Family Risk Factors, Parental Depression, and Psychopathology in Offspring

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Associations between parents' poor marital adjustment, parent–child discord, affectionless control, low family cohesion, and parental divorce and DSM-III diagnoses were explored in a study of 220 offspring of parents with and without major depression. Family risk factors were more prevalent among offspring of depressed parents. Risk factors were associated with major depression and any diagnosis for children of nondepressed parents; they were associated with conduct disorder for both groups. Parental depression was more important than family risk factors in models predicting major depression, anxiety disorders, and any diagnosis. Both parental depression and family risk factors were significant predictors of conduct disorder. Implications for the etiology of psychopathology and for analytic strategies are discussed.

There is considerable evidence, based on systematic study, that children from disrupted families have a greater risk for psychopathology than children from stable families. Despite consistent conclusions, previous research on the impact of family environment on psychopathology in children is limited in several critical respects. Most studies have focused exclusively on one dimension of family discord—that is, on relationships between parents (parents' marital discord, divorce, or separation; e.g., Emery, 1982; Emery, Joyce, & Fincham, 1987) or on relationships between parents and children (parental rejection of children or parent–child conflict; e.g., Lefkowitz & Tesiny, 1984; Patterson, 1982). Relying for the most part on dependent measures derived from behavioral checklists, previous studies have been limited by their failure to use diagnostic criteria for children that are comparable with those used in clinical practice.

Perhaps the most serious limitation of previous research on family environment has been its failure to include any assessment (clinically valid or otherwise) of parental psychopathol-

ogy. Because parental psychopathology is a correlate of both family discord (Brown & Harris, 1978; Molholm & Dinitz, 1972; Rutter & Quinton, 1984) and psychopathology in children (e.g., Beardslee, Bemporad, Keller, & Klerman, 1983; Weissman et al., 1987), serious questions about the validity of previous studies omitting parental psychopathology are raised.

Two previous studies including assessments of parental psychopathology provide some preliminary answers to these questions. Rutter (1971) compared the influence of marital discord on antisocial behavior in a group of children of parents with personality disorders with a group of children of parents without personality disorder. For both groups, rates of antisocial behavior were considerably higher when marriages were discordant. Although parental personality disturbance had no effect on the risk for antisocial behavior in children from nondiscordant marriages, it increased the risk for antisocial behavior for children from discordant marriages. Emery, Weintraub, and Neale (1982) examined associations between parental psychopathology, marital discord, and school behavior among children with a parent who was diagnosed (according to Research Diagnostic Criteria [RDC]; Spitzer, Endicott, & Robins, 1978) as either schizophrenic, unipolar depressed, bipolar, or normal. Emery et al. suggested that once marital discord is taken into account, the direct association between parental affective disorder and children's school behavior disappears. As with other previous studies in this area, however, these analyses are limited by their reliance on marital discord as an index of family discord, and their exclusive focus on behavioral outcomes, instead of diagnostic outcomes, in children.

The present study is an attempt to assess the importance of multiple measures of family discord on psychopathology in

Table 1
Age and Sex of Children by Parental Diagnosis

Sample/age (years)	≥1 parent depressed		Neither parent depressed		Total n
	n	%	n	%	
Males					
6–11	17	11.1	3	4.5	20
12–18	24	15.7	15	22.4	39
19+	33	21.6	13	19.4	46
Total	74	48.4	31	46.3	105
Females					
6–11	9	5.9	6	9.0	15
12–18	37	24.2	16	23.9	53
19+	33	21.6	14	20.9	47
Total	79	51.6	36	53.7	115
Total n					
Children	153	100	67	100	220
Families	65		26		91

children of depressed and nondepressed parents using clinical diagnostic criteria to assess psychopathology in both parents and children (see later discussion). The study addresses five questions suggested by previous research: (a) Is family discord consistent in its effects on children of parents with and without psychopathology? (b) Does family discord have effects on psychopathology in children above and beyond that of parental psychopathology? (c) Are these effects consistent across different diagnostic outcomes in children? (d) Are these effects consistent for different dimensions of family discord? (e) What is the *relative* importance of family risk factors and parental psychopathology for psychopathology in children?

Method

Sample

This study is based on 220 offspring at high and low risk for major depression by virtue of the presence or absence of major depression in their parents (probands). Parents who had children between the ages of 6 and 23 were participants in a family study of major depression (Weissman, Leckman, Merikangas, Gammon, & Prusoff, 1984). Previous reports from this study have compared 125 offspring of 56 depressed proband parents with 95 offspring of 35 normal proband parents. In psychiatric assessments of probands and their spouses taken at the time of the study, 3 normal probands and 6 spouses of normal probands reported a lifetime history of major depressive disorder; the depressed parents from these 9 families had 28 children. Thus, the present report compares 153 offspring from 65 families with one or more depressed parent with 67 offspring from 26 families with neither parent depressed.

Major depression in parents was defined according to the RDC (modified to require 4 weeks duration of symptoms and impairment in a major social role) and was assessed using the Schedule for Affective Disorders and Schizophrenia–Lifetime Version (SADS-L; Endicott & Spitzer, 1978). The parents composing the nondepressed group, originally identified in a 1975 community survey, reported no history of psychiatric illness in at least four direct interviews given over an 8-year period.

