higher scores on the physical abuse and emotional maltreatment scales than black or Hispanic children; boys were more likely to be placed out of home than girls; and girls were more likely than boys to report more extended and better quality social supports. As for associations among the different dependent variables, the measure of cortisol diurnal drop was significantly correlated with ratings of out-of-home placements, perceived affections from supports, and reported affection for supports. All the attributional style scores were significantly correlated; the rating of perceived affection from supports was significantly correlated with the rating of affection for supports; and the attributional style difference score was significantly correlated with the measure of perceived affection from supports.

A stepwise procedure was utilized to select the variables that best discriminated between the two groups of children. Variables retained with the stepwise procedure include: the out-of-home placements rating, CASQ difference score, and the ratings of conflictual relations, physical abuse, perceived affection from supports, and emotional maltreatment. The six variables that were retained significantly distinguished children who met the criteria for MDD and/or DD, and those that failed to meet the diagnostic criteria for either diagnosis, Wilks's Lambda $F(6,49) = 10.00, p < 0.001$. Together these six variables had a multiple R of 0.76, accounting for approximately 60% of the variance in designating group membership. Ratings of children's out-of-home placements contributed most significantly in determining group membership.

When children with a canonical function score of +1.00 or greater were classified as depressed and/or dysthymic, 13 of the 16 children meeting the criteria for one or both of the diagnoses were correctly classified, and 38 of the 40 children who failed to meet the criteria for either diagnosis were correctly classified. These classifications resulted in sensitivity (the proportion of depressed children correctly identified) and specificity (the proportion of nondepressed children correctly identified) scores of 81% and 95%, respectively, with a total of 91% of the sample correctly classified.

Discussion

As predicted, a disproportionate number of the maltreated

children in this study met the diagnostic criteria for one of the major affective disorders. In fact, the prevalence rate for major depression in this sample of children defined as at-risk for depression because of a history of abuse and/or neglect was comparable to the rate reported in other samples of children defined as at-risk for depression because of a familial history of affective illness (Weissman et al., 1984; Welner and Rice, 1988). Overall, 18% of the sample met the criteria for major depression, and 25% met the criteria for dysthymia, with the majority of the children who met the criteria for major depression also meeting the criteria for dysthymia.

In terms of the effect of different maltreatment related experiences, children who met the diagnostic criteria for MDD and/or DD were found to have higher scores on the physical abuse, emotional maltreatment, and out-of-home placement ratings. They were more apt to have suffered severe injuries over an extended period of time, have parents that were drug dependent and extremely rejecting or psychologically unavailable, and they were also more likely to have experienced multiple out-of-home placements.

The failure to find group differences on the sexual abuse rating may be because of the small number of children who were subjected to this form of abuse (20%), and the likelihood that many cases of sexual abuse were undetected. Nearly half of the reports of sexual abuse were initially unknown to social workers and were discovered while examining the children's medical records (Kaufman, 1990b, manuscript in preparation). The fact that many medically documented cases of sexual abuse were not reported to the state agency that serves maltreated children is extremely disturbing and underscores the need to improve communication among the state and private agencies that serve children and their families.

The failure to find an association between the ratings of neglect and the children's depression scores should not be interpreted to mean that neglect is not deleterious for children. In analyzing other data collected as part of this project (Kaufman, 1990c, manuscript in preparation), children with higher neglect ratings were found to have lower IQ scores, and ratings of neglect were found to explain more variance in children's IQ scores than any other type of maltreatment. This finding is consistent with other studies that have documented that poverty, poor nutrition, and poor medical care are associated with decrements in children's IQ scores (Sameroff and Seifer, 1983), and highlights the need to employ societal level interventions; at present in the United States, 22% of all children under the age of six are below the poverty line (Bureau of the Census, 1987).

Measures of the children's social supports were also found to affect the likelihood of children developing a depressive disorder. Children with more positive supports and fewer conflictual relationships were less likely to be depressed than the other maltreated children in the study. In addition, children who were not depressed were less likely to name their mother or father as a negative or conflictual support, and they were also more likely to report that they felt more cared about by their supports than children who met the criteria for one of the depressive disorders.

All these results highlight the salience of the quality of the parent-child relationship in determining which maltreated children are most likely to develop a depressive disorder. Children who met the diagnostic criteria for one of the depressive disorders suffered more extreme abuse, were subjected to multiple and extended separations from their biological parents, described their relationship with their parents in antagonistic terms, and reported that they felt unloved by them.

