

Depression and Anxiety in Parents of Children With ADHD and Varying Levels of Oppositional Defiant Behaviors: Modeling Relationships With Family Functioning

Todd B. Kashdan

Department of Psychology, University at Buffalo, State University of New York

Rolf G. Jacob

Department of Psychology and Otolaryngology, University of Pittsburgh School of Medicine

William E. Pelham

Department of Psychology, University at Buffalo, State University of New York

Alan R. Lang

Department of Psychology, Florida State University

Betsy Hoza

Department of Psychology, Purdue University

Jonathan D. Blumenthal

Child Psychiatry Branch, National Institute of Mental Health

Elizabeth M. Gnagy

Department of Psychology, University at Buffalo, State University of New York

This study investigated the relation between parental anxiety and family functioning. Parental anxiety and depression, child attention deficit hyperactivity disorder (ADHD), and oppositional defiant disorder (ODD) symptoms were all included as predictors of 3 measures of family functioning to examine the independent contributions of each. Using a self-report battery completed by 45 mother–father pairs, 3 family functioning factors were derived: Parental Warmth and Positive Involvement, Intrusiveness and Negative Discipline, and Social Distress. Multilevel modeling simultaneously estimated the unique contributions of parental and child symptoms on family functioning. Results indicated that parental anxiety was negatively associated with Parental Warmth and Positive Involvement, Intrusiveness and Negative Discipline, and Social Distress; parental depression was only negatively associated with Social Distress. Child ODD symptoms had independent associations with all outcomes; no relations were found with ADHD. Sex moderated the effects of parental anxiety on Parental Warmth and Positive Involvement such that only for mothers did greater anxiety lead to less Parental Warmth and Positive Involvement.

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Requests for reprints should be sent to Rolf G. Jacob, Western Psychiatric Institute and Clinic, 3811 O'Hara Street, Pittsburgh, PA 15213. E-mail: jacobr@msx.upmc.edu or kashdan@buffalo.edu

Depressive symptoms are greater in mothers of children with disruptive behavior disorders (DBD) than in comparison to normal control mothers (e.g., Befera & Barkley, 1985; Nigg & Hinshaw, 1998). Depressive symptoms, in turn, may be associated with aversive parenting behaviors (e.g., Campbell, Pierce, March, & Ewing, 1991). However, the relevant studies have not examined whether these effects are specific to depression or common to other negative emotional states such as anxiety. In one of the first published studies of parenting behaviors of clinically anxious mothers, anxious mothers displayed significantly less warmth and positive affect than control mothers (Whaley, Pinto, & Sigman, 1999). In the same study, clinically anxious mothers were also more critical,

controlling, and possessive of their children. Thus, similar to depression, parental anxiety appears to negatively influence the quality of parent–child relationships. Moreover, differences between anxious mothers and control mothers remained after controlling for depressive symptoms (Whaley et al., 1999).

Are the correlations between parental depression and parenting behaviors specific to depression or a function of shared variance with anxiety? Trait anxiety is defined as a general proneness to being nervous and worried and high reactivity to perceived stress (Spielberger, 1977). There is a great deal of convergence between depression and anxiety as suggested by shared symptoms and cognitive processes (e.g., Burns & Eidelson, 1998), and high comorbidity rates between anxiety and mood disorders (Mineka, Watson, & Clark, 1997). Yet, there are differences with relevance to parents of children with behavior problems. In social situations, highly anxious individuals are more concerned about future threats to the self, responding with hypervigilance, timidity, and unassertiveness for fear of confrontations and upsetting others (Wilhelm, Boyce, & Brownhill, *in press*). These anxious attributes might carry over into parenting behaviors, particularly in situations where parents are forced to confront children who are noncompliant, argumentative, and prone to anger outbursts. In contrast, depressed parents are more prone to ruminating about their mistakes and inadequacies (i.e., fear of loss). This study examined the unique family and social functioning correlates of parental depression and anxiety.

Influences of Child DBD on Family and Social Functioning

Children with DBD can have adverse effects on parents' mental health (e.g., Harrison & Sofronoff, 2002; Pelham et al., 1997, 1998). Dealing with children with behavior problems may exacerbate parenting inadequacies and social difficulties. Parents of children with DBD rate their family environments as less supportive and more stressful, romantic relationships to be more problematic, and parental coping abilities to be lower than parent comparison groups (e.g., Brown & Pacini, 1989; Johnston, 1996; Mash & Johnston, 1983). Thus, aversive parenting behaviors may not only result from parents' own symptoms of distress, but also the characteristics of their children. This notion is supported by findings that the quality of parent–child relationships improves when children are treated with medication, behavioral, and combined treatments (e.g., Humphries, Kinsbourne, & Swanson, 1978; Wells et al., 2000). Findings suggest that both parental depression and childhood DBD affect the quality of parent–child relationships and general social adjustment (see Cummings & Davies, 1994, for review). In this study, in addition to parental anxiety and depression, we examined

the degree to which the characteristics of the child are related to parental behavior and social adjustment.

A growing body of literature provides support for differentiating between child attention deficit hyperactivity disorder (ADHD) and child oppositional defiant disorder (ODD) symptoms. Child ODD has been shown to have an incremental effect on parenting behaviors and stress and perceived family environment beyond the predictive power of child ADHD diagnoses (e.g., Barkley, Anastopoulos, Guevremont, & Fletcher, 1992; Barkley, Fischer, Edelbrock, & Smallish, 1991; Edwards, Barkley, Laneri, Fletcher, & Metevia, 2001). In fact, most of the explanatory power in predicting family functioning and parent–child relationship difficulties appears to be the result of child ODD or the interaction between ODD and ADHD and not childhood ADHD alone (Johnston & Mash, 2001). Thus, we separately examined the influences of child ADHD and ODD symptoms on family functioning outcomes.