Table 1 displays the demographic characteristics of the children by parents' diagnostic status. There were 105 boys and 115 girls. A total of 35 children were prepubertal (ages 6–11), 92 were between the ages of 12 and 18 years, and 93 were between the ages of 19 and 23. The mean age for the children was about 17 years. There were no significant differences in the age and sex distribution of children by parents' diagnostic status. Note that all of the subjects in the study were White.

Assessment

For a complete description of study design and assessment, see Weissman et al., 1987. A slightly modified version of the Schedule for Affective Disorders and Schizophrenia for School-Aged Children, Epidemiologic Version (K-SADS-E; Orvaschel, Puig-Antich, Chambers, Tabrizi, & Johnson 1982) formed the core of a comprehensive interview administered to the parent about the child and to the child about him or herself. Interviewers, who were blind to the parents' diagnoses, interviewed a parent (usually the mother) about the child, and at a later time interviewed the child. The battery of measures included an assessment of each child's behavioral and social functioning, as well as questions about each child's developmental history. Parents (mothers and fathers) and children who were more than 7 years old were asked to complete self-administered reports about themselves.

Diagnoses in Offspring

Table 2 summarizes the measures used in the present study. In the present analysis, four lifetime diagnoses in children, including major depression, anxiety disorder, conduct disorder, and any diagnosis were examined in relation to indexes of family disharmony. Because children of depressed parents are at increased risk for depression (Weissman et al., 1987) and because symptoms constituting depression and anxiety disorders have been found to overlap (e.g., Bernstein & Garfinkel, 1986; Puig-Antich & Rabinovich, 1986), these two diagnostic categories were considered appropriate outcome measures. Because researchers have previously suggested that the influence of family disharmony on children is limited to externalizing disorders, conduct disorder and a summary measure, any diagnosis, were included in the analysis for comparative purposes. If a child met the criteria for any of 42 possible diagnoses encompassing a broad range of psychiatric disorders, then he or she was classified as having *any diagnosis*.

Table 2
Description of Variables Used in the Study

Variable	Description
Family risk variables	
Poor marital adjustment	Children with parents reporting scores at or below 107 on the Locke-Wallace (1959) SMAT were counted as being exposed to *poor adjustment*. Scores were based on parent self-report, taking the lowest reported parent score.
Parent–child discord	Children were counted being exposed to parent–child discord if mothers reported past existence of a great deal of fighting between a parent (either the mother or the father) and at least one child in the family.
Low family cohesion	Children who reported scores at or below the sample median (12) of the five-item cohesion subscale of the Family Adaptability and Cohesion Evaluation Scale (FACES; Olson, Sprenkle, & Russell, 1979) were counted as living in families characterized by low cohesion.
Affectionless control	Children who scored at least one parent low on caring and high on control on the Parental Bonding Index (PBI; Parker Tupling, & Brown, 1979) were counted as having a parent with affectionless control.
Parental divorce	Children whose biological parents reported a divorce were counted as having been exposed to divorce.
Stratification variable	
Parent's diagnostic status	An indicator variable reflecting whether or not a child's biological parent had a lifetime RDC (Spitzer, Endicott, & Robins, 1978) diagnoses of major depression.
Control variables	
Age of child	Two indicator variables reflecting the child's age at the time of the interview, including one reflecting whether the child was between 6 and 11 years, and another reflecting whether the child was between 12 and 18 years.
Sex of child	An indicator variable reflecting whether or not the child was female.
Socioeconomic status	A 5-point scale based on the Hollingshead (1957) two-factor index.
Number of siblings in a family	
Outcome measures	
Best estimate DSM-III lifetime diagnoses (American Psychiatric Association, 1980)	Diagnoses combining all available information, including mother reports with respect to the child and child self-reports using the K-SADS-E (Orvaschel, Puig-Antich, Chambers, Tabrizi, & Johnson, 1982): (a) major depression, (b) any anxiety disorder, (c) any conduct disorder, and (d) any diagnosis.

Note. SMAT = Short Marital Adjustment Test; RDC = Research Diagnostic Criteria; *DSM-III* = *Diagnostic and Statistical Manual of Mental Disorders,* 3rd edition; K-SADS-E = Schedule for Affective Disorders and Schizophrenia for School-Aged Children, Epidemiologic Version.

Diagnoses in offspring were made according to a *best estimate* procedure (Leckman, Sholomskas, Thompson, Belanger, & Weissman, 1982), in which a child psychiatrist and psychologist who were not involved in the interviewing reviewed all sources of information and independently assigned a lifetime *Diagnostic and Statistical Manual of Mental Disorders,* 3rd edition (DSM-III; American Psychiatric Association, 1980) diagnosis. Discrepancies in diagnoses by the independent evaluators were resolved by a third source, who also independently and blindly reviewed all available information. In an attempt to assess the reliability of the best estimate procedure, a second child psychiatrist reviewed all available information on 38 randomly selected children and made best estimate diagnoses. Agreement between psychiatrists on childrens' diagnoses (as measured by the kappa coefficient) was excellent (the following kappa coefficients were generated from the reliability study: major depression, .89; anxiety disorder, .69; conduct disorder, .93; and any diagnosis, 1.00).

Family Discord

The study considers five measures of family functioning (see Table 2) including two measures reported by the parents (poor marital adjustment and parent–child discord), two measures reported by the child (low family cohesion and at least one parent characterized by affectionless control) and one index of family structure (whether or not the child's biological parents reported a divorce).

