

The Pennsylvania State University

The Graduate School

Department of Psychology

MATERNAL ANXIETY, PARENTING, AND THE EMERGENCE OF CHILD ANXIETY  
AMONG YOUNG CHILDREN WITH AND WITHOUT DEVELOPMENTAL DELAY

A Thesis in

Psychology

by

Marissa N. Pellegrino

© 2006 Marissa N. Pellegrino

Submitted in Partial Fulfillment  
of the Requirements  
for the Degree of

Doctor of Philosophy

August 2006

The thesis of Marissa N. Pellegrino was reviewed and approved\* by the following:

Keith A. Crnic  
Adjunct Professor of Psychology  
Thesis Adviser  
Co-Chair of Committee

Brian Rabian  
Associate Professor of Psychology  
Co-Chair of Committee

Thomas Borkovec  
Distinguished Professor of Psychology

Craig Edelbrock  
Professor of Human Development and Family Studies

Kevin Murphy  
Professor of Psychology  
Head of the Department of Psychology

\*Signatures are on file in the Graduate School

## ABSTRACT

The present study investigated mechanisms of transmission of anxiety from mother to child across the preschool period, with particular attention to the mediating role of parenting specifically related to emotional experiences. Contrasts in these processes between families of children with and without developmental delays allowed for further exploration of mechanisms of effect related to the presence of risk. In contrast to the generally modest findings in the absence of child risk, findings in the presence of risk were notably more powerful. Although maternal anxiety during early childhood appeared associated with later child anxious symptoms regardless of risk status, only in the presence of risk was a mechanism of effect able to be identified. More specifically, a lack of positive parenting behaviors mediated the relations between maternal anxiety in early childhood and later child anxiety in the presence of child risk. As hypothesized, family factors appeared more salient under conditions of risk and served to intensify and realize the risk of early maternal anxiety. Specific study results and implications for prevention and intervention efforts are discussed.

## TABLE OF CONTENTS

List of Tables.....	vi
Chapter I: INTRODUCTION.....	1
Chapter II: LITERATURE REVIEW.....	6
Overview of Current Models of Anxiety Development.....	6
Parental Anxiety and Child Anxiety: Familial Aggregation.....	7
Parenting and Child Anxiety.....	10
Parental Anxiety and Parenting.....	18
Child Risk Status.....	21
Parent and Child Risk, Parenting, and the Emergence of Child Anxiety: The Current Study.....	24
Chapter III: METHOD.....	28
Design Overview.....	28
Participants.....	28
Procedure.....	30
Initial assessment.....	30
Laboratory visits.....	31
Home visits.....	33
Measures.....	33
Parental anxiety at age three.....	33
Parenting at age four.....	33
Child anxiety at age five.....	35
Chapter IV: RESULTS.....	37
Data Reduction.....	37
Parenting at age four.....	37
Child anxiety at age five.....	37
Preliminary Analyses.....	38
Descriptive statistics and group differences.....	38
Parenting at age four.....	39
Parenting, maternal anxiety, and child anxiety.....	40
Maternal anxiety and parenting.....	43
Gender differences.....	43
Hypothesis Testing.....	44
Hypothesis 1: Maternal anxiety as a predictor of parenting behavior and child anxiety.....	44
Hypothesis 2: Parenting behavior as a predictor of child anxiety.....	46
Hypothesis 3: Parenting behavior as a mediator of the relations between maternal and child anxiety.....	49
Hypothesis 4: Group differences in pathways of influence.....	50
Chapter V: DISCUSSION.....	52
Parental Anxiety and Child Anxiety: Familial Aggregation.....	52
Parenting and Child Anxiety.....	56
Maternal Anxiety and Parenting.....	61
Mechanism of Effect.....	64

Summary and Limitations.....	65
REFERENCES.....	69
APPENDIX: Observational Coding Systems.....	81