Taken together, the studies showing the effects of child DBD on parenting behaviors, and those finding that parental behaviors exacerbate child DBD symptoms (e.g., Capaldi, 1991; Klein & Mannuzza, 1991), suggest that there are recursive loops between child and parent behaviors. The reciprocation of aversive reactions can lead to more dysfunctional parent–child relationships and poorer psychological functioning in children, parents, and the family environment (cf. Conger, Patterson, & Ge, 1995). In this study, we examined the multivariate effects of (a) child ADHD and ODD symptoms and (b) parental anxiety and depression on family functioning.

Examining Parental Sex Differences Within and Between Families

Most studies on parent and child psychopathology have focused exclusively on mothers, ignoring fathers (Phares, 1996). In one of the few studies examining mothers and fathers in the same family, anxiety in fathers of children with ADHD and ODD uniquely predicted conflict in father–son interactions above and beyond the severity of child symptoms (Edwards et al., 2001); no effects were found for paternal depression or maternal anxiety or depression. Although these data provide some support for addressing sex differences, these findings should be interpreted cautiously. Using a strategy common to many studies, the authors did not address the independence of their data and conducted separate analyses for mothers and fathers. Failing to account for the interdependence of mothers and fathers from the same family can lead to inaccurate estimates of error terms and inflate the size of differences between mothers and fathers (Type I error). However, separating mothers and fathers reduces the sample size of each analysis and, consequently, the statistical power to detect existing differences (Type II error).

Taken together, less accurate error estimates and the loss of power by partitioning the sample indicate the need for more appropriate analytic techniques. Most analytic techniques are based on the assumption that observations are independent of one another. This assumption is typically violated with existing dyads because partner ratings from the same couple are likely to be related to each other when they are evaluating their shared environment (e.g., parents evaluating their children and family). Instead of using common methods for analyzing data with multiple within-family informants (i.e., regression or analysis of variance), a multi-level modeling approach, allows for the simultaneous estimation of within- and between-family variance, and “ensures that estimates of covariation between outcomes of the same couple will be corrected for measurement error” (Raudenbush, Brennan, & Barnett, 1995, p. 163). In this study, we tested the independence of our data (Kenny, Kashy, & Bolger, 1998) and analyzed our data with a hierarchical linear modeling (HLM) approach.

Overview of Study Goals

Our primary objectives were to examine the independent roles of parent anxiety and depression and child ADHD and ODD on parent-child relationship behaviors and parent social adjustment. Fitting with prior work, we expected ODD symptoms to have an incremental association with family functioning outcomes beyond that attributable to ADHD symptoms. In the absence of relevant research, no hypotheses were made as to the unique contributions of parental anxiety and depression to family functioning. Parental sex was examined as a main effect and interaction term in all analyses. Because mothers tend to be more involved in day-to-day caregiving, we hypothesized that parent anxiety and depressive symptoms would be more pronounced and have greater adverse effects in mothers compared to fathers. Because relations between parental psychopathology and family functioning may merely represent consistency in response styles, the influence of social desirability was examined. Social desirability or self-presentation concerns are a common feature of greater depressive and anxiety symptoms (e.g., Joiner, 2000; Kashdan & Herbert, 2001). For parents with excessive anxiety, parental social desirability appears to decrease parent reported rates of child diagnoses (e.g., DiBartolo, Albano, Barlow, & Heimberg, 1998). Given these concerns, the influences of parent and child symptoms on family functioning were examined while controlling for social desirability.

An issue needing discussion is the selection of family functioning variables. The variables chosen in this study were based on established relations with child DBD and parental depression and anxiety. Factor anal-

yses of parenting scales in parents of children with DBD consistently find a factor relating to warmth and positive involvement and a second factor relating to negative discipline and control tactics (e.g., Wells et al., 2000). The first factor fits with evidence that parents raising children with DBD enact less warmth, engagement, and praise than comparison parents (e.g., Johnston, 1996). Moreover, both anxious and depressed parents exhibit low levels of warmth compared to nonanxious and nondepressed parents (e.g., Hops et al., 1987; Whaley et al., 1999). The second factor fits with studies finding that parents raising children with DBD have more conflicts and enact more punitive discipline and controlling tactics than matched parents (e.g., Barkley et al., 1991). Based on retrospective and observational studies, both depressed and anxious parents also exert excessive control and are emotionally overinvolved in their children's lives (e.g., Rapee, 1997). Excessive levels of parental aggression and control-intrusiveness captures the defining features of expressed emotion in the family environment, which has repeatedly been shown to exacerbate psychiatric symptoms and perceived stress (in children and adults; e.g., Coiro & Gottesman, 1996). Parental warmth and positive involvement, and aggression and intrusiveness, represent behaviors specific to the parenting role. Parents of children with DBD also have problems in their social, romantic, and occupational functioning (e.g., Barkley et al., 1992; Johnston, 1996) and they need to be able to function in these other roles while also serving as a parent. Thus, based on this overview, to study family functioning outcomes we used scales tapping positive and negative parent-child relationship behaviors, and parent social role adjustment.

Method

Participants

The participants in this study consisted of 45 father-mother pairs with a child with ADHD. These participants were part of a larger sample of 252 parents of boys between the ages of 5 and 12 years (186 mothers, 66 fathers) drawn from a pool of parents seeking fee-based outpatient clinical services for their children at the Attention Deficit Disorder Program of Western Psychiatric Institute and Clinic at the University at Pittsburgh Medical Center. This larger sample pool has contributed to numerous studies of ADHD (Pelham et al., 1990, 1993).¹ As part of their regular clinical evaluation, teachers were contacted to complete symptom

¹Comparisons between mothers and fathers in a portion ($n = 28$) of this sample of ADHD children on the Parent-Child Relationship Questionnaire have been published (Gerdes, Hoza, & Pelham, 2003), albeit in comparison to controls and not addressing parental anxiety and depression or using the HLM approach we advocate in this article.

ratings. Teachers sent ratings directly back to the investigators. All participants (parents and teachers) gave voluntary informed consent to these assessment procedures.