The assessment of marital adjustment between currently married spouses was based on the Short Marital Adjustment Test (SMAT; Locke & Wallace, 1959), which has been shown to discriminate well between distressed and nondistressed marriages. Within the present study, the validity of the measure as an index of discord is supported by high correlations between low scores on the SMAT and a marital relations measure derived from the Social Adjustment Scale Self-Report (SAS-SR; Weissman, Sholomskas, & John, 1981) concerning recent conflict with spouse ($r = .80$ and $r = .65$, respectively, for mothers and fathers). Because a report of poor marital adjustment by at least one spouse indicates the presence of poor adjustment in a marriage (lower scores indicate worse adjustment; see Emery et al., 1982), a decision was made to use the lowest SMAT score available in a couple for all data analysis. For the 177 children with valid parent reports on the SMAT, a median exposure score of 107 was selected as a cut point for a binary index of poor marital adjustment. Scores of 107 or less were recorded as ones, and scores above 107 were recorded as zeros on this index. A binary index of parent–child discord was scored as a one for a child if mothers reported past existence of a great deal of arguing, fighting, or tension between a parent (either the mother or the father) and at least one child in the family; all other children in the sample received a zero on this index.

Two measures of family discord were derived from separate scales included in the child self-report instrument. A measure of family cohesion was derived from the five-item Cohesion subscale of the Family

Adaptability and Cohesion Evaluation Scale (FACES; Olson, Sprenkle, & Russell, 1979). The 4-point likert-type items included in this scale assess a child's perception of the cohesiveness of his or her current family unit. The five items included in the scale assess a child's perception of family togetherness, the amount of recreational time family members spend with one another, as well as the independence and autonomy of family members. Research has shown that high scores on the cohesion subscale are associated with healthy family functioning (Pratt & Hansen, 1987). Because low cohesion was considered an index of family disintegration, children responding at or below the sample median of 12 received a one on this measure, whereas all others received a zero. Within the present study, the five items composing the measure showed modest internal consistency reliability (Chronbach's $\alpha = .40$).

The child's report of parenting behavior was based on his or her response to the Parental Bonding Instrument (PBI; Parker, Tupling, & Brown, 1979). This scale consists of twenty-five 4-point items assessing a child's perception of parenting behaviors of each of his or her parents (mothers and fathers are rated separately). Parents are evaluated along two dimensions, caring and overprotection, with separate norms on each dimension for mothers and fathers. Within the present sample, the four subscales (i.e., maternal caring, maternal overprotection, paternal caring, and paternal overprotection) all demonstrated acceptable levels of internal consistency reliability (the following Chronbach's alphas were generated: maternal caring, .77; maternal overprotection, .83; paternal caring, .83; paternal overprotection, .86).

Because previous research has identified *affectionless control* (i.e., a low rating on the caring dimension combined with an extremely high rating on the overprotection dimension), as a risk factor for psychiatric illness (depression and anxiety) in children, the four subscales of the PBI were combined into one overall index of affectionless control. Children who gave their mothers a score below 27 on the caring dimension and above 13.5 on the overprotection dimension were counted as having a mother with affectionless control. Children who gave their fathers a score below 24 on the caring dimension and above 13.5 on the overprotection dimension were counted as having a father with affectionless control. A child was given a score of 1 on the index if the child's report of either parent's behavior met the criteria for affectionless control. All other children with completed PBIs on either parent were given a score of 0.

Statistical Analyses

Rates of positive diagnoses for each of the disorders were compared for children with and without each risk factor. In addition, each of the family risk measures were examined in separate maximum likelihood logistic regressions (using the SAS LOGIST procedure; SAS Institute, Inc., 1986) predicting depression, anxiety, conduct disorder, and any diagnosis. Each logistic model controlled for age (children aged 6 to 11 and children aged 12 to 18 were compared with children aged 19 and older), sex, a 5-point index of socioeconomic status (based on the Hollingshead two-factor index; Hollingshead, 1957), an index of the number of siblings in the family, and an indicator of parents' diagnostic status (a value of 1 indicating that at least one parent was depressed and a value of 0 indicating that neither parent was depressed). A Parental Diagnostic Status × Risk Factor interaction term was entered into each regression to assess the consistency of effects across both groups of children.

The antilogarithm of the regression coefficient for the risk factors yields an odds ratio for evaluating the impact of the risk factor for children of nondepressed parents; the antilogorithm of the sum of the coefficient for the risk factor and the coefficient for the interaction term yields an odds ratio for evaluating the impact of the risk factor for children of depressed parents. Similarly, the antilogarithm of the regression

coefficient for parental depression yields an odds ratio for evaluating the impact of parental depression in the absence of a risk factor; the antilogorithm of the sum of the coefficient for parental depression and the coefficient for the interaction term yields an odds ratio for evaluating the impact of parental depression in the presence of a risk factor. Standard errors for log odds ratios were derived from the variance–covariance matrix for the parameter estimates, according to procedures outlined by Kleinbaum, Kupper, and Morgenstern (1982, pp. 476–491).

To ascertain the relative importance of family risk factors and parental psychopathology, a series of hierarchical logistic regressions were performed. Assessment of the overall change in model fit (i.e., the change in the likelihood ratio statistic) with the addition of risk factors or of an index of parental depression was made for each of 20 regression models.