## LIST OF TABLES

Table 1. Participant Ethnicity Across Sites.....	29
Table 2. Participant Demographics.....	30
Table 3. Means, SD, and Group Differences Between Typically Developing Children (TD) and Children with Developmental Delays (DD).....	39
Table 4. Intercorrelations Among Parenting and Mother-Child Relationship Variables at age 4 for Typically Developing Children (TD) and Developmentally Delayed Children (DD).....	40
Table 5. Correlations Between Parenting Behaviors at Age 4 and Maternal Anxiety at age 3 and Child Anxiety at age 5 for Typically Developing Children (TD) and Developmentally Delayed Children (DD).....	42
Table 6. Correlations Between Maternal Anxiety at age 3 and Child Anxiety at age 5 for Typically Developing Children (TD) and Developmentally Delayed Children (DD).....	43
Table 7. Separate Regression Analyses for Maternal Anxiety Predicting Parenting Behaviors and Child Anxiety for Typically Developing Children (TD) and Developmentally Delayed Children (DD).....	45
Table 8. Stepwise Regression Analysis for Parenting Behavior Predicting Child Anxiety (CBCL) for Typically Developing (TD) Children.....	47
Table 9. Stepwise Regression Analysis for Parenting Behavior Predicting Child Anxiety (DISC) for Typically Developing (TD) Children.....	48
Table 10. Stepwise Regression Analysis for Parenting Behavior Predicting Child Anxiety (CBCL) for Developmentally Delayed (DD) Children.....	48
Table 11. Stepwise Regression Analysis for Parenting Behavior Predicting Child Anxiety (DISC) for Developmentally Delayed (DD) Children.....	49
Table 12. Hierarchical Regression Analysis for Emotional Scaffolding Mediating the Relation Between Maternal and Child Anxiety for Developmentally Delayed (DD) Children.....	50
Table 13. Hierarchical Regression Analysis for Positive Parenting Composite Mediating the Relation Between Maternal and Child Anxiety for Developmentally Delayed (DD) Children.....	50

## Chapter I: Introduction

With lifetime prevalence rates between 10-25%, anxiety disorders represent one of the most common forms of psychiatric disorders among both children and adults (Dadds, Spence, Holland, Barrett, & Laurens, 1997; Donovan & Spence, 2000). Although historically there has been much research on anxiety disorders in adults, prior to 1980 anxiety disorders in children and adolescents had been relatively ignored in terms of scientific inquiry. One reason for this was the widely held notion that fears and worries during childhood were transitory in nature and thus did not constitute an important or compelling area for investigation. During the past two decades, however, there has been increased interest in childhood anxiety. With the arrival of the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders third edition (DSM-III) (1980), descriptive criteria for childhood anxiety disorders were delineated, giving them a prominent position in the diagnostic nomenclature. This fostered better communication among researchers and led to increased attention to childhood anxiety from the research community.

Although children may suffer from a number of mental health problems, anxiety disorders represent one of the most common forms of psychopathology in children (Donovan & Spence, 2000). In fact, prevalence estimates equal those of childhood externalizing problems (Manassis & Bradley, 1994), and it has been suggested that anxiety disorders are twice as common as attention deficit disorder in children (Popper, 1993). Anxious children can manifest levels of symptom severity and impairment similar to those found in anxious adults. Further, these symptoms can be distressing and debilitating to children and their families and can have a negative impact on general social adjustment (Last, Perin, Hersen, & Kazdin, 1996). More specifically, anxiety in childhood has been associated with impairments in peer relations,

affective expression, self-esteem, attention, social behavior, and school performance (Strauss, Frame, & Forehand, 1987). Past studies also suggest that childhood anxiety exhibits a high level of stability over time and leads to the development of other psychiatric disorders (Last et al., 1996), and there is growing evidence that many anxious adults report their problems to have originated in childhood (Barrett, Dadds, & Rapee, 1996).

