Maternal Sensitivity and Anxiety: Impacts on Child Outcome

Sarah J. Kertz
Carrie L. Smith
L. Kevin Chapman
Janet Woodruff-Borden

ABSTRACT. Children of anxious parents have been shown to be at an increased risk of developing an anxiety disorder. Thus, it is critically important to identify factors that increase or decrease that risk. The depression literature has shown that maternal sensitivity decreases negative child outcome associated with maternal depression. The current study was designed to determine whether maternal sensitivity may buffer children of anxious mothers in a similar way. Three hypotheses were tested. First, that anxious mothers would display less sensitivity than nonanxious mothers in interactions with their children; that there would be an interaction between sensitivity and anxiety on child outcome; and that sensitivity would account for variance in child outcome beyond that attributed to anxiety. One hundred and twenty-five mothers (75 anxious) and their children (ages 3–12) completed the study. Mothers were administered the Anxiety Disorders Interview Schedule-IV and Parent, and a subset also completed the Beck Anxiety Inventory. Children completed the Anxiety Disorders Interview Schedule-Child. Dyads also engaged in two interaction tasks (one cognitive, one social) which were coded for maternal sensitivity and three child

---

Sarah J. Kertz, BA, Carrie L. Smith, BA, L. Kevin Chapman, PhD, and Janet Woodruff-Borden, PhD, are affiliated with the University of Louisville, KY.

Address correspondence to: Sarah J. Kertz, Department of Psychological and Brain Sciences, University of Louisville, Louisville, KY 40292 (E-mail: sarah.kertz@louisville.edu).

outcome behaviors. Results showed that anxious mothers displayed less sensitivity in the social task but not in the cognitive task. An interaction between anxiety and sensitivity was found only when predicting child negativity in the social task. Finally, maternal sensitivity was found to account for variance in child outcome beyond that of anxiety. Implications and directions for future research are discussed.

KEYWORDS. Anxiety, behavior, child outcome, maternal sensitivity, protective factor

Anxiety disorders are among the most common of all psychological disorders (Anderson, Williams, McGee, & Silva, 1987; Kashani & Orvaschel, 1990). Research has shown that anxiety aggregates in families, with children of anxious parents five to seven times more likely to be diagnosed with an anxiety disorder than their normal counterparts (Beidel & Turner, 1997; Turner, Beidel, & Costello, 1987). Although the mechanisms by which anxiety may be transmitted are not clear, psychosocial factors have recently received significant attention in the literature. The identification of family factors and parental behaviors that may lead to increased risk for developing an anxiety disorder, as well as those that may serve as protective or mediating factors, is especially important.

Parental psychopathology has been associated with poor parenting skills and lower levels of parent-child interaction quality and consequently negative child outcome (Cohn & Tronick, 1983; Cox, Puckering, Pound, & Mills, 1987; Hops, Bigian, Sherman, Arthur, Friedman, & Osteen, 1987; Seifer & Dickstein, 2000; Warren et al., 2003; Whaley, Pinto, & Sigman, 1999; Zahn-Waxler, McKnew, Cummings, Davenport, & Radke-Yarrow, 1984). However, studies from the depression literature have indicated that maternal sensitivity can mitigate the negative effects of maternal depression on children (Harnish, Dodge, & Valente, 1995; National Institute of Child Health and Human Development Early Child Care Research Network,1999). The current study was conducted to examine relationships between maternal anxiety, maternal sensitivity, and child outcome to test the hypothesis that high levels of maternal sensitivity in anxious mothers will similarly act as a buffer against negative child outcome.

Anxious mothers have been characterized as displaying "affectionless control" while interacting with their children (Harvison, Chapman,

Ballash, & Woodruff-Borden, current issue). Retrospective reports of anxious and depressed adults described parental behavior high in control but low in warmth (Leon & Leon, 1990). These findings have been supported in several other studies. Warren et al. (2003) found clinically anxious mothers diagnosed with panic disorder were rated as more intrusive in interactions with their infants than nonanxious mothers. Women who reported high levels of anxiety but were not clinically anxious also displayed higher levels of controlling behavior when interacting with their infant children (Field, Sandberg, Garcia, Vega-Lahr, Goldstein, & Guy, 1985; Hock, McBride, & Gnezda, 1989; Stifter, Coulehan, & Fish, 1993; Wijnorks, 1999). This pattern of intrusiveness and overcontrol is also seen in studies with older anxious children who characterized their families as promoting less independence than did nonanxious children (Messer & Beidel, 1994). Another study showed that anxious mothers granted less autonomy, displayed less warmth and positivity, and catastrophized and criticized more than nonanxious mothers during parent-child interactions (Whaley, Pinto, & Sigman, 1999).