Results

Distribution of Risk Factors and Diagnoses in Offspring

As a preliminary step, the distribution of each of the risk factors, as well as the distribution of each lifetime diagnosis, were examined separately for children with at least one depressed parent and children with neither parent depressed. The first five rows of Table 3 suggest that children of depressed parents have a higher rate of exposure to each of the indexes of family disharmony than do children of nondepressed parents. Children of depressed parents were exposed to significantly higher rates of poor marital adjustment, $\chi^2(1, N = 177) = 35.44, p < .001$, and parental divorce, $\chi^2(1, N = 220) = 11.53, p < .001$. They were significantly more likely to report higher rates of low cohesion, $\chi^2(1, N = 178) = 5.63, p < .05$, and affectionless control, $\chi^2(1, N = 178) = 6.64, p < .01$. Differences in rates of exposure to parent–child discord were marginally significant across the two samples. Note that the low rates of exposure to risk factors for children of nondepressed parents suggest limitations in the power to detect effects for risk factors within this subgroup.

The denominators in the first and third columns of Table 3 indicate the number of valid assessments for each of the risk factors. Slightly more than 20% of the sample had missing values on the three measures based on self-reports, poor marital adjustment, low family cohesion, and affectionless control. An analysis of missing values for the two-child self-report measures suggested that children of one or more depressed parents had a significantly higher rate of missing values on these measures than did children of nondepressed parents, $\chi^2(1, N = 220) = 10.74, p < .001$. Boys were significantly more likely to have missing reports than were girls, $\chi^2(1, N = 220) = 4.18, p < .05$. Analyses of missing values for parent reports of poor marital adjustment suggested that children older than 18 were more likely to have missing parent reports than were children 18 years or younger, $\chi^2(1, N = 220) = 5.51, p < .05$.

The bottom portion of Table 3 suggests that overall rates of lifetime diagnoses were high for both groups of children, with 76% of the children of depressed parents and 57% of the children of nondepressed parents reporting some lifetime diagnosis. The rates for all of the diagnostic categories were higher for the children of depressed probands, with differences reaching statistical significance for anxiety disorder, $\chi^2(1, N = 220) =$

Table 3

Rates per 100 of Risk Factors and Diagnoses in Children by Parental Diagnoses

Measure	≥1 parent depressed		Neither parent depressed	
	Affected assessed	Rate/100	Affected assessed	Rate/100
Family risk factor				
Poor marital adjustment	78/118	66.1	11/59	18.6***
Parent–child discord	49/152	32.2	13/67	19.4
Low family cohesion	67/115	58.3	25/63	39.7*
Affectionless control	39/115	33.9	10/63	15.9**
Parental divorce	58/153	37.9	10/67	14.9***
Lifetime *DSM* diagnosis in child				
Major depression	54/153	35.3	15/67	22.4
Anxiety disorder	61/153	39.9	12/67	17.9**
Conduct disorder	35/153	22.9	9/67	13.4
Any diagnosis	116/153	75.8	38/67	56.7**

Note. DSM = *Diagnostic and Statistical Manual of Mental Disorders.*
* $p < .05$. ** $p < .01$. *** $p < .001$.

10.13, $p < .01$, and any diagnosis, $\chi^2(1, N = 220) = 8.10$, $p < .01$. The high rates of children with lifetime diagnoses observed in this study are comparable with those observed in several other recent direct interview studies of children using DSM-III diagnostic criteria (Weissman, 1988).

Intercorrelations Between Risk Factors

Table 4 assesses the intercorrelations between family risk factors. The results indicate that associations between predictors are generally small or modest, with coefficients ranging in absolute magnitude from .01 to .22. The modest association between affectionless control and low cohesion (.22, $p < .01$) raises some questions about method bias, inasmuch as these are both measures generated from child self-reports. It should be noted that although the index of parental divorce was not associated with the binary index of marital discord, it did have a modest negative association with a continuous measure based on the lowest reported parent score on the SMAT ($r = -.23$, $p < .01$). The overall pattern of associations suggests that the indexes chosen for the analysis tap separate dimensions of family disharmony.

Relationships Between Risk Factors and Diagnoses in Children

The preliminary question addressed in the analysis is whether there is any association between family risk factors and childhood psychopathology. Table 5 summarizes the results of a series of cross tabulations between each family risk factor and the four major diagnostic categories in children. Every family risk factor except affectionless control is significantly associated with at least one psychiatric diagnosis. Children exposed to parents who report poor marital adjustment were significantly more likely than other children to have at least one lifetime diagnosis (i.e., any diagnosis), $\chi^2(1, N = 177) = 6.18$, $p < .05$. Children with parents reporting the presence of parent–child discord were significantly more likely to be diagnosed with conduct disorder, $\chi^2(1, N = 219) = 12.76$, $p < .001$. Children reporting low family cohesion were more likely to be diagnosed with major depression, $\chi^2(1, N = 178) = 5.72$, $p < .05$, and conduct disorder, $\chi^2(1, N = 178) = 8.48$, $p < .01$. Parental divorce showed a strong association with lifetime diagnoses of conduct disorder, $\chi^2(1, N = 220) = 9.39$, $p < .01$. Inspection of other nonsignificant trends (e.g., the association between

Table 4

Correlations Between Family Risk Measures

Measure	1		2		3		4		5
	ϕ	n^a	ϕ	n	ϕ	n	ϕ	n	
1. Poor marital adjustment	—								
2. Parent–child discord	.13	177	—						
3. Low cohesion	.20	148*	−.03	178	—				
4. Affectionless control	.03	148	.01	178	.22	178**	—		
5. Parental divorce	.04	177	−.12	219	.15	178	−.06	178	—

a Numbers vary according to completion of self-report measures by parents and children.
* $p < .05$. ** $p < .01$.