Despite the widespread occurrence and apparent short- and long-term consequences of childhood anxiety, knowledge of the development of anxious symptoms in children remains somewhat limited. Although the potential effectiveness of early interventions with children experiencing anxiety is now becoming recognized (Dadds et al., 1997), these efforts are being stalled by the current lack of knowledge about the nature of these problems in the early years of childhood and about the relative importance of various possible risk and protective factors. Detailed empirical knowledge of anxiety development in children is required to assist in the development of effective prevention and treatment efforts, for with a clearer understanding of the etiology of anxious symptoms, prevention and intervention strategies can be specific, cost-effective, and target those individuals at greatest risk (Manassis & Bradley, 1994).

Although knowledge of the development of anxiety remains limited, research is beginning to recognize the importance of this issue. As a result, several conceptual models now exist to explain the development of anxiety (Chorpita & Barlow, 1998; Manassis & Bradley, 1994; Vasey & Dadds, 2001). However, although these models are integrative and informative in many ways, they are only preliminary attempts at describing the development of anxiety, especially early anxiety in young children. Anxiety development is a complex process, and it is not likely that all anxiety develops through the same mechanisms, nor it is likely that key processes are identical at all stages of development. Thus, existing models do not cover the

entire range of possible processes involved in the development of anxiety, and additional models are possible. Clarification of and empirical support for important variables involved in the pathways to anxiety is now needed. Pathways leading to the early emergence of anxious symptoms in preschool children were focused on in the current study.

One approach to examining the development of anxiety in children is to focus on relevant risk and protective factors. Risk factors refer to variables whose presence predicts the onset, severity, and duration of psychopathology, while protective factors refer to variables that improve resilience to both risk factors and psychological disorder. These variables may be biological, environmental, or psychological in nature (Coie et al., 1993). Empirical research investigating the etiology of anxiety has identified a number of possible risk factors associated with childhood anxiety. Unfortunately, the search for protective factors involved in the development of anxiety in children has not been as intensive as the search for risk factors (Donovan & Spence, 2000). One particular risk factor, parental anxiety, was the focus of this study. Parental anxiety represents an especially promising area for research, as children of parents with an anxiety disorder are 3.5 times more likely to be diagnosed as having an anxiety disorder themselves when compared to children of parents without a psychiatric disorder, and they are more likely to develop an anxiety disorder than are children of parents with a depressive disorder (Merikangas, Avenevoli, Dierker, & Grillon, 1999). Furthermore, research has also shown moderate to strong specificity in the type of disorder found within a family (Rapee, 2002), suggesting that parental anxiety represents a specific risk for child anxiety rather than risk for psychopathology in general.

While there is considerable evidence for a familial link between parental and child anxiety (Turner, Beidel, Roberson-Nay, & Tervo, 2003), the mechanisms of transmission are not

well understood (Woodruff-Borden, Morrow, Bourland, & Cambron, 2002). As a result, it is not yet clear how parental anxiety operates to increase the risk for the emergence of early anxious symptoms in children. Factors other than genetics likely play a role in this pathway of transmission of risk and warrant increased attention (Turner et al., 2003; Woodruff-Borden et al., 2002). It is these factors that were focused on in the current study. Parenting represents one possible factor playing a role in the transmission of anxiety from parent to child, as parenting has not only been repeatedly emphasized as an important contributor to anxiety in children (Vasey & Dadds, 2001), but several differences in the interactions of anxious parents with their children have also been identified in comparison with nonanxious dyads (Turner et al., 2003). The presence of specific risk conditions in the child may add further dimensions to the complexity of the transmission of anxiety in families. Indeed, from a transactional perspective, it is likely that the role of the environment, including parental psychopathology and parenting behaviors, will be more critical given the presence of child risk conditions (Sameroff & Chandler, 1975), thus leading to more powerful pathways of influence.