The parents in the larger sample were given an option to participate in numerous research projects involving, for example, child and parental cognitions, treatment effects, and stress-induced drinking (see Pelham et al., 1997, 1998), for all of which consent was provided. Questionnaires in this study were completed contemporaneously prior to participation in treatment. For parents to participate in studies on child behavior and alcohol consumption, from which this sample was drawn, they were required to be social drinkers (abstainers or those suffering from alcohol problems were excluded; Pelham et al., 1997, 1998).

For this study 45 mother–father pairs were identified that could be reliably determined as being from the same family, sharing the same child (90 parents and 45 children with ADHD; 1 mother, father, and child for each family). Table 1 reports the characteristics of our sample of 45 families.

Table 1. Means and Standard Deviations for Participant Characteristics

Item	<i>M</i>	<i>SD</i>	<i>N</i>
Child age	9.43	1.84	
Parent age	39.00	1.84	
Marital status			
Married			44 (97.8%)
Cohabitation			1 (2.2%)
Socioeconomic status ^a	56.52	24.51	
Current child medication status (<i>n</i> = 41)			
Ritalin			25 (61%)
No medication			16 (39%)
Disruptive Behavior Disorders Parent Rating Scale ^b			
ADHD	8.81	3.42	
ODD	5.28	2.41	
CD	1.18	1.28	
Disruptive Behavior Disorders Teacher Rating Scale ^b			
ADHD	8.60	3.88	
ODD	3.78	3.08	
CD (<i>n</i> = 27)	1.28	1.74	
IOWA Conners Parent Rating Scale (<i>n</i> = 43) ^c			
Inattention–overactivity	10.80	2.07	
Oppositional–defiant	10.20	3.70	
IOWA Conners Teacher Rating Scale (<i>n</i> = 43) ^c			
Inattention–overactivity	10.26	2.98	
Oppositional–defiant	6.93	4.72	

Note: *N* = 90 participants comprising 45 mother–father pairs with one child with ADHD. Sample sizes for different items are provided where there are missing data. ADHD = attention deficit hyperactivity disorder; ODD = oppositional defiant disorder; CD = conduct disorder.

^aHollingshead (1975). ^bPelham et al. (1992) with 14 ADHD items, 9 ODD items, and 13 CD items. ^cLoney and Milich (1982).

Measures

Child externalizing disorder diagnoses and symptom severity as rated by parents and teachers.

Diagnoses of child externalizing disorders were established using the Disruptive Behavior Disorders [DBD] Rating Scale (Pelham, Gnagy, Greenslade, & Milich, 1992), completed by mothers and teachers, and the parent DBD structured diagnostic interview designed to accompany it. The DBD is comprised of the *Diagnostic and Statistical Manual of Mental Disorders* (3rd ed., rev. [DSM–III–R] American Psychiatric Association, 1987) symptom lists for ADHD, ODD, and conduct disorder (CD) and uses a 4-point response scale ranging from 0 (*not at all*) to 3 (*very much*). Symptoms were counted if either the parent or teacher rated the symptom as a 2 (occurring *pretty much*) or 3 (occurring *very much*). The DBD has been shown to have excellent psychometric properties (see Pelham et al., 1992, for normative data). Based on the DBD rating scale and information from the parent interview, either a master's- or doctoral-level clinician made an initial ADHD diagnosis. A doctoral-level clinician with extensive clinical and research experience in child DBD (i.e., ADHD expert) was required to provide confirmation of all initial diagnoses by conducting his or her own analysis of all available diagnostic information (Pelham et al., 2002).

Both parent and teacher ratings on the DBD Rating Scale (Pelham et al., 1992) were considered in calculating the total number of symptoms endorsed for ADHD, ODD, and CD; parent and teacher symptom endorsements were summed. We examined ADHD and ODD symptoms separately in all analyses. By definition, ODD symptoms are a function of relationships between children and adult figures, whereas CD is not (e.g., destruction of property and behavior toward animals). Therefore, we did not include CD symptoms in our analyses. In addition, parents and teachers rated each child on the IOWA Conners Rating Scale (IOWA Conners; Loney & Milich, 1982).

Parental depressive symptoms. Using a 4-point Likert scale, parents completed the widely used 21-item Beck Depression Inventory (Beck & Steer, 1987). The Beck Depression Inventory has demonstrated excellent construct validity in both psychiatric and nonpsychiatric samples (see Beck, Steer, & Garbin, 1988, for a review of reliability and validity).

Parental anxiety symptoms. Using a 4-point Likert scale, parents completed the widely used 20-item State–Trait Anxiety Inventory–Trait (Spielberger, Gorsuch, & Lushene, 1970) to assess general feelings of anxiety, tension, nervousness, and worry. Decades of research have demonstrated the construct validity of the

State–Trait Anxiety Inventory–Trait as a measure of individual differences in perceiving and reacting to stress in psychiatric and medical patients, working adults, and college students (Spielberger & Sydeman, 1994).

Parental social desirability. Parents completed the Marlowe–Crowne Social Desirability Scale (Crowne & Marlowe, 1960). The Marlowe–Crowne Social Desirability Scale has shown to have acceptable psychometric properties and appears to have large associations with more recent scales tapping tendencies to “unrealistically deny negative characteristics of the self” and “unrealistically attribute positive characteristics to the self” (Roth, Harris, & Snyder, 1988, p. xx). Thus, the Marlowe–Crowne Social Desirability Scale assesses whether individuals engage in specific tactics in attempts to control their self-presentation to others.