Table 5
Diagnoses in Child (Lifetime Rates per 100) by Presence of Family Risk Factor

Lifetime diagnosis in child	Poor marital adjustment		Parent–child discord		Low family cohesion		Affectionless control		Parental divorce	
	Yes (n = 89)	No (n = 88)	Yes (n = 62)	No (n = 157)	Yes (n = 92)	No (n = 86)	Yes (n = 49)	No (n = 129)	Yes (n = 68)	No (n = 152)
Major depression	28.1	29.6	33.9	30.6	41.3	24.4*	42.9	29.5	38.2	28.3
Anxiety disorder	39.3	28.4	37.1	31.9	30.4	39.5	40.8	32.6	29.4	34.9
Conduct disorder	18.0	14.8	35.5	14.0**	29.4	11.6**	28.6	17.8	32.4	14.5**
Any diagnosis	77.5	60.2*	75.8	67.5	77.2	66.3	81.6	68.2	69.1	70.4

*$p < .05$. **$p < .01$.

affectionless control and two other diagnoses, major depression and any diagnosis), along with the observation that 16 out of 20 comparisons between children with and without a diagnosis resulted in higher rates of diagnoses for children with a risk factor, suggests that for the sample as a whole, risk factors are consistently associated with diagnostic outcomes.

Table 6 examines whether the these trends remained after controlling for parents' diagnostic status. Comparison of the upper and lower portions of Table 6 suggests that these trends do not consistently hold for children of depressed parents as compared with children of nondepressed parents. For children of depressed parents, conduct disorder was the only diagnosis significantly associated with family risk factors. Exposure to parent–child discord, $\chi^2(1, N = 152) = 12.91, p < .001$, and reports of low cohesion, $\chi^2(1, N = 115) = 4.94, p < .05$, were associated with higher rates of conduct disorder. In contrast, for children of nondepressed parents, all diagnostic outcomes except anxiety disorder were positively associated with at least one family risk factor.

All of the family risk factors except parent–child discord were associated with at least one diagnostic outcome. Exposure to poor marital adjustment was strongly associated with higher rates of any diagnosis, $\chi^2(1, N = 59) = 7.33, p < .01$. Reports of low family cohesion were associated with higher rates of major depression, $\chi^2(1, N = 63) = 5.99, p < .05$. Reports of affectionless control were associated with higher rates of major depression (Fisher's exact test, $p = .05$, two-tailed) and any diagnosis (Fisher's exact test, $p = .04$, two-tailed). Exposure to parental divorce was strongly associated with higher rates of conduct disorder (Fisher's exact test, $p = .02$, two-tailed).

Because the 220 offspring included in the analyses discussed previously came from 91 families, there is some question as to whether multiple children from the same family distorted the findings. In order to evaluate this possibility, additional analyses were carried out using one child randomly selected from each family. The resulting sample, including 65 offspring with one or more depressed parents and 26 offspring with neither parent depressed, was used in stratified cross tabulations similar to

Table 6
Diagnoses in Child (Lifetime Rates per 100) by Presence of Family Risk Factor and Parents' Diagnostic Status

Lifetime diagnosis in child	Poor marital adjustment		Parent–child discord		Low family cohesion		Affectionless control		Parental divorce	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
≥1 parent depressed										
	n = 78	n = 40	n = 49	n = 103	n = 67	n = 48	n = 39	n = 76	n = 58	n = 95
Major depression	28.2	42.5	34.7	35.9	41.8	33.3	41.0	36.8	41.4	31.6
Anxiety disorder	41.0	42.5	42.9	38.8	38.8	50.0	46.2	42.1	31.0	45.3
Conduct disorder	20.5	20.0	40.8	14.6**	32.8	14.6*	30.8	22.4	31.0	17.9
Any diagnosis	75.6	77.5	79.6	73.8	79.1	79.2	79.5	79.0	70.7	79.0
Neither parent depressed										
	n = 11	n = 48	n = 13	n = 54	n = 25	n = 38	n = 10	n = 53	n = 10	n = 57
Major depression	27.3	18.8	30.8	20.4	40.0	13.2*	50.0	18.9*	20.0	22.8
Anxiety disorder	27.3	16.7	15.4	18.5	8.0	26.3	20.0	18.9	20.0	17.5
Conduct disorder	0.0	10.4	15.4	13.0	20.0	7.9	20.0	11.3	40.0	8.8*
Any diagnosis	90.9	45.8**	61.5	55.6	72.0	50.0	90.0	52.8*	60.0	56.1

*$p < .05$. **$p < .01$.