Early developmental delay represents one particular child risk factor that may have important influences on the development of anxiety in children. Children with developmental disabilities are clearly at an increased risk for anxiety (Bregman, 1991), and families of these children experience increased stress, excessive caretaking demands, financial burden, and restrictions on leisure and social activities (Baker, Blacher, Crnic, & Edelbrock, 2002; Crnic, Friedrich, & Greenberg, 1983; Gunn & Berry, 1987; Rodrigue, Morgan, & Geffken, 1992). Relations among parental anxiety, parenting, and child anxiety, as well as the processes involved in the transmission of anxiety from parent to child, may operate differently in families of children with developmental delays when compared to families of typically developing children.

The differences are likely a function of the multiple risks involved as well as their effects on family functioning.

The current study aimed to extend understanding of the relations among parental anxiety, parenting, and child anxiety. There were two major aims of the current study. The first aim was to examine unique mechanisms of transmission of anxiety from mother to child across the preschool period by focusing on the mediating role of parenting specifically related to emotional experiences. Parenting behaviors traditionally associated with child anxiety, such as parental overprotection and control, were also examined as mediators of the relations between maternal and child anxiety. The second aim was to address the potential impact of a major risk factor by contrasting the processes in operation across the preschool period for children with developmental delays and for typically developing children. The specific relations examined were: 1) the effects of maternal anxiety on parenting, the mother-child relationship, and child anxiety across the preschool years; 2) the effects of parenting and the mother-child relationship on emerging child anxiety at age five; and 3) the role of parenting and the mother-child relationship as mediators of the relations between maternal anxiety at age three and child anxiety at age five among families of children with and without early developmental delays.

Transactional theory suggests that although the processes in operation may be similar for typically developing children and children with developmental delays, family context will be more critical for children under conditions of risk. Therefore, parental anxiety and parenting may be especially important determinants of child anxiety among children with developmental delays.

## Chapter II: Literature Review

### *Overview of Current Models of Anxiety Development*

As mentioned above, research is beginning to recognize the importance of better understanding the early development of anxiety in children, and as a result, several conceptual models have emerged to help explain this complex process. The failure of traditional models of childhood anxiety focusing on single variables and main effects to explain more than a fraction of the variance associated with anxiety in children has led to increased awareness that the development of anxiety is complex and multidetermined (Vasey & Dadds, 2001). Integrating evidence from a variety of psychological domains, including anxiety, helplessness, locus of control, parenting, attachment theory, and stress and resilience, Chorpita and Barlow (1998) presented a model that emphasizes the importance of early experience in the development of anxiety. More specifically, they suggested that early experience with an uncontrollable and unpredictable environment may foster a cognitive style characterized by a tendency to interpret and process events as out of one's control, which in turn, may subsequently represent a vulnerability for anxiety. Furthermore, while recognizing the potential importance of biological correlates of anxiety, such as increases in the behavioral inhibition system (BIS), corticotrophin releasing factor (CRF), and hypothalamic pituitary adrenocortical (HPA) activity, Chorpita and Barlow (1998) suggest that these correlates are influenced by psychological variables, specifically low perceived control. Taking a slightly different approach, Manassis and Bradley (1994) also proposed an integrated model for the development of anxiety. Their model is based partially upon research suggesting that the temperamental characteristic of behavioral inhibition is an initial predisposing factor for the development of anxiety. Attachment theory is then used to describe how this initial tendency can be exacerbated or ameliorated in the context of the

parent-child relationship. Like Barlow and Chorpita (1998), Manassis and Bradley (1994) also suggest that this relationship primarily influences the child indirectly through the internal working model that arises from it.

Although integrative and informative in many ways, these models are only preliminary attempts at describing the development of anxiety. Furthermore, while these models represent two possible pathways to the development of anxiety, it is not likely that all anxiety develops through the same processes and thus additional models are possible. The developmental psychopathology perspective provides a conceptual framework for the study of anxiety development in children that integrates findings from various disciplines and posits that both external, including familial and social-environmental, and internal, including genetic, temperamental, and cognitive, risk and protective factors contribute to the development of childhood anxiety (Manassis & Bradley, 1994; Vasey & Dadds, 2001). Furthermore, as mentioned above, the developmental psychopathology perspective also suggests that a single risk factor can have a variety of outcomes (multifinality) and that there are multiple pathways to the same outcome (equifinality). Thus, it is not likely that all anxiety develops through the same mechanisms and consideration of transactions between multiple variables across time is necessary to begin to unravel this complex process. The contributions of parental anxiety and parenting to the development of anxiety in young children was the focus of the current study.