Parental social adjustment. Parents completed the 54-item Social Adjustment Scale–Self Report (Weissman & Bothwell, 1976) to assess their level of functioning in several primary social roles over the past 2 weeks (e.g., social and leisure; parenting; and relationships with romantic partner, family unit, and extended family). In computing the total score, only work items related to the primary work role are included—working outside for pay, homemaker, or student—thus, the total score is based on 48 items. Respondents used a 5-point Likert scale. Example items from some of the subscales include: “How many friends have you seen or spoken to on the telephone in the past two weeks?” (social and leisure); “Have you been interested in what your children are doing, friends, school, play, or hobbies during the past two weeks?” (parental); “Have you had open arguments with your partner in the last two weeks?” (marriage or cohabitation); “During the last two weeks, have you been thinking that your partner or any of your children have let you down at any time?” (family unit). Construct validity for the Social Adjustment Scale–Self Report has been shown in prior samples of parents undergoing life stressors (see Weismann, Sholomskas, & Karen, 1981, for a review). Moreover, scores are positively related to hostile family environments (Chambless & Steketee, 1999) and interpersonal difficulties (e.g., Vittengl, Clark, & Jarrett, 2003).

Quality of parent–child relationships. Parents completed the 40-item Parent–Child Relationship Questionnaire (Furman & Giberson, 1995). The five overarching factors of the Parent–Child Relationship Questionnaire include (a) Personal Relationship—companionship and intimacy (e.g., “How much do you and this child do nice things for each other?”); (b) Warmth—nurturance and affection (e.g., “How much do you feel proud of this child?”); (c) Disciplinary Warmth—praise, prosocial behaviors, and shared deci-

sion making (e.g., “How much do you tell this child that he or she did a good job?”); (d) Power Assertion—quarreling and forceful punishment (e.g., “How much do you yell at this child for being bad?”); and (5) Possessiveness—control and protectiveness (e.g., “How much do you want this child to be around you all of the time?”). In families with ADHD children, the respective scales of the Parent–Child Relationship Questionnaire have shown relations with observed parenting behaviors, other self-report measures of parenting, and discipline tactics (e.g., Johnston, Murray, Hinshaw, Pelham, & Hoza, 2002), as well as sensitivity to ADHD treatments (Hinshaw et al., 2000). Respondents used a 5-point Likert scale.

Perceived familial environment. To assess family-oriented events and issues, parents completed the 90-item Family Environment Scale (Moos, 1974). We restricted our analyses to the Cohesion and Conflict scales.² Example items from each subscale include the following: “Family members really help and support one another” (Cohesion subscale); “Family members often criticize one another” (Conflict subscale). Both of these scales have been used in prior studies wherein parents raising children with ADHD reported significantly greater Conflict and less Cohesion than matched comparison groups (Brown & Pacini, 1989; Greene et al., 1996); each of these studies attest to the excellent reliability and validity of these scales. Respondents used a dichotomous yes–no format.

Aggregation of Parent–Child Relationship Quality and Parental Social Adjustment Measures

Fitting with prior work with multiple measures of parenting and family outcomes (e.g., Wells et al., 2000), we condensed our variables into a more reasonable number of overarching factors. To do so, we conducted a principal components analysis with a varimax rotation using the original sample of parents. The original sample was used to obtain a sample size large enough for the factor structure to be reliably estimated. Analyses were conducted separately for 172 mothers and 52 fathers to confirm that the factor structure was equally appropriate for mothers and fathers.

As shown in Table 2, the factor structure was relatively invariant across mothers and fathers. Three factors had eigenvalues greater than 1.0 (3.31, 1.45, 1.03

²Due to less than acceptable psychometric properties (Sanford, Bingham, & Zucker, 1999), we did not include the scales of Expressiveness, Control, Independence, and Achievement Orientation on the Family Environment Scale. The remaining scales of the Family Environment Scale (i.e., Intellectual–Cultural, Active–Recreational, Moral–Religious, Organization) were not included because they were not relevant to our focus on parent–child and social relationships.

Table 2. Descriptive Statistics and Factor Loadings of Principal Component Analyses of Parenting Measures

	Mothers		Fathers		Parental Warmth Factor Loadings		Parental Social Distress Factor Loadings		Parental Intrusiveness Factor Loadings	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>
	PCRQ warmth	7.95	1.11	8.31	.88	+ .83	+ .71	-.20	-.08	-.13
PCRQ disciplinary warmth	7.49	.93	7.38	.77	+ .81	+ .82	-.16	-.04	.02	.06
PCRQ personal relationship	6.89	.90	7.01	.90	+ .86	+ .88	-.18	-.09	.11	.06
PCRQ power assertion	5.68	.94	5.35	.95	-.38	-.37	.20	.12	+ .71	+ .53
PCRQ possessiveness	9.24	1.61	8.76	1.44	.27	.08	.02	.04	+ .84	+ .88
FES cohesion	6.76	2.19	6.82	2.30	.25	.18	-.77	-.81	-.01	.06
FES conflict	4.07	2.09	3.53	2.41	-.16	.04	+ .80	+ .86	.10	.09
SAS total	32.85	14.62	29.03	13.00	-.10	-.33	+ .81	+ .58	.03	.40

Note: Principal component analyses were conducted separately for mothers (*M*; *n* = 172) and fathers (*F*; *n* = 52). Parental warmth and positive involvement explained 40.08% and 36.85% of the variance in mothers and fathers; parental social distress explained 18.06% and 18.12% of the variance in mothers and fathers, respectively; parental intrusiveness and negative discipline explained 12.83% and 13.44% of the variance in mothers and fathers, respectively. Primary factor loadings are in bold. PCRQ = Parent-Child Relationship Questionnaire; FES = Family Environment Scale; SAS = Social Adjustment Scale.

for mothers; 2.95, 1.45, 1.08 for fathers). An examination of the scree plots supported three factors labeled Parent Warmth and Positive Involvement, Parental Social Distress, and Parental Intrusiveness and Negative Discipline. Factor scores are inherently unstable; therefore, to maximize generalizability we used a unit sum approach. The respective scales comprising each of the three factors were transformed into *z* scores and summed together to create composite scores. The alpha coefficients for the Parental Warmth and Positive Involvement (.92 and .87 for mothers and fathers, respectively), Intrusiveness and Negative Discipline (.82 and .81 for mothers and fathers, respectively), and Social Distress (.78 and .79 for mothers and fathers, respectively) indicate acceptable internal consistency.