In addition to displaying affectionless control, anxious mothers have also been shown to disengage from their children. Comparisons between mothers with self reported anxiety and nonanxious mothers showed that anxious mothers were significantly more disengaged in the communicative domains of face, voice, and touch in interactions with their infants (Weinberg & Tronick, 1998). In mildly stressful interactions with older children, clinically anxious mothers were shown to withdraw and disengage more, as well as display lower levels of productive engagement (Woodruff-Borden, Morrow, Bourland, & Cambron, 2002).

Researchers have suggested that the overcontrolling behaviors of anxious parents may indicate to the child that the world is a dangerous place and that he or she is incapable of navigating successfully without parental intervention (Chorpita & Barlow, 1998). Further, parents may limit the child's exposure to new or challenging situations, thus limiting their opportunities for learning (Hudson & Rapee, 2004). It has also been proposed that low warmth may indicate to the child that he or she will not be supported in challenging situations (Moore, Whaley, & Sigman, 2004). Finally, it has been hypothesized that anxious mothers may model a fearful cognitive style that is then mimicked by the child (Moore et al., 2004).

Although maternal anxiety places children at risk, certain features of parenting behavior have been associated with positive child outcome. Researchers have identified maternal sensitivity as one parental characteristic that is especially important. Maternal sensitivity involves accurately perceiving and responding to a child's needs and behavior (Mertesacker et al., 2004). Several studies have documented the importance of sensitive parenting. One study found that high levels of sensitive parenting predicted faster rates of cognitive-language and social development in infants (Landry, Smith, Miller-Loncar, & Swank, 1997). Another infant study showed that irritable children of highly sensitive mothers were more likely to be securely attached (Van den Boom, 1994). A longitudinal study following children from age 6 months to 3 years showed that higher levels of maternal sensitivity in early childhood contributed to later reductions in child anxiety and depressive symptoms in temperamentally vulnerable children (Warren & Simmens, 2005). Thus, maternal sensitivity appears to represent a particular constellation of parenting behaviors that contribute to positive child outcome.

The depression literature indicates that maternal sensitivity contributes to positive child outcome in children of depressed mothers. Relationships between maternal depressive symptoms, mother-child interaction quality, and child behavior problems were examined by Harnish, Dodge, and Valente (1995). Mother-child interaction quality was assessed by observer ratings of: mother and child enjoyment of the interaction, maternal sensitivity and responsiveness, clarity and directiveness of mother's commands, mutual interaction time, and child compliance. Results showed that women who reported higher levels of depression interacted less positively with their children than did mothers who reported lower levels of depression. In turn, children who experienced lower quality interactions with their mothers were more likely to have high levels of externalizing behavior problems. However, results also showed that interaction quality partially mediated the effects of maternal depression on child externalizing problems, although this relationship did not hold for African American participants.

The National Institute of Child Health and Human Development Early Child Care Research Network (1999) further explored the relationships between maternal depression, maternal sensitivity, and child outcome. This study included infants and mothers with chronic, occasional, or no depressive symptoms. Results showed that never

depressed women displayed the highest level of sensitivity in interactions with their children. Chronically depressed mothers rated their children as less cooperative and more problematic than the other two groups, and children of chronically depressed mothers had lower expressive language scores. Further, children of chronically or sometimes depressed mothers showed lower school readiness and verbal comprehension scores than children of never depressed mothers. However, children of depressed mothers who were also highly sensitive scored higher on a measure of expressive language. Further, depressed but sensitive mothers also rated their children as more cooperative than did mothers who were depressed with lower levels of sensesitivity. This suggests that maternal sensitivity may act as a buffer for children whose mothers are depressed and may compensate for the detrimental effects of maternal depression on children.

To date, only one study has examined the relationship between maternal anxiety, maternal sensitivity, and child outcome (Warren & Simmens, 2005). A longitudinal study with mothers and their temperamentally difficult infants included a mixed group of women who reported symptoms of separation anxiety and depression. Results showed that higher levels of separation anxiety and depressive symptoms were correlated with greater child anxiety and depressive symptoms at ages 2 and 3, while higher levels of maternal sensitivity were correlated with lower levels of child anxiety and depression. Further, maternal sensitivity, maternal anxiety, and maternal depression were significant predictors of child anxiety and depressive symptoms at ages 2 and 3, but only for boys. For girls, only maternal anxiety and depressive symptoms were significant predictors. While these results are promising, the study also has several limitations worth noting. The original study from which the data were taken was not designed to examine these relationships, thus the measures were not ideal. The only measure of maternal anxiety in the dataset was a measure of separation anxiety which assessed mother's feelings of worry and guilt when separated from her infant. Clinical diagnoses of anxiety disorders would have provided a better measure of maternal anxiety and allowed for the distinction between clinically anxious and nonanxious mothers.