#### *Parental Anxiety and Child Anxiety: Familial Aggregation*

Empirical research has repeatedly demonstrated a familial link between parental and child anxiety. For example, in one study, the life-time prevalence risk for all anxiety disorders was found to be 15% among the first-degree relatives of controls, 32% among the first-degree relatives of agoraphobic patients, and 33% among the first-degree relatives of individuals with

panic disorder (Woodruff-Borden et al., 2002). In another study of 59 children aged 4-12 (Turner et al., 1987), children of parents with an anxiety disorder were seven times more likely to be diagnosed as having an anxiety disorder themselves when compared to children of parents without a psychiatric diagnosis, and twice as likely when compared to children of parents diagnosed with dysthymia (Turner et al., 1987). In an additional study, children and adolescents (aged 4-20) of parents with panic disorder and agoraphobia were twice as likely to meet criteria for an anxiety disorder diagnosis than children of parents without a psychiatric diagnosis (Biederman, Rosenbaum, Bolduc, Faraone, & Hirshfeld, 1991). In a study of children with anxiety disorders, children with ADHD, and children without psychiatric diagnoses (Last, Hersen, Kazdin, Orvaschel, & Perrin, 1991), relatives of the children with anxiety disorders were found to have higher rates of anxiety disorders themselves when compared to the relatives of the other two groups (34.6 % vs. 23.5% and 16.3% for the ADHD and control groups, respectively).

Thus, the results from these studies clearly indicate a general familial element underlying anxiety. Interestingly, research has also shown moderate to strong specificity in the type of disorder found within a family (Rapee, 2002). However, these studies cannot identify whether this familial aggregation is due to environmental influences or to shared genes (Eley, 2001), nor can they describe the mechanisms by which these associations may be mediated. Biological models propose that constitutional variables, such as temperament or behavioral inhibition, account for this familial link. Research in this domain has repeatedly found behavioral inhibition to be more prevalent among children of patients with anxiety disorders than among children of psychiatric comparison subjects (Battaglia et al., 1997; Manassis, Bradley, Goldberg, Hood, & Swinson, 1995; Rosenbaum et al., 2000). In fact, compared to the 10-15% prevalence rate of behavioral inhibition found within normative samples (Kagan, 1994), the prevalence rate in a

group of children of adult anxiety disorder patients was found to be close to 85% (Rosenbaum et al., 1988). Neuropsychological conceptualizations of anxiety further support biological models of anxiety transmission. According to Gray's neuropsychological model of brain functioning (1982), activity in the Behavioral Inhibition System (BIS) is associated with anxiety, as well as inhibition (Oosterlaan, 2001). The BIS is sensitive to novel stimuli, as well as signals of punishment and nonreward. It serves to inhibit behavior, increase attention to the environment, and increase arousal. The BIS produces, in addition to other things, withdrawal and avoidance in response to novelty. Activity in the BIS is associated with anxiety, and overfunctioning of the BIS is linked with pathological anxiety (Oosterlaan, 2001). Therefore, the BIS appears to mediate behaviors associated with both temperamental inhibition and with anxiety, thus providing a possible neuropsychological basis for the transmission of anxiety within families. Although promising, empirical research examining the BIS as it relates specifically to anxiety transmission remains limited, and further research in this domain is needed.