Statistical Analysis: Overview of HLM Analyses

We conducted preliminary tests on the interdependence of our data or the degree of similarity in rating between mother and father partners from the same couple. HLM (Version 5.04; Raudenbush, Bryk, Cheong, & Congdon, 2000) was used with partners at the lower level nested in families at the upper level, statistically controlling for the effects of all other predictor variables (i.e., parental depression, parental anxiety, child ADHD and ODD symptoms, sex, and significant interaction effects; see Table 3 for final model components). As indicated by Raudenbush and Bryk (2002), the formula for between-family unit intraclass correlations was

$$\text{intraclass correlations} = \frac{\text{Level-2 variance component}}{\text{Level-2 variance component} + \text{Level-1 variance component}}$$

where Level 1 refers to each individual parent and Level 2 to family units (mothers and fathers from the same family). Assuming interdependent data, we tested all primary analyses using HLM. We estimated the association between parental depression and anxiety and child ADHD and ODD symptoms with family functioning outcomes (i.e., Parental Warmth and Positive Involvement, Intrusiveness and Negative Discipline, and Social Distress) controlling for the interdependency of mothers and fathers in the same family unit. Each person's outcome was predicted by equations where within-family unit (individual parent level; Level 1) and between-family unit (i.e., the interdependence; Level 2) variation were estimated simultaneously. We also separately examined Parental Depression \times Child ODD symptoms and Parental Anxiety \times Child ODD symptoms interaction terms (interactions were also examined with Child ADHD symptoms). Finally, sex of parent was examined as a main effect and interaction term with parental anxiety and depressive symptoms.³ Only significant interaction terms were retained in models.

The total variance explained by the independent variables in each model (R^2) was computed by comparing the variance components in unrestricted models (containing only a dependent variable and a random intercept) with restricted models (containing all final independent variables). As indicated by Snijders and Bosker (1999), the formula for the within-unit variance explained was

$$R^2 = 1 - \frac{[(\text{Level-1 restricted variance component} + \text{Level-2 restricted variance component}) / (\text{Level-1 unrestricted variance component} + \text{Level-2 unrestricted variance component})]}{1}$$

³There was no theoretical rationale for exploring interaction effects between parental symptoms (anxiety and depression) and child symptoms (ODD and ADHD). Nonetheless, we conducted independent tests of these effects, and none of them approached significance for any multilevel models.

Table 3. Intercorrelations of Child ADHD and ODD Symptoms, and Parental Ratings of Depression, Anxiety, Parent–Child Relationship Quality, and Social Distress

Variables	1	2	3	4	5	6	7	8	M (for Fathers)	SD (for Fathers)
1. Child ADHD symptoms	—								11.18	2.46
2. Child ODD symptoms	.51** (.51**)	—							6.57	2.08
3. Parental depression	.16 (.05)	.17 (.11)	—						5.39	4.19
4. Parental anxiety	.08 (.15)	.16 (.05)	-.69*** (.61***)	—					35.30	9.70
5. Warmth and positive involvement	-.04 (-.03)	-.33* (-.16)	-.26+ (-.14)	-.48*** (.02)	—				0.50	2.05
6. Intrusiveness and negative discipline	.10 (.33*)	.28+ (.35*)	.06 (.27+)	.36* (.36*)	.02 (-.15)	—			-0.32	1.41
7. Social distress	.29+ (.19)	.38* (.37*)	.58*** (.45**)	.56*** (.53***)	-.36* (-.32*)	.21 (.39*)	—		-0.33	2.47
8. Social desirability	.02 (-.15)	-.17 (-.17)	-.43** (-.01)	-.39** (-.23)	.06 (.24)	-.23 (-.33*)	-.21 (.28+)	—	18.49	5.52
M (for mothers)	11.18	6.57	6.50	37.71	0.14	0.31	0.33	18.80		
SD (for mothers)	2.46	2.08	7.46	10.93	2.66	1.46	2.48	5.17		

Note: Correlations for mothers are outside parentheses and correlations for fathers are inside parentheses. Data were available for 44 mothers for child ODD symptoms and all 45 mothers completed the remaining questionnaires. Data were available for 41 fathers for parental warmth and positive involvement, intrusiveness and negative discipline, and social distress; 44 fathers for child ODD symptoms and parental depression; and all 45 fathers completed the remaining questionnaires. ADHD = attention deficit hyperactivity disorder; ODD = oppositional defiant disorder. $+p < .10$. $*p < .05$. $**p < .01$. $***p < .001$.

In conducting HLM analyses, the grouping variable (i.e., the intercept) was treated as a random effect and all the individual difference predictor effects were fixed (i.e., no error terms in these equations) and grand-mean centered. In HLM, the degrees of freedom for independent variable effects are based on the number of participants in the sample.