Table 7

Adjusted Odds Ratios for Lifetime Diagnoses for Children Exposed Versus Children Unexposed to Family Risk Factor by Parents' Diagnostic Status

Lifetime diagnosis in child	Poor marital adjustment ($n = 172$)		Parent–child discord ($n = 214$)		Low family cohesion ($n = 176$)		Affectionless control ($n = 176$)		Parental divorce ($n = 215$)	
	Odds ratio	SE LOR	Odds ratio	SE LOR	Odds ratio	SE LOR	Odds ratio	SE LOR	Odds ratio	SE LOR
					≥ 1 parent depressed					
Major depression	0.55	0.448	1.13	0.400	1.11	0.447	1.03	0.460	1.35	0.378
Anxiety disorder	1.09	0.420	1.17	0.382	0.60	0.405	1.16	0.412	0.58	0.371
Conduct disorder	1.36	0.551	5.73	0.465**	2.20	0.516	1.72	0.496	1.98	0.423
Any diagnosis	1.31	0.491	1.66	0.468	0.67	0.517	1.07	0.530	0.59	0.441
					Neither parent depressed					
Major depression	2.25	0.824	2.31	0.753	3.78	0.664*	5.02	0.785*	0.90	0.878
Anxiety disorder	2.22	0.806	1.13	0.873	0.24	0.838	1.03	0.882	1.43	0.891
Conduct disorder	—ᵃ	—ᵃ	1.83	0.932	2.18	0.804	1.95	0.937	6.06	0.844*
Any diagnosis	17.92	1.11**	1.98	0.670	1.99	0.581	7.96	1.106	1.02	0.733

Note. Odds ratios are adjusted for child's age, sex, number of siblings in family, and socioeconomic status. *SE* LOR = standard error of the log odds ratio.
ᵃ Not calculated due to insufficient number of exposures and cases.
* $p < .05$. ** $p < .01$.

those used to generate Table 6. The findings from the random sample nearly replicated those obtained from the original sample for both groups of children. In the random sample, parent–child discord persisted as the only significant risk factor related to psychopathology (conduct disorder) in children of one or more depressed parents. Despite considerable loss of power to detect differences in the children of nondepressed parents, only two out of five previously significant findings, the association between affectionless control and any diagnosis, and the association between parental divorce and conduct disorder became nonsignificant (the formal association was significant at the .10 level).

Using the entire sample of 220 children, a series of maximum likelihood logistic regressions was run with each of the diagnoses as separate binary dependent variables in order to rule out possible confounders in the preceding analyses. On the basis of the coefficients obtained from these models,[1,2] separate adjusted odds ratios for each of the risk factors for children of depressed and nondepressed parents were calculated. Table 7 contains the adjusted odds ratios and standard errors of the log odds ratios for lifetime diagnoses for children exposed versus children unexposed to each family risk factor. Significance tests on adjusted odds ratios are computed by dividing the natural logarithm of the adjusted odds ratios by their standard errors. The resulting z statistic evaluates whether the adjusted odds ratios are significantly different from one.

The top portion of Table 7 shows adjusted odds ratios for family risk factors for children with at least one depressed parent. Out of 20 odds ratios, only 2 (the odds for conduct disorder for those exposed to parent–child discord and the odds for conduct disorder for those reporting low cohesion) exceed a value of 2 (odds ratios 5.73 and 2.20, respectively). An even more striking contrast with the children of nondepressed parents

emerges from investigation of significance tests. With the exception of the odds ratio for parent–child discord in the model predicting conduct disorder, none of the odds ratios for children of depressed parents reach statistical significance.

The lower portion of Table 7 suggests that when possible confounders were taken into account, individual family risk factors persist in their importance for children of nondepressed parents. With one exception (the association between affectionless control and any diagnosis), all previously significant associations maintain their significance at the .05 level in the adjusted models. In contrast to the odds ratios in the upper portion of Table 7, nine odds ratios in the lower portion of Table 7 exceed the value of 2. Comparisons between the two sets of odds ratios suggest that risk factors are consistently more adverse for children of nondepressed parents than they are for children of depressed parents. For the children of nondepressed parents, parental reports of poor marital adjustment resulted in nearly an 18-fold increase in risk for any diagnosis. Those reporting low family cohesion had nearly a 4-fold increase in risk for major depression. Children reporting exposure to affectionless control experienced a 5-fold increase in risk for major depression and nearly an 8-fold increase in risk for any diagnosis. Children of

[1] The model using poor marital adjustment as a predictor for conduct disorder was based on a pair of stratified analyses.

[2] Because we were interested in assessing the impact of risk factors within each of the two groups of children (i.e., children with and children without a depressed parent), interaction terms were used to construct odds ratios whether or not they were significant in the logistic regression models. Only three interaction terms reached statistical significance at the .10 level (see Table 8). Although we had limited power to test the significance of these interactions, the coefficients in Table 7 should be interpreted with caution.

Table 8

Models Assessing the Relative Importance of Risk Factors and Parental Psychopathology