In sum, the aggregation of anxiety in families has been well established (Beidel & Turner, 1997; Turner, Beidel, & Costello, 1987). Because children of anxious parents are at an increased risk of developing an anxiety disorder, it is critically important to identify factors

that increase or decrease that risk. The depression literature has shown that maternal sensitivity decreases negative child outcome associated with maternal depression. The current study was designed to determine whether high levels of maternal sensitivity buffer children of anxious mothers from other negative effects in a similar way. Three hypotheses were tested. First, we hypothesized that anxious mothers would display less sensitivity than nonanxious mothers in interactions with their children. Second, we predicted an interaction between sensitivity and anxiety on child outcome. Finally, we predicted that sensitivity would account for variance in child outcome beyond that attributed to anxiety.

METHOD

Participants

Mothers and children were recruited to participate in a larger study examining the nature of familial anxiety. The researchers distributed flyers to schools, daycares, and afterschool programs. Participants were biological children, age 3 to 12 years, and currently resided with their mother. Mothers with a current primary diagnosis of an anxiety disorder based on DSM-IV criteria were included in the anxious group. The nonanxious control group included women with no Axis I disorder, either current or in the child's lifetime. Dyads with children diagnosed with any disorder other than anxiety were excluded from both groups.

Measures

Anxiety Disorder Interview Schedule-Fourth Edition (ADIS-IV; Brown, DiNardo, & Barlow, 1994). Parents completed the ADIS-IV, a structured interview which assesses for all DSM-IV anxiety and related disorders in adults. Mothers assigned a diagnosis are also provided with a severity rating ranging from 0 (*absent*) to 8 (*very severe*) indicating the level of impairment associated with the disorder. Reliability and validity estimates for the ADIS-IV are not yet available, however studies using previous editions of the ADIS have reported fair to excellent agreement for the anxiety disorders. Kappas for diagnostic agreement range from .43 to .82 (DiNardo, Moras, Barlow, Rapee, & Brown, 1993). The reliability of the lifetime version

of the interview, ADIS-IV-L, is good to excellent for diagnostic agreements (kappas from .60 to .86; Brown, DiNardo, Lehman, & Campbell, 2001), with the exception of Dysthymic Disorder (.22).

Anxiety Disorders Interview Schedule for DSM-IV: Child and Parent Versions (ADIS-C/P; Silverman & Albano, 1996). Results from these interviews are combined to diagnose psychological disorders in children 6 to 17 years of age. Because the ADIS-P is not appropriate for very young children, only the ADIS-P was used to diagnose 3–5 year old children. The ADIS-P/C has excellent reliability for separation anxiety disorder, social phobia, specific phobia, and generalized anxiety disorder, and excellent test-retest reliability of the interview (Silverman, Saavedra, & Pina, 2001).

All interviews were conducted by advanced doctoral students who were required to meet reliability criteria of three consecutive diagnostic matches within one point of severity rating. All interviews were videotaped, and one-third was rated by a second interviewer to determine interrater reliability. Kappas for diagnostic agreement on primary diagnoses were as follows: ADIS-IV = .90, ADIS-P (3–5 year olds) = .75, and ADIS-P/C (6–12 year olds) = .85.

Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988). The BAI measures the severity of anxiety symptoms, a number of which are physiological in nature. The scale has high internal consistency (.92) and test-retest reliability (.75) (Beck et al., 1988). Adequate convergent validity has also been demonstrated (e.g., Osman, Kopper, Barrios, Osman, & Wade, 1997). The BAI was used as a continuous measure of current anxiety in mothers.

Interaction Tasks

Mother-child dyads completed two videotaped 10-minute interaction tasks. Each dyad completed one cognitive-achievement oriented task which was more structured in nature and one slightly less structured social-interactional task. Types of task differed between ages 3–5 and 6–12 in order to be age appropriate. The cognitive task for the 3–5 year old children involved completing a series of puzzles, while children 6–12 years old worked on unsolvable anagrams. For the social task, the younger children told a story aloud and older children prepared a speech to be delivered into a camera. Instructions for

the tasks were identical and directed toward the child, who was also told that it was acceptable for parent to help. All tasks were presented in counterbalanced order to control for order effects.

Data Coding

Videotaped interactions were coded by observers using the National Institute of Child Health and Human Development Study of Early Child Care and Youth Development Coding Manual (2002). The manual includes measures of a variety of qualities, each of which is measured on a 7 point scale, ranging from highly characteristic of the interaction (7) to not at all characteristic of the interaction (1). Parent Rating Scales assess supportive presence (demonstration positive regard and emotional support), respect for child's autonomy (recognition and respect for the validity of the child's individuality, motives, and perspectives), stimulation of cognitive development (fostering of mental development), quality of assistance (ensuring that child understands goals of tasks and providing appropriate hints and suggestions), confidence (demonstration of belief that she can interact successfully with the child) and hostility (expression of anger, discounting, or rejecting the child) (reversed). Child Rating Scales include agency (child acts with enthusiasm and eagerness) and negativity (child displays anger, dislike, or hostility toward the mother). The Dyadic Scales measure goal directed partnership (dyad shares a common goal with the purpose of providing a learning and self-esteem enhancing experience for the child) and affective mutuality/felt security (mutuality of emotion between mother and child and security child feels with mother).