Results

Preliminary Analyses

Comparisons between included and excluded participants. We conducted analyses to determine whether our final sample of mother–father pairs was representative of the original larger sample. Analyses were conducted to examine potential Group (included vs. excluded participants) and Group \times Sex differences on demographic, predictor, and outcome variables. The included group was more likely to be married, $\chi^2(6, 244) = 76.53, p < .001$, and had a higher socioeconomic status, $t(244) = 3.48, p = .001$, than the excluded sample. These findings are not surprising as we intentionally selected intact families. The only other group difference was that parents in the final sample reported higher scores on the Oppositional–Defiant scale of the IOWA Conners, $t(237) = 3.08, p < .005$.

Child diagnoses and symptoms. All parent sets had been selected because they had a child meeting criteria for ADHD. A subset met additional diagnoses of

ODD ($n = 20$; 45%) and CD ($n = 12$; 27%). Table 1 shows the respective parent and teacher symptom counts on the DBD rating scales and the scores for the IOWA Conners. The respective IOWA Conners parent and teacher ratings for Inattention–Overactivity and Oppositional–Defiant were similar to other published studies of ADHD children (e.g., Pelham et al., 1999; Pelham et al., 2002). The DBD parent symptom counts for ADHD, ODD, and CD failed to have significant relations with respective DBD teacher symptom counts. This is not surprising as parents and teachers observe children in different roles and contexts and make their evaluations of child behavior problems accordingly. In fact, aggregated parent and teacher reports are used for clinical diagnoses because behavior disorder symptoms can manifest at school, home, or both (American Psychiatric Association, 1994). Using the same rationale, indices of ADHD and ODD symptom severity were created by combining parent and teacher reports (only one informant needs to endorse a symptom for it to be tabulated).

Sample characteristics. As illustrated in Table 1, virtually all parents were married and all of the families were living in the same household. The average socioeconomic status of the sample was in the middle to upper-middle class range ($M = 56.52, SD = 24.51$; Hollingshead, 1975). Preliminary analyses indicated that parental marital status, family socioeconomic status, and child medication status had nonsignificant relations with each of the family functioning outcomes (i.e.,

Parental Warmth and Positive Involvement, Intrusiveness and Negative Discipline, and Social Distress) and predictors (i.e., child ADHD and ODD, parental depressive, and anxiety symptoms). As a result, demographic variables were not considered in subsequent analyses.

Table 3 provides the means, standard deviations, and intercorrelations between all self-report measures used in the primary analyses.

Zero-order correlations among measures of child ADHD and ODD symptoms, parental depression and anxiety, and parent–child relationship behaviors and parental social distress. As shown in Table 3, child ADHD symptoms were positively related to Parental Intrusiveness and Negative Discipline in fathers ($r = .33, p < .05$) and Parental Social Distress in mothers ($r = .29, p < .10$). Child ODD symptoms were negatively related to Parental Warmth and Positive Involvement in mothers ($r = -.33, p < .05$), and positively related to both Parental Intrusiveness and Negative Discipline and Parental Social Distress in mothers ($r = .28, p < .10$ and $r = .38, p < .05$) and fathers ($r = .35, p < .06$ and $r = .37, p < .05$).

Parental trait anxiety had moderate positive relations with Parental Intrusiveness and Negative Discipline for mothers and fathers ($r_s = .36, p_s < .05$) and a negative relation with Parental Warmth and Positive Involvement for mothers ($r = -.48, p < .001$). Parental depression had a moderate positive relation with Parental Intrusiveness and Negative Discipline in fathers ($r = .27, p < .10$) and a negative relation with Parental Warmth and Positive Involvement in mothers ($r = -.26, p < .10$). Both parental anxiety and depression had large positive relations with Parental Social Distress in mothers and fathers ($r_s = .45$ to $.58$; all $p_s < .01$). Social desirability was negatively related to depression and anxiety in mothers ($r_s = -.43$ and $-.39$; all $p_s < .01$), and Parental Intrusiveness and Negative Discipline in fathers ($r = -.33, p < .05$), and a positive relation with Social Distress in fathers ($r = .28, p < .10$). This positive relation was the only anomaly out of the expected correlations with social desirability. Controlling for social desirability did not significantly affect the magnitude of any of the relations under study. Surprisingly, there were small to near-zero relations between child and parent psychopathology ($r_s = .05$ to $.17$; all $p_s = ns$). Although there is evidence of sex differences, these analyses did not account for the interdependence of mothers and fathers from the same family reporting on shared phenomena (i.e., family functioning and parent–child relationships with the same child).

Multilevel Statistical Analyses (HLM Analyses)

The first step was to test the interdependence of mothers and fathers in their levels of the dependent

variables (Warmth, Intrusiveness, Distress). Thereafter, using each of the three factors as the dependent variable, the effects of the following predictors were examined: child ODD symptoms, child ADHD symptoms, parental anxiety, and parental depression. These predictor variables combined explained 41% of the variance of Parental Social Distress, 23% of Parental Intrusiveness and Negative Discipline, and 17% of Parental Warmth and Positive Involvement.

1. Tests of the independence of mothers and fathers. The intraclass correlations for Parental Warmth and Positive Involvement, Intrusiveness and Negative Discipline, and Social Distress were $.32$ ($p < .001$), $.27$ ($p < .001$), and $.06$ ($p < .005$), respectively. Thus, the proportion of variance in outcomes attributable to Level 2 effects (between-family unit) was 32%, 27%, and 6%, respectively. These findings indicate that our data were interdependent. Thus, HLM analyses were used to test our primary hypotheses.