Designs such as twin and adoption studies have also become more prominent over the past decade in order to begin to answer questions related to genetic versus environmental transmission of anxiety. One clear finding from these studies is that, although there is a genetic influence on anxiety in childhood that seems to account for about one-third of the total variance (Eley, 2001; Fyer, 1993; Kendler, Neale, Kessler, Heath, & Eaves, 1992), there are also significant environmental influences on anxiety in childhood. These studies have also shown that the genetic component in anxiety disorders appears to be largely general across several anxiety disorders as well as mood disorders and eating disorders (Eley, 1997). However, most studies of familial anxiety indicate relatively specific links within families for specific disorders, thus suggesting that environmental factors are not only involved in the association between

parental and child anxiety, but may influence the specificity of the relationship (Eley, 1997). In addition, the fact that not all children of parents with an anxiety disorder go on to develop anxious symptoms themselves also implicates an important role for the environment. Although these children are at a greater risk for developing anxious symptoms when compared to children of parents without an anxiety diagnosis, consistent with the principle of multifinality, there is marked divergence in outcomes for these children. Therefore, it is critical to examine those environmental variables that may contribute to the familial transmission of anxiety by mediating the relations between parental and child anxiety. Doing so will allow us to design more specific and effective prevention programs to target populations at risk and counter the potentially detrimental effects of parental anxiety on children. Parenting represents one possible factor playing a role in the transmission of anxiety from parent to child, as parenting has not only been repeatedly emphasized as an important contributor to anxiety in children (Vasey & Dadds, 2001), but several differences in the interactions of anxious parents with their children in comparison with nonanxious dyads are beginning to emerge (Turner et al., 2003).

### *Parenting and Child Anxiety*

There is a vast literature describing the important role parenting characteristics play in children's development and overall adjustment, including the development of anxiety. Overall, studies that have examined the relations between parental behavior and affect and childhood anxiety suggest that parents of anxious children often behave in ways that increase the likelihood of their child responding in an anxious manner (Donovan & Spence, 2000). Many different aspects of parenting have been suggested to affect anxious symptoms in children, although it remains unclear which of these factors might be most important, either alone or in interaction with other risk factors. Furthermore, previous research linking parenting and anxiety has

unfortunately been characterized by a lack of consistency in methods, measures, and theory (Rapee, 1997), often making it difficult to draw clear conclusions.

Parental overprotection or control, parental insensitivity, rejection, or lack of warmth, and parental modeling of anxious behaviors represent three dimensions that have been repeatedly suggested as possible risk factors for the development of anxious symptoms in children (Donovan & Spence, 2000). The construct of overprotection or control is generally operationalized as involving excessive parental involvement in controlling the child's environment in order to minimize aversive experiences for the child (Parker, 1983). These anticipated experiences may not represent actual threats to the child, however, and thus overprotection may not appreciably limit exposure to aversive situations. It is, however, likely to narrow the range of behaviors the child is exposed to or constrain the child's ability to manipulate and engage the environment independently (Parker, 1983). This is hypothesized to affect children's perceptions of mastery over the environment, which subsequently creates a cognitive bias characterized by perceiving events as out of one's control. The construct of rejection is generally operationalized as involving low warmth and unresponsive parenting (i.e., low sensitivity, low responsiveness, lack of acceptance of child's feelings and behaviors, and lack of praise). It has been suggested that this parenting may teach the child that his or her actions are inconsequential and do not influence the environment (Parker, 1983). Furthermore, it is also thought that parents who fail to demonstrate acceptance of children's negative emotions and criticize or minimize children's expressions of negative affect increase children's sensitivity to anxiety by hindering the development of emotion regulation and the ability to learn to tolerate negative affect (Gottman, Katz, & Hooven, 1997). The construct of modeling anxious behaviors is generally operationalized as conveying to children that problems are unsolvable or dangerous

and extinguishing expressions of coping or problem-solving (Whaley, Pinto, & Sigman, 1999). It is thought that this parenting may teach the child that there is no effective way of coping with problems, thus hindering the development of strategies to manage anxiety.