Children who were depressed were also more likely than the other children in the study to have parents with high depression scores. Family interaction studies have found that during an episode of illness, depressed parents are more rejecting (Davenport et al., 1984) and punitive (Weissman et al., 1972; Cox et al., 1987) of their children than non-depressed comparison parents. This finding further highlights the salience of the quality of the parent-child relationship in determining which maltreated children are most likely to develop a depressive disorder. The contribution of genetic factors is also relevant. An epidemiological study with adult respondents found that unfair, inconsistent punishment predicted the occurrence of depressive disorders independent of the influence of parental psychiatric history (Holmes and Robins, 1987), and it is likely that a history of maltreatment and a familial loading for affective illness are two nonmutually exclusive, independent risk factors for depression in children. Although measures of maternal depression did not make a unique contribution in discriminating between depressed and nondepressed children, the effect of familial loading for affective illness was not fully tested in this study, as lifetime diagnoses of maternal depression were not obtained, and measures of paternal psychopathology were unavailable.

Measures of attributional style also significantly differentiated children who met the criteria for one of the depressive disorders from those that did not. Children who tended to attribute positive events to external, unstable, and specific causes, and negative events to internal, stable, and global causes were more likely to be depressed than children with more adaptive attributional styles. This finding is consistent with many previous studies (Kaslow et al., 1988) and highlights that it is not just what happens to children, but how they make sense of the events that happen to them that determines their likelihood for developing a depressive disorder.

Measures of cortisol secretion were also related to children's depression assessments. Children who failed to show the expected diurnal drop in cortisol levels were more likely to meet the diagnostic criteria for depression or dysthymia than children who failed to meet the diagnostic criteria for either diagnosis. The cortisol measures, however, failed to make a unique contribution in predicting children's diagnostic status once the other measures obtained in this study were considered. More robust findings may have emerged had a comparison group that was not subjected to chronic stress been employed and a more sensitive assessment of cortisol regulation, such as the dexamethasone suppression test (Carroll, 1982), been utilized. It is interesting to note, however, that the cortisol diurnal drop measure was sig-

nificantly correlated with the ratings of children's out-of-home placements and perceived affection from supports. The association between these ratings and the cortisol diurnal drop measure is consistent with the results of animal studies that have been used to suggest that maternal deprivation infers a vulnerability to depression that is mediated by cortisol regulatory abnormalities (Thomas et al., 1968), with the rating of out-of-home placements providing a gauge of physical deprivation, and the rating of perceived affection from supports providing an index of emotional deprivation.

When attempts were made to classify the children as depressed or not depressed, using the measures collected in this study, 91% of the children were correctly classified. The selection of this high-risk sample and the utilization of the measures obtained in this investigation increased diagnostic predictions over the base rate reported in the general population (2%) and the base rate observed in this high-risk sample (27%). Replication of the predictive ability of these instruments in an independent sample is required, however, to demonstrate the utility of the discriminant function used to classify the children in this study.

Most of the children in the study who met the criteria for major depression also met the criteria for dysthymia. Adults with "double depression" have been found to be less responsive to tricyclic treatments, have a lower familial loading for affective illness, and a greater rate of object loss than other adult depressives (Akiskal et al., 1981). They have also been found to be at a higher risk for relapse (Keller et al., 1983). Although a comparable number of children with a history of maltreatment and children of affectively ill parents are at risk for developing depressive disorders, there may be important distinctions in the etiology of the disorders in these two high-risk groups that would lead to different treatment recommendations. It is likely that there are multiple distinct and overlapping pathways to the etiology of depression within these two nonmutually exclusive high-risk groups. Further research with careful attention paid to the issue of heterogeneity is warranted in order to advance understandings of the etiology and treatment of depression in children (Kaufman, 1990d, submitted manuscript).

Research in the area of child maltreatment has both important theoretical and practical implications. While studies are needed to identify effective prevention and intervention strategies, research in this area can also enhance understandings of normal and atypical development—especially those associated with the etiology of psychiatric disorders (Cicchetti and Rizley, 1981). In these days when molecular genetics have infiltrated the field of psychiatric research, it is important not to lose sight of environmental factors that impact on the etiology of psychopathology. It is equally important, however, to utilize multidisciplinary research approaches, as the impact of environmental stressors may be modified by other factors in the environment and mediated by both cognitive and neurobiological mechanisms.

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