Maternal sensitivity was derived from a composite of supportive presence, respect for child's autonomy, stimulation of cognitive development, quality of assistance, confidence, and hostility. Child outcome was measured with scores on the agency scale, negativity scale, and a composite of the two Dyadic Scales: goal-directed partnership and affective mutuality/felt security. Coders were blind to group membership and included two doctoral students and one undergraduate student trained to reliability of 80% agreement on each subscale. One third of all interactions were coded by all three raters for reliability and resulted in 91% agreement for maternal sensitivity, 94% for child negativity, 89% for child agency, and 83% for dyad.

RESULTS

Demographics

Demographics for the two groups are presented in Table 1. The final sample included 95 Caucasian, 19 African American, 7 Hispanic, 1 Asian, and 3 Other/Mixed dyads. Seventy four mothers were diagnosed with an anxiety disorder, including panic disorder without agoraphobia (n = 3), panic disorder with agoraphobia (n = 5),

TABLE 1. Demographics and Preliminary Analyses of Anxious and Nonanxious Groups

Variable	Anxious Sample	Control Sample	t/Chi-square
Mother Age			
M	34.93	36.90	−1.704
SD	6.422	6.243	
Mother Ethnicity			.233
Caucasian	54	41	
African American	15	4	
Hispanic	3	4	
Asian	0	1	
Mixed/Other	2	1	
Mother Education			7.416
Some HS/HS grad	14	4	
Some college/college grad	50	31	
Graduate/prof. Training	10	16	
Family Income*			.131
<$30,000	27	10	
$30,000–70,000	22	19	
>$70,000	24	21	
Marital Status			.128
Married	42	34	
Divorced and single	12	13	
Divorced and remarried	3	0	
Separated	5	2	
Never married	10	2	
Widowed	2	0	
Child Age			
M	6.42	7.02	−1.195
SD	2.617	2.963	
Child Gender			.590
Male	37	23	
Female	37	28	

*Information not provided by two participants.

social phobia (n = 14), generalized anxiety disorder (n = 34), obsessive compulsive disorder (n = 1), specific phobia (n = 9), post traumatic stress disorder (n = 2), agoraphobia (n = 2), and adjustment disorder (n = 4). The nonanxious control group included 51 mothers.

Preliminary Analyses

The groups did not differ in terms of mother or child age, ethnicity, child gender, or family income. However, a significant difference was found for maternal education, with more anxious mothers in the ''some high school/high school graduate'' and ''some college/college ollege graduate'' categories and more nonanxious mothers in the ''graduate/professional training'' group. Accordingly, education was used as a covariate in subsequent analyses.

Hypothesis Testing

Anxious Mothers will Display Lower Levels of Sensitivity in Interactions with Their Children Compared to Nonanxious Mothers. Based on research from the depression literature, it was hypothesized that anxious mothers would display lower levels of maternal sensitivity than nonanxious mothers. A one-way analysis of covariance was used to examine the effects of anxiety on maternal sensitivity with maternal education levels of the anxious and nonanxious used as the covariate. A significant difference was found between the two diagnostic groups for overall maternal sensitivity levels across both tasks ($F(1,122) = 4.90$, $p = .029$) with anxious mothers displaying lower levels of sensitivity (see Table 2). When the two tasks were

TABLE 2. Sensitivity Displayed in Each Task

Sensitivity in Task	Anxious Sample	Nonanxious Sample
Combined		
M	4.87	5.23
SD	.80	.69
Cognitive		
M	4.94	5.24
SD	.85	.71
Social		
M	4.81	5.22
SD	.86	.75

examined separately, a significant difference between the two groups was found for the social task ($F(1,122) = 6.32$, $p = .013$) but not for the cognitive task ($F(1,122) = 2.610$, $p = .109$).

Interaction between Maternal Sensitivity and Anxiety Diagnosis in Prediction of Child Outcome. To examine the relationship between maternal anxiety and sensitivity and the impact on child outcome, a two-way analysis of covariance was conducted, with mother's education as the covariate. Mothers were divided into two groups using a median split of sensitivity scores. Three child outcomes were operationally defined as the amount of agency, negativity, and composite of the two dyad ratings. A significant main effect for sensitivity ($F(1, 120) = 25.35$, $p < .001$) was found when child outcome was measured as agency displayed during the tasks. There was no main effect for anxiety diagnosis ($F(1,120) = .544$, $p = .462$) nor was there a significant interaction ($F(1, 120) = .707$, $p = .402$). Examining child negativity, a main effect was again found for maternal sensitivity ($F(1,120) = 5.50$, $p = .021$) and anxiety ($F(1,120) = 4.40$, $p = .038$) however the interaction was not significant ($F(1,120) = 1.18$, $p = .279$). The third child outcome of dyad ratings showed a significant main effect for sensitivity ($F(1,120) = 63.427$, $p < .001$) but not anxiety ($F(1,120 = .047$, $p = 828$). Again, the interaction between sensitivity and anxiety was not significant ($F(1,120) = .033$, $p = .857$).