2. HLM predictors of Parental Warmth and Positive Involvement. As Table 4 shows, child ODD symptoms had a negative association with Warmth and Positive Involvement, $t(81) = -2.38, p = .018$, but child ADHD symptoms had no significant effect, $t(81) = 1.06, p = .289$. A significant sex effect indicated that mothers had lower levels of Warmth and Positive Involvement than fathers, $t(81) = -2.73, p = .007$. In addition, parental anxiety was associated with less Warmth and Positive Involvement, $t(81) = -3.28, p = .001$, whereas depression had no unique significant effect, $t(81) = 0.24, p = .81$. The main effects of anxiety and sex were qualified by a significant Sex \times Parental Anxiety interaction effect, $t(81) = 2.89, p = .004$. We decomposed the interaction by examining the effects of parental anxiety separately for mothers and fathers. For fathers, anxiety had a nonsignificant relation with Warmth and Positive Involvement ($r = .02, p = .91$). In contrast, for mothers, anxiety was significantly negatively associated with Warmth and Positive Involvement ($r = -.48, p < .001$).

3. HLM predictors of Parental Intrusiveness and Negative Discipline. Child ODD symptoms had a unique negative association with Intrusiveness and Negative Discipline, $t(81) = 2.34, p = .019$, but child ADHD symptoms had no significant effect, $t(81) = 0.19, p = .851$. Parental anxiety had a unique positive association, $t(81) = 2.45, p = .014$. Depression had no significant unique effect, $t(81) = -1.12, p = .262$; nor did sex, $t(81) = -1.88, p = .06$. The primary significant findings found parental anxiety and child ODD symptoms to have unique, additive influences on greater Intrusiveness and Negative Discipline.

Table 4. Contributions of Child and Parent Psychopathology, and Sex to Indexes of Parent–Child Relationship Quality and Parental Social Distress: Hierarchical Linear Modeling

	Dependent Measures											
	Warmth and Positive Involvement				Intrusiveness and Negative Discipline				Social Distress			
	<i>B</i>	<i>t</i> Test	<i>p</i>	<i>R</i> ²	<i>B</i>	<i>t</i> Test	<i>p</i>	<i>R</i> ²	<i>B</i>	<i>t</i> Test	<i>p</i>	<i>R</i> ²
Sex ^a	−4.50	−2.73	.007		−.46	−1.88	.060		−.37	−0.91	.366	
Child ADHD sex ^b	.14	1.06	.289		.01	0.19	.851		.02	0.20	.838	
Child ODD sex ^b	−.36	−2.38	.018		.21	2.34	.019		.35	2.88	.004	
Parent depression ^c	.01	0.24	.810		−.03	−1.12	.262		.10	2.24	.025	
Parent anxiety ^d	−.24	−3.28	.001		.04	2.45	.014		.08	3.13	.002	
Social desirability ^e					−.05	−1.97	.049					
Sex × Anxiety	.13	2.89	.004									
<i>R</i> ²				.17				.23				.41

Note: Degrees of freedom were 81 for the Warmth and Positive Involvement model and the Intrusive and Negative Discipline model, and 82 for the Social Distress model. Nonsignificant social desirability main effects and interaction effects were deleted from models. All *p* values were two-tailed. *B* = unstandardized HLM coefficient; *R*² = based on all individual difference predictors (Snijders & Bosker, 1999); ADHD = attention deficit hyperactivity disorder; ODD = oppositional defiant disorder.

^aDummy-coded variable (1 = mother; 2 = father). ^bDisruptive Behavior Disorders Rating Scale (Pelham et al., 1992). ^cBeck Depression Inventory (Beck & Steer, 1987). ^dState–Trait Anxiety Inventory (Spielberger et al., 1970). ^eMarlowe–Crowne Social Desirability Scale (Crowne & Marlowe, 1960).

4. HLM predictors of Parental Social Distress.

Whereas child ODD symptoms had a unique association with greater Parental Social Distress, $t(82) = 2.88$, $p = .004$, child ADHD symptoms had a nonsignificant effect, $t(82) = 0.20$, $p = .838$. Parental depressive symptoms, $t(82) = 2.24$, $p = .025$, parental anxiety, $t(82) = 3.13$, $p = .002$, and child ODD symptoms each had unique additive effects toward greater Parental Social Distress. The effect of sex was not significant, $t(82) = -0.91$, $p = .366$.

Discussion

As the main results of this study, parental anxiety was uniquely related (controlling for parental depression and child ADHD and ODD) to greater Parental Intrusiveness and Negative Discipline, and Parental Social Distress, and decreased Parental Warmth and Positive Involvement. By contrast, parental depression had no independent effects on parenting behaviors, although it did adversely affect Parental Social Distress. Because our measures were gathered at the same time point, we cannot draw conclusions regarding causality of the relations between child and parent symptoms, but the literature suggests a transactional view. As appropriate, we discuss this further later.

As for child disruptive behavior problems, child ODD symptoms were uniquely related to all three family functioning outcomes, whereas child ADHD symptoms failed to predict any outcomes. Finding child ODD symptoms to be associated with the quality of parent–child relationships and parental social adjustment is consistent with prior research (e.g., Barkley et al., 1992; Barkley, 1991; Johnston, 1996). Our results imply that

child ODD symptoms have an incremental effect beyond the severity of ADHD symptoms in a sample of ADHD children. By definition, child ODD is a function of relationships with children and adult figures (American Psychiatric Association, 1994). Therefore, it is not surprising that ODD was significantly associated with parent–child relationships. However, the fact that ODD was significantly associated with parental distress suggests that ODD disrupts parents' lives in other ways. Although correlational relations do not imply direct causation, these results are consistent with emerging awareness of the negative impact of child problem behaviors on parental mental health (e.g., Johnston, 1996; Pelham et al., 1997, 1998).

Although there were few parental sex differences, mothers did have lower levels of Parental Warmth and Positive Involvement and a tendency toward higher Parental Intrusiveness and Negative Discipline. Perhaps the reason for this is that mothers continue to carry the brunt of responsibility for disciplining their problematic children. Mothers of ADHD children tend to exhibit more controlling and less rewarding parenting tactics than mothers of control children (Danforth, Barkley, & Stokes, 1991), and these parenting behaviors have been shown to predict the development and persistence of child aggression (e.g., Klein & Mannuzza, 1991).