Diagnostic outcome in child/ family risk factor in model	Hierarchical model		Full model[c]				
	Parental depression χ^2 change[a]	Risk factor χ^2 change[b]	Parental depression		Risk factor		
			Odds ratio	SE LOR	Odds ratio	SE LOR	n
Major depression							
Poor marital adjustment	4.78*	0.64	2.56	.441*	0.72	.411	172
Parent–child discord	4.22*	0.57	2.05	.359*	1.31	.361	214
Low cohesion	4.12*	1.84	2.15	.386*	1.65	.371	176
Affectionless control[d]	4.24*	1.13	2.18	.389*	1.54	.403	176
Divorce	3.76	0.46	1.99	.363	1.26	.346	215
Anxiety disorder							
Poor marital adjustment	7.15**	0.35	3.04	.431**	1.25	.384	172
Parent–child discord	11.34***	0.19	3.30	.376***	1.16	.351	214
Low cohesion	13.66***	3.94*	3.99	.399***	0.49	.359*	176
Affectionless control	10.70**	0.11	3.35	.388**	1.13	.375	176
Divorce	13.29***	1.54	3.70	.383***	0.65	.350	215
Conduct disorder							
Poor marital adjustment	3.88*	0.00	2.98	.582*	1.03	.492	172
Parent–child discord	1.94	13.87***	1.81	.439	4.56	.414***	214
Low cohesion	4.33*	3.40	2.51	.462*	2.19	.436	176
Affectionless control	4.75*	1.62	2.61	.460*	1.76	.443	176
Divorce	1.83	5.55*	1.78	.437	2.47	.383*	215
Any diagnosis							
Poor marital adjustment[d]	2.77	4.89*	1.92	.394	2.44	.408*	172
Parent–child discord	6.81**	2.12	2.34	.326**	1.76	.396	214
Low cohesion	8.53**	0.04	2.94	.374**	1.08	.383	176
Affectionless control[d]	7.69**	1.80	2.78	.371**	1.83	.462	176
Divorce	8.96**	1.23	2.73	.338**	0.67	.360	215

Note. SE LOR = standard error of the log odds ratio.

[a] Evaluates change in likelihood ratio statistic, χ^2 (1), with the addition of parent depression variable in logistic model including risk factor variable, along with control for age, sex, number of siblings, and socioeconomic status.

[b] Evaluates change in likelihood ratio statistic, χ^2 (1), with the addition of risk factor variable in logistic model including parent depression variable, along with controls for age, sex, number of siblings, and socioeconomic status.

[c] Model includes indicator of parental depression status *and* risk factor, along with controls for age, sex, number of siblings, and socioeconomic status.

[d] A Parental Depression × Family Risk Factor interaction term is significant in the regression model. Because the present model excludes this interaction term, these results should be interpreted with caution.

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

nondepressed parents who reported a history of divorce had a 6-fold increase in risk for conduct disorder.

Although the foregoing analyses suggest that family risk factors are relatively more important for children of nondepressed parents, they say nothing about the overall relative importance of family risk factors and parental psychopathology for the development of childhood psychopathology. Table 8 directly addresses this issue through two sets of hierarchical logistic regressions. The first column of Table 8 lists coefficients that indicate the improvement in model fit (i.e., the change in the model log likelihood statistic) with the addition of the parental depression variable. The coefficients in the second column indicate the change in model chi-square with the addition of each of the family risk variables. The increment in the model log likelihood statistic from the addition of a variable to a logistic model is distributed as a chi-square with one degree of freedom. The last four columns of the table indicate the odds ratios (and standard errors of the log odds ratios) generated from each of the main

effects (parental depression status and family risk factor), predicting each diagnostic outcome.

Addition of the parental depression variable almost always improves the model regardless of the outcome measure considered or the family risk factor present in the model. Of the 20 chi-squared coefficients, 16 are significant beyond at least .05 level. Of the 4 nonsignificant coefficients, 2 approach statistical significance (i.e., they are significant at the .10 level).

In contrast with coefficients for models adding parental depression, most of the coefficients for models adding family risk factors are small and nonsignificant. Only models predicting conduct disorder appear to show consistent improvement from the addition of family risk factors. Coefficients for both parent–child discord, $\chi^2(1, N = 214) = 13.87$, $p < .01$, and divorce, $\chi^2(1, N = 215) = 5.55$, $p < .05$, add more to models predicting conduct disorder than parental depression. Only two other coefficients for models adding risk factors reach statistical significance. Low cohesion has a significant negative association with

anxiety disorder. Poor marital adjustment has a significant positive association with any diagnosis. For most diagnostic outcomes, the addition of parental depression consistently results in a larger and more significant model chi-square increment than does the addition of family risk factors.

The findings from the hierarchical models are supported by models including both parental depression and each risk factor, simultaneously (see Table 8, columns 3–6). The odds ratios generated from coefficients for parental depression status consistently approach or exceed 2 for all diagnostic outcomes. These odds ratios are consistently significantly different from 1 when the outcome is major depression, anxiety disorder, or any diagnosis. Except in two models predicting conduct disorder and one model predicting any diagnosis, the odds ratios generated from the coefficients for the family risk factors are smaller than the odds ratios generated from the coefficients for parental depression status. Odds ratios generated from coefficients for family risk factors seldom exceed 2 and are rarely significantly different from 1.

Discussion

Conclusions

The present study found that family risk factors, including parents' marital discord, parent–child discord, affectionless control, low family cohesion, and parental divorce were more prevalent among children of depressed parents than they were among children of nondepressed parents. The presence of these factors was associated with higher rates of major depression, conduct disorder, and any diagnosis in offspring. When the children were stratified by parents' diagnostic status, presence of these factors showed an association with higher rates of major depression and any diagnosis only in children of nondepressed parents. Presence of these factors had little association with these outcomes for children of depressed parents. Conduct disorder was associated with family risk factors for both groups of children. Anxiety disorders were not positively associated with family risk factors for either group of offspring.

Assessment of the relative importance of parental depression and family risk factors suggests that parental depression is consistently more important as a predictor of major depression, anxiety disorders, and any diagnosis in offspring. Both parental depression and family risk factors were important as risk factors for conduct disorder. Family risk factors were consistently more important as risk factors for conduct disorder than they were for other disorders.