Analyses were also conducted for each task independently using maternal sensitivity and child outcome ratings for only that task. For the cognitive task (puzzle and anagram), a significant main effect was found for sensitivity when predicting child agency ($F(1,120) = 30.64$, $p < .001$), however no main effect for maternal anxiety diagnosis or interaction was found. A main effect for sensitivity was also found for child negativity ($F(1,120) = 6.15$, $p = .015$) but not anxiety and there was not an interaction between the variables. Similar results were found for the dyad, with a main effect for sensitivity ($F(1,120) = 67.69$, $p < .001$) but not anxiety and the interaction was also not significant. Analyses of the social task (story and speech) revealed a main effect for sensitivity for child agency ($F(1, 120) = 13.17$, $p < .001$) and dyad ($F(1,120) = 76.10$, $p < .001$) but no main effect for anxiety and no interaction was found. The results for child negativity showed a significant interaction between sensitivity and anxiety diagnosis ($F(1,120) = 6.71$, $p = .011$), indicating that the relationships between these variables differ in anxious

TABLE 3. Negativity Scores of Children in the Social Task

	Anxious Sample	Nonanxious Sample
Highly Sensitive	1.35	1.21
Mildly Sensitive	1.77	1.49

and nonanxious mothers. To clarify these results, anxious and nonanxious mothers were examined separately based on their diagnostic status. Results showed a significant main effect for sensitivity in anxious mothers ($F(1,71) = 14.40$, $p < .001$) but not for nonanxious mothers ($F(1,48) = .290$, $p = .593$). Negativity scores are presented in Table 3.

Maternal Sensitivity will Account for Variance in Child Outcome Beyond Maternal Anxiety. Two sets of regressions—one including diagnostic severity rating as a continuous measure of anxiety, and the other using BAI scores available from a subsample of the mothers—were conducted to examine variance in child outcome due to maternal sensitivity. Maternal education was entered in Block One, maternal anxiety in Block Two, and maternal sensitivity in Block 3. When using diagnostic severity ratings, each model was significant in predicting child agency, negativity, and dyadic relationship. In addition, after controlling for the effects of anxiety, maternal sensitivity accounted for additional variance in the child outcome measures. Social and cognitive tasks were examined individually; however, no deviations from this pattern were observed.

When BAI scores were used in the predictions, all three models were again significant and maternal sensitivity explained additional variance. However, maternal anxiety remained a significant predictor when examining child negativity. Analyses were also conducted for cognitive and social tasks. Results of individual tasks showed only one difference from the examination of the tasks combined, with anxiety remaining a significant predictor for child agency in the social task. Results are presented in Table 4.

DISCUSSION

Prior research has shown that children of anxious parents are at an increased risk of developing an anxiety disorder. The role of

TABLE 4. Results for Predictions of Child Outcome

Outcome	Model F	R Square Change (Block 2)	R Square Change (Block 2)	R Square Total
Severity Ratings				
Combined				
Agency	23.45***	.05	.31	.37
Neg.	11.39***	.06	.11	.22
Dyad	63.17***	.04	.54	.61
Cognitive				
Agency	27.76***	.02	.35	.41
Neg.	7.59***	.03	.07	.16
Dyad	53.33***	.03	.51	.57
Social				
Agency	5.92***	.05	.08	.13
Neg.	11.24***	.07	.13	.22
Dyad	44.02***	.05	.46	.52
BAI Scores				
Combined				
Agency	12.08***	.04	.24	.29
Neg.	8.90***	.16	.06	.48
Dyad	37.83***	.01	.53	.75
Cognitive				
Agency	6.32***	.00	.30	.34
Neg.	4.53**	.07	.03	.13
Dyad	30.04***	.01	.48	.50
Social				
Agency	7.50***	.09	.11	.20
Neg.	11.15***	.16	.12	.28
Dyad	30.66**	.04	.47	.49

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

parenting has been examined as one way this increased risk is transmitted, and anxious mothers have been shown to display both affectionless control and high levels of disengagement with their children. However, research has also delineated parenting behaviors associated with positive child outcomes. Maternal sensitivity in particular has received significant attention in the literature and has been associated with positive outcomes in high risk children. This study examined the impact of anxiety on maternal sensitivity and the impact of each on child outcome. Based on previous research, we hypothesized that anxious mothers would be less sensitive than nonanxious mothers in interactions with their children. Further, we

predicted that there would be an interaction between anxiety and maternal sensitivity and that maternal sensitivity would account for variance in child outcome beyond that explained by anxiety.