A significant Parent Sex × Anxiety interaction indicated that lower levels of Parental Warmth and Positive Involvement were found in highly anxious compared to less anxious mothers. The results seem consistent with findings reported by Whaley et al. (1999) that clinically anxious mothers display more dysfunctional behaviors in experimental parent–child interactions than normal mothers even after controlling for maternal depression. On the other hand, they are inconsistent

with the report by Edwards et al. (2001) that in fathers, but not in mothers, anxiety and child problem severity were related to more conflicts in experimental father–child interactions. If the relations concerning parental anxiety found in this study reflect a causal relation, a clinical implication would be that parenting behaviors might improve when therapeutic attention is targeted at parental anxiety, particularly in mothers. There have been several studies in which the utility of ancillary treatment for depression has been examined for depressed mothers of disruptive children (Chronis, Gamble, Roberts, & Pelham, 2000; Sanders & McFarland, 2000), but no comparable studies of treatment for parental anxiety have been conducted. Such a prediction could be tested in future prospective examinations in clinical contexts.

There were four advantages of this study compared to the majority of prior work using parents of ADHD children. First, we simultaneously estimated the effects of parental anxiety and depression and child ADHD and ODD symptoms on family functioning outcomes. Second, we used separate dimensional symptom counts of ADHD and ODD to examine their independent relations with family functioning outcomes. Third, we examined families with mothers and fathers to test the main and interactive influences of parental sex on family functioning. Finally, we used a multilevel modeling approach with mothers and fathers nested within family units to account for shared variance between parents from the same family.

Our HLM approach found that the between-family unit variable made a substantial contribution to the variance accounted for in Parental Warmth and Positive Involvement, Intrusiveness and Negative Discipline, and Social Distress. These findings cast doubt on the assumption of independence implicit in previous research studies. The examination of fathers and mothers, or multiple siblings, from the same family are naturally nested structures (individuals at Level 1 within families at Level 2). Researchers examining samples with more than one family member informant need to address the independence of their data with multilevel modeling techniques. If researchers encounter significant partner interdependence, it would be advisable to use analytic strategies such as multilevel and structural equation modeling techniques (Bollen, 1989; Byrne, 2001).

Even given the advantages just mentioned, there are reasons for interpreting these findings cautiously. Of most importance is our reliance on self-report measures and the limitations inherent in a cross-sectional study. Other potential alternative explanations for significant findings include unmeasured constructs such as actual deficits in parenting ability and social skills and environmental stressors such as financial strain. Furthermore, the only collateral reports available were for diagnoses and symptom counts for child externalizing disorders. It may have been beneficial to use

collateral reports to substantiate parent reports of parental family functioning. Another concern is that because all children had diagnoses of ADHD, the range of ADHD symptomatology was limited, which may have minimized the impact of ADHD symptoms. In contrast, for the Beck Depression Inventory, the means and standard deviations observed for mothers and fathers were similar to sample means reported by parents of ADHD children at baseline for the various conditions in the large-scale, multisite Multimodal Treatment Study of Children with ADHD (Wells et al., 2000). For the State–Trait Anxiety Inventory–Trait, our sample means for mothers and fathers were higher than those reported for a sample of 103 mothers of psychiatrically normal toddlers (Kochanska, Clark, & Goldman, 1997).

A final set of caveats reflects our assessment of parental anxiety and depression. An alternative explanation of significant effects of parental anxiety or depression is that these conditions are associated with a bias toward negative evaluations, a bias that may have affected the reports of interpersonal strain or parenting behaviors. However, finding relations to be minimally affected by controlling for social desirability reduced support for this explanation. Another possible interpretation of our findings is that self-reported anxiety and depression may both be measuring the common construct of negative affectivity (Widiger & Clark, 2000); this interpretation is supported by the large positive correlations between anxiety and depression. This possible explanation would limit any conclusions about the differential predictive utility of parental anxiety compared to depression. Although the average Beck Depression Inventory scores were below the clinical range, the scores from our sample were representative of other samples of parents of ADHD children. More important, there is empirical evidence that the Beck Depression Inventory is dimensional and the evidence for proposed cutoffs for mild, moderate, and severe depression is less than adequate (e.g., Ruscio & Ruscio, 2002). We have been careful to specify that our approach to parent symptoms is dimensional, designed to examine average families of ADHD children, rather than diagnostic, that is, a binary depression present–absent variable.

Our findings suggest that prior work on the adverse correlates, consequences, and concomitants of parental depression may be largely a function of overlap between the constructs of anxiety and depression. The dysfunctional parent–child relationships and parental social role distress uniquely associated with parental anxiety found in our study extend work on the influence of excessive anxiety on lower quality of life. Excessively anxious, and stress-reactive, parents may be particularly vulnerable to significant distress and impairment in the face of daily confrontations with children exerting hostility and behavior problems. The re-

lation between negative parenting behaviors and parental anxiety may be a reflection of anxious parents' interpersonal attachment style. Mikulincer (1998) found that persons with an anxious-ambivalent attachment style tended to be more anger prone. In addition, shame, an emotion related to social anxiety, has been found to be associated with maladaptive responses to anger (Tangney, Wagner, Hill-Barlow, Marschall, & Gramzow, 1996). Although we examined the influences of parent and child symptoms on family functioning outcomes, other studies have found the quality of parent-child relationships to exacerbate and prolong child behavior problems and aggression. We can hypothesize reciprocal interchanges among the negative interpersonal styles, distress, and impairment of children and parents, leading to downward spirals, but research that can accurately examine causal relations is necessary to substantiate these ideas.

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