Importance of Different Risk Factors

The findings suggest that both parents' marital conflict and parent–child conflict are important risk factors for both internalizing and externalizing disorders. The largest effects for the study were found for poor marital adjustment. Exposure to parents' poor marital adjustment resulted in nearly an 18-fold increase in risk for any diagnosis among children of nondepressed parents. Exposure to parent–child discord resulted in nearly a 6-fold increase in the risk for conduct disorder for children of depressed parents. Exposure to parental divorce resulted in a 6-fold increase in risk for conduct disorder among children of nondepressed parents. Among the two measures of family discord based on the child's report, affectionless control had the most adverse impact. Reports of affectionless control were associated with a 5-fold increase in risk for major depression and nearly an 8-fold increase in risk for any diagnosis for children of nondepressed parents. Reports of low cohesion were associated with nearly a 4-fold increase in major depression for children of nondepressed parents.

Implications

These findings suggest guidelines for future research on the impact of family risk factors on childhood psychopathology. Limiting outcome measures to general indexes of behavioral disorders may be misleading. It is important for researchers to carefully assess children on a broad range of psychiatric diagnoses. The present study is one of the few to base outcome measures on a DSM-III diagnosis made after a structured diagnostic assessment. In addition, because the diagnostic procedure is based on all available information (i.e., from parents, self-reports, and clinical records), biases introduced by a restrictive focus on one particular observer (i.e., the child or his or her parent) are reduced.

Failure to account for parental diagnosis may lead to an oversimplification of results. The contrast between the two risk groups in this study, especially when major depression was the outcome, was suggestive of interactive effects for the risk factors. We noted that the stratified analyses in this study should be viewed with caution inasmuch as most of the statistical tests for interaction effects were nonsignificant. The high rates of risk factors for children of depressed parents and the low rates of risk factors for children of nondepressed parents resulted in limited power to detect effects within stratified models. Researchers planning studies to assess the relative importance of family risk factors and parental psychopathology need to consider these findings in determining the appropriate sample sizes for detecting possible interactive effects.

Contrasts between the two groups of children with respect to major depression raise questions about the mechanism through which risk factors operate. Previous research on this sample (Weissman et al., 1987) has shown that age of onset for depression for children of depressed parents who become depressed (M age of onset = 12.7 years) is much younger than the mean age of onset for children of nondepressed parents who get depressed (M age of onset = 16.8 years). It may be that children of depressed parents become ill before family risk factors have a chance to exert their influence.

The increased risk for children of depressed parents for major depression may be suggestive of a genetic pathway for this disorder (Weissman, 1988). If so, then the stratified analyses in this study may provide support for the notion that there are distinct pathways to depression in children—one genetic (parental), the other environmental (family risk factors). Nevertheless, parental depression was highly associated with most of the family risk factors identified in this study. As such, the presence of depressed parents may constitute an environmental risk to

children above and beyond that identified by any single risk factor included in the study. Failure to detect additive effects for each individual family risk factor may have been a consequence of the inextricable link between family risk factors and parental depression.

Limitations

It must be stressed that the findings presented here were cross-sectional. As such, interpretation cannot preclude the possibility that some of the family risk variables are a consequence of the child's psychopathology. This is particularly problematic for both child self-report measures (low cohesion and affectionless control) and for one parent-report index (parent-child discord). Children who feel depressed or anxious may be more likely to report negative feelings about their parents and their home environment. Parents of children with behavioral difficulties (i.e., conduct disorder) may be more likely to report discord with those children. On the other hand, the finding that poor marital adjustment and parental divorce were important correlates of childhood psychopathology suggests that findings in relationship to the other three variables are not artifactual.

It was noted that the current study was generated from family data, with many families represented by more than one child. Possible distortions resulting from multiple children in the same family were explored by using a random sample of one child per family to construct cross tabulations similar to those depicted in Table 6. The findings from the random sample nearly replicated those obtained from the original sample.

The findings from the replicated cross tabulations provided support for the continued use of the entire sample in the logistic regressions. Nevertheless, because there is reason to believe that observations within the same family share covariance, the standard errors for some of the significance tests from the logistic regressions may be underestimated. This suggests that the statistical significance of some effects discussed in this article may be overstated. It does not argue against conclusions about the direction of effects across proband groups.

An additional limitation is the nonspecificity of the family risk factors included in the study. Parent-child discord was an index of any conflict between parents and children in the family. Affectionless control was based on reports about either mothers or fathers. The poor marital adjustment index was based on the presence of one report of poor adjustment in either parent with his or her current spouse. Studies have shown that marital adjustment may have a different effect on mother-child interactions than on father-child interactions (Brody, Pillegrini, & Sigel, 1986). They have also shown that mother-child interactions may have a different effect on behavioral problems in children than do father-child interactions (Burman, John, & Margolin, 1987). The aim of the present study was to assess general effects of family environment on psychopathology in children. Future research should spell out more precisely the conditions under which particular environmental variables have adverse consequences.

Although this study suggests that family risk factors have little consequence for the onset of DSM-III depression for children of depressed parents, it says nothing about their impact on

the severity and course of this disorders for high-risk children. There is some indication from the present study that at least one family risk factor, parental divorce, may be related to more debilitating forms of depression in high-risk children. The study also says nothing about the possible influence of other environmental risk measures such as death in the family or other life events associated with depression in adults (Brown & Harris, 1978). Follow-up research with this sample will explore these issues in more detail.

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