Results suggest that anxious mothers interact less sensitively with their children. Analyses of tasks combined and the social task alone showed that anxious mothers displayed lower levels of sensitivity in interactions with their children. These results corroborate previous findings that mothers with other forms of psychopathology (such as depression) are also less sensitive (Cohn, Campbell, Matias, & Hopkins, 1990; Cummings & Davies, 1994; DeMulder & Radke-Yarrow, 1991; National Institute of Child Health and Human Development Early Child Care Research Network, 1999). However, anxious mothers did not appear to differ from nonanxious mothers in the cognitive tasks. This may be due in part to the more structured nature of the puzzle and anagram tasks. Mothers may have felt their role was slightly less ambiguous in these tasks, as opposed to the story and speech tasks, where the nature of their involvement was not as well defined.

The hypothesis that there would be an interaction between anxiety and sensitivity was supported only in terms of child negativity displayed during the social task. Sensitivity appeared to play an important role for anxious mothers, with children of highly sensitive anxious mothers exhibiting less negativity than children of anxious mothers who were not sensitive. Sensitivity did not significantly impact the negativity scores of children of nonanxious mothers. Both maternal sensitivity and maternal anxiety affected child negativity when tasks were examined together. Child agency and the dyadic relationship were influenced only by maternal sensitivity. This held true when examining the tasks together and separately.

Maternal sensitivity explained additional variance above and beyond that of maternal anxiety. Sensitivity was a significant predictor of child agency, negativity, and the dyadic relationship when tasks were combined and also when divided into cognitive and socially oriented interactions. After controlling for the effects of anxiety, maternal sensitivity remained as the only significant predictor. When using BAI scores available from a subsample of the women as a continuous measure of anxiety; anxiety, as well as sensitivity, remained significant predictors of child negativity in the combined, cognitive and social tasks analysis, as well as in the prediction of child agency in the social task. This may suggest that both maternal

anxiety and sensitivity are important to consider, especially in the context of child negativity.

Overall, maternal sensitivity emerged as a powerful predictor of child outcome and of the mother-child relationship. Although anxious mothers demonstrated less sensitivity in interactions with their children, the reasons for this difference in behavior are unclear. It may be that anxious mothers are preoccupied with their own anxiety and are therefore unable to devote adequate attention to the needs of their children (Woodruff-Borden et al., 2002). However, results are also positive. Maternal anxiety does not necessarily lead to poor child outcome. Rather, the data suggest that maternal parenting behaviors are more predictive of child outcome than anxiety alone.

These findings may provide a way to buffer the effects on children of having an anxious parent and also have important implications for interventions. Because maternal sensitivity appears to have the strongest relationship to child outcome, strategies directed toward decreasing the impact of maternal anxiety on children's well being should focus on discrete parenting behaviors rather than, or in addition to, alleviating symptoms of anxiety. Previous research has shown that anxious mothers display higher levels of disengagement and affectionless control than nonanxious mothers (Leon & Leon, 1990, Woodruff-Borden et al, 2002). Interventions designed to increase sensitivity in anxious mothers may best serve these women by targeting parental negativity and respect for the child's autonomy, two important aspects of sensitive parenting which seem to be especially problematic for anxious mothers. Alterations in these negative and controlling maternal behaviors might then convey a different message to children about their own competence and abilities, perhaps decreasing anxious feelings and cognitions (Chorpita & Barlow, 1998). Increasing sensitivity, and therefore mother-child interaction quality, may in turn decrease anxious feelings. Future research should further explore the nature and direction of these relationships.

It is also important to examine these relationships in a culturally diverse sample, particularly in African American populations. Prior work has suggested that African American parents use a more authoritarian parenting style characterized by high levels of control than Caucasian parents (Smetana & Daddis, 2002). Although this parenting style has been associated with childhood problems in Caucasian families, this has not been supported in work with African American families (Baumrind, 1972; Ferguson-Peters, 1988; Goodman et al.,

1998; McLeod, Druttschnitt, & Dornfeld, 1994). It has been suggested that this behavior might serve as a protective factor in African American families where there may be more environmental stressors (Lamborn, Dornbusch, Steinberg, 1996). Because parenting styles may contribute to optimal child outcome differently in African American and Caucasian families, it is important to examine the relationship between maternal sensitivity, anxiety, and child outcome with larger samples of African American dyads.

REFERENCES

Anderson, J. C., Williams, S., McGee, R., & Silva, P. A. (1987). DSM-III disorders in preadolescent children: Prevalence in a large sample from the general population. *Archives of General Psychiatry*, *44*, 69–76.

Baumrind, D. (1972). An exploratory study of socialization effects on African American children: Some African American-Caucasian comparisons. *Child Development*, *43*, 261–267.

Beck, A. T., Epstein, N., Brown, G., & Steer, R. A. (1988). An inventory for measuring clinical anxiety: Psychometric properties. *Journal of Consulting and Clinical Psychology*, *56*, 893–897.

Beidel, D. C., & Turner, S. M. (1997). At risk for anxiety: I. Psychopathology in the offspring of anxious parents. *Journal of American Academy of Child and Adolescent Psychiatry*, *36*, 918–924.

Brown, T. A., DiNardo, P. A., & Barlow, D. H. (1994). *Anxiety disorders interview schedule-4th edition (ADIS-IV)*. San Antonio, TX: Psychological Corporation.

Brown, T. A., DiNardo, P. A., Lehman, C. L., & Campbell, L. A. (2001). Reliability of DSM-IV anxiety and mood disorders: Implications for the classification of emotional disorders. *Journal of Abnormal Psychology*, *110*, 49–58.

Chorpita, B. F, & Barlow, D. H. (1998). The development of anxiety: The role of control in the early environment. *Psychological Bulletin*, *124*(1), 3–21.

Cohn, J. F., Campbell, S. B., Matias, R., & Hopkins, J. (1990). Face-to-face interactions of postpartum depressed and nondepressed mother-infant pairs at 2 months. *Developmental Psychology*, *26*(1), 15–23.

Cohn, J. F., & Tronick, E. Z. (1983). Three-month-old infant's reaction to simulated maternal depression. *Child Development*, *54*, 185–193.

Cox, A. D., Puckering, C., Pound, A., & Mills, M. (1987). The impact of maternal depression in young children. *Journal of Child Psychology and Psychiatry*, *28*, 917–928.

Cummings, E. M., & Davies, P. T. (1994). Maternal depression and child development. *Journal of Child Psychology and Psychiatry*, *35*, 73–112.

DeMulder, E. K., & Radke-Yarrow, M. (1991). Attachment with affectively ill and well mothers: Concurrent behavioral correlates. *Development and Psychopathology*, *3*, 227–242.

DiNardo, P. A., Moras, K., Barlow, D. H., Rapee, R. M., & Brown, T. A. (1993). Reliability of DSM-III-R anxiety disorder categories: Using the Anxiety Disorders Interview Schedule-Revised (ADIS-R). *Archives of General Psychiatry*, *50*, 251–256.

Field, T., Sandberg, D., Garcia, R., Vega-Lahr, N., Goldstein, S., & Guy, L. (1985). Pregnancy problems, postpartum depression, and early mother-infant interactions. *Developmental Psychology*, *21*(6), 1152–1156.

Goodman, S. H., Narrow, C. W., Cohen, P., Fielding, B., Alegria, M., Leaf, P. J., Kandel, D., McCue, H. S., Bravo, M., Moore, R., & Duncan, M. K. (1998). Measurement of risk for mental disorders and competence in a psychiatric epidemiologic community survey: The National Institute of Mental Health Methods for the Epidemiology of Child and Adolescent Mental Disorders (MECA) study. *Social Psychiatry and Psychiatric Epidemiology*, *33*, 162–173.

Harnish, J. D., Dodge, K. A., & Valente, E. (1995). Mother-child interaction quality as a partial mediator of the roles of maternal depressive symptomatology and socioeconomic statusin the development of child behavior problems. *Child Development*, *66*, 739–753.

Harvison, K.W., Chapman, L. K., Ballash, N. G., & Woodruff-Borden, J. (in press). Anxiogenic patterns in mother-child interactions. *Child & Family Behavior Therapy*, *30*(2), Current Issue.

Hock, E., McBride, S., & Gnezda, M. T. (1989). Maternal separation anxiety: Mother-infantseparation from the maternal perspective. *Child Development*, *60*, 793–802.

Hops, H., Bigian, A., Sherman, L., Arthur, J., Friedman, L., & Osteen, V. (1987). Home observations of family interactions of depressed women. *Journal of Consulting and Clinical Psychology*, *55*, 341–346.

Hudson, J. L., & Rapee, R. M. (2004). Generalized anxiety disorder: Advances in research and practice. In R. G. Heimberg, C. L. Turk, & D. S. Mennin (Eds.), *Anxious temperament to disorder: An etiological mode* (pp. 51–74). New York: Guilford Press.

Kashani, J. H., & Orvaschel, H. (1990). A community study of anxiety in children and adolescents. *American Journal of Psychiatry*, *147*, 313–318.

Lamborn, S. D., Dornbusch, S. M., & Steinberg, L. (1996). Ethnicity and community context as moderators of the relations between family decision making and adolescent adjustment. *Child Development*, *67*, 283–301.

Landry, S. H., Smith, K. E., Miller-Loncar, C. L., Swank, P. R. (1997). Predicting cognitive-language and social growth curves from early maternal behaviors in children at varying degrees of biological risk. *Developmental Psychology*, *33*(6), 1040–1053.

Leon, C. A., & Leon, A. (1990). Panic disorder and parental bonding. *Psychiatric Annals*, *20*, 503–508.

McLeod, J. D., Druttschnitt, C., & Dornfeld, M. (1994). Does parenting explain the effects of structural conditions on children's antisocial behavior? A comparison of African Americans and Caucasians. *Social Forces*, *73*, 575–604.

Mertesacker, B., Bade, U., Haverkock, A., & Pauli-Pott, U. (2004). Predicting maternal reactivity/sensitivity: The role of infant emotionality, maternal depressiveness/anxiety, and social support. *Infant Mental Health Journal*, *25*(1), 14.

Messer, S. C., & Beidel, D. C. (1994). Psychosocial correlates of childhood anxiety disorders. *Journal of the American Academy of Child and Adolescent Psychiatry*, *33*, 975–983.

Moore, P. S., Whaley, S. E., & Sigman, M. (2004). Interactions between mothers and children: Impacts of maternal and child anxiety. *Journal of Abnormal Psychology*, *113*(3), 471–476.

National Institute of Child Health and Human Development Study of Early Child Care and Youth Development (2002). *Procedures for administering the adult-child interaction task* (Chapter 42.5; Appendix C: Coding Manual). Retrieved September 1, 2006, from http://secc.rti.org/home.cfm

National Institute of Child Health and Human Development Early Child Care Research Network. (1999). Chronicity of maternal depressive symptoms, maternal sensitivity, and child functioning at 36 months. *Developmental Psychology*, *35*(5), 1297–1310.

Osman, A., Kopper, B. A., Barrios, F. X., Osman, J. R., & Wade, T. (1997). The Beck anxiety inventory: Reexamination of factor structure and psychometric properties. *Journal of Clinical Psychology*, *53*(1), 7–14.

Peters, M. F. (1988). Parenting in Black families with young children. In H. P. McAdoco (Ed.), *Black families* (pp. 228–241). Beverly Hills, CA: Sage.

Seifer, R., & Dickstein, S. (2000). Parental mental illness and infant development. In C. Zeahnah (Ed.), *Handbook of infant mental health* (2nd ed., pp. 145–160). New York: Guilford Press.

Silverman, W. K., Saavedra, M. S., & Pina, A. A. (2001). Test-retest reliability of anxiety symptoms and diagnoses with the anxiety disorders interview schedule for DSM-IV: Child and parent versions. *Journal of the American Academy of Child Adolescent Psychiatry*, *40*, 937–943.

Silverman, W. K., & Albano, A. M. (1996). *The anxiety disorders interview schedule for DSM-IV: Child and parent versions*. San Antonio, TX: Psychological Corporation.

Smetana, J. G., & Daddis, C. (2002). Domain-specific antecedents of parental psychological control and monitoring: The role of parenting beliefs and practices. *Child Development*, *73*(2), 563–580.

Stifter, C. A., Coulehan, C. M., & Fish, M. (1993). Linking employment to attachment: The mediating effects of maternal separation anxiety an interactive behavior. *Child Development*, *64*, 1451–1460.

Turner, S. M., Beidel, D. C., & Costello, A. (1987). Psychopathology in the offspring of anxiety disorders patients. *Journal of Consulting and Clinical Psychology*, *55*(2), 229–235.

Van den Boom, D. C. (1994). The influence of temperament and mothering on attachment and exploration: An experimental manipulation of sensitive responsiveness among lower-class mothers with irritable infants. *Child Development*, *65*, 1457–1477.

Warren, S. L., Gunnar, M. R., Kagan, J., Anders, T. F., Simmens, S. J., Rones, M., Wease, S., Aron, E., Dahl, R. E., & Stroufe, L. A. (2003). Maternal panic disorder: Infant temperament, neurophysiology, and parenting behaviors. *Journal of the American Academy of Child and Adolescent Psychiatry*, *42*, 814–825.

Warren, S. L. & Simmens, S. J. (2005). Predicting toddler anxiety/depressive symptoms: Effects of caregiver sensitivity on temperamentally vulnerable children. *Infant Mental Health Journal*, *26*(1), 40–55.

Weinberg, K. M., & Tronick, E. Z. (1998). The impact of maternal psychiatric illness on infant development. *Journal of Clinical Psychiatry*, *59*(2), 53–61.

Wijnorks, L. (1999). Maternal recollected anxiety and mother-infant interaction in preterminfants. *Infant Mental Health Journal*, *20*(4), 393–409.

Whaley, S. E., Pinto, A., & Sigman, M. (1999). Characterizing interactions between anxious mothers and their children. *Journal of Clinical and Counseling Psychology*, *67*(6), 826–836.

Woodruff-Borden, J., Morrow, C., Bourland, S., & Cambron, S. (2002). The behavior of anxious parents: Examining mechanisms of transmission of anxiety from parent to child. *Journal of Clinical Child and Adolescent Psychology*, *31*, 364–374.

Zahn-Waxler C., McKnew, D. H., Cummings, E. M., Davenport, Y., & Radke-Yarrow, M. (1984). Problem behaviors and peer interactions of young children with a manic-depressive parent. *American Journal of Psychiatry*, *141*, 236–240.