Research comparing anxious and nonanxious participants (usually adults) on their retrospective perceptions of their parents' childrearing styles (Bruch & Heimberg, 1994; Laraia, Stuart, Frye, & Ballenger, 1994; Rapee, 1997; Silove, 1986) consistently indicated that anxious subjects perceived their parents as having been both more rejecting and more controlling and protecting than did nonclinical subjects. Furthermore, greater anxiety was typically associated with reports of higher levels of parental control and rejection. However, it is necessary to keep in mind that these studies were almost exclusively based on retrospective self-reports of adults, who for the most part had been free from strong parental influence for quite some time. In addition, current anxiety may have created reporting biases among these adults, thus leading to inaccurate recollections of their early environment.

Additional studies examining links between parenting and anxiety have administered questionnaires directly to children and adolescents, or to their parents, and the results appear to be consistent with those described above (Rapee, 1997). For example, one study examined children from the general population ages 9-14 years who were diagnosed as having or not having an anxiety disorder using a structured clinical interview (Stark, Humphrey, Crook, & Lewis, 1990). Results indicated that anxious children reported their families as being significantly lower on cohesion (perhaps related conceptually to insensitivity and rejection) and higher on enmeshment (perhaps related conceptually to overprotection and control) than did nonclinical children. These families were also less open to expression and engaged in greater conflict and fewer pleasant activities. Similar results have also been reported by Rubin and Mills

(1990), who found that mothers of withdrawn 4-year-old children were significantly more likely than mothers of either aggressive or “average” children to report using power-assertive, directive, or coercive strategies with their children. Furthermore, significant positive relations have been found between anxious rearing behaviors and parental control, on the one hand, and anxiety disorders symptomatology on the other hand, as reported by children aged 8-12 years (Muris & Merckelbach, 1998).

Further support for links between parenting and anxiety comes from the work of Messer and Beidel (1994), who studied the psychosocial and environmental correlates of childhood anxiety disorders in a sample of third- through sixth-grade children. With respect to family environment, their results indicated that anxiety-disordered children described their environment as less promoting of independence than test-anxious only or normal controls did. Thus, the results of several studies converge to suggest that parental control or protection, as well as parental insensitivity or rejection, may be related to anxious symptoms in children. Once again, however, it is necessary to keep in mind that these studies are limited by their sole reliance on self-report measures and by their correlational designs, which preclude causal inferences.

Several observational studies similarly examining the relations between parenting behaviors and anxious symptoms in the child have also been conducted, and although fewer in number, these studies are generally more robust in methodology. In one study, Krohne and Hock (1991) observed interactions between 47 mother-child dyads (with children aged 10-13 years) while they engaged in a complex cognitive task (putting together a difficult puzzle-like cube). Prior to these interactions, participants were divided into a high-anxious and a low-anxious group using a median split of scores on both the parent and the child versions of the State-Trait Anxiety Inventory, and differing patterns of interactions were subsequently observed between the two

groups. Results indicated that mothers of high-anxious girls were more restrictive and controlling than mothers of low-anxious girls. However, this effect was not demonstrated for boys (Krohne & Hock, 1991). Based upon these findings, Krohne and Hock (1991) suggested that parental overcontrol tends to interfere with children's acquisition of effective problem-solving skills, resulting in a failure to learn to deal successfully with stressful life situations. Parental overcontrol has also been suggested to undermine children's beliefs in their ability to succeed in challenging situations, thus producing low expectancies for success and low self-efficacy for problem-solving (Krohne & Hock, 1991). Similarly, in a study conducted by Hudson & Rapee (2001), clinically anxious and nonclinical children (mean age 10.5 years) were asked to solve complex cognitive puzzles and mothers were instructed to help "only if your child really needs it." Results indicated that mothers of children with anxiety disorders gave more help and were more intrusive with their help during the task than mothers of nonanxious children. In a follow-up study using the same methodology, mothers of anxious children were more involved and intrusive during interactions with both the anxious child as well as the sibling of the anxious child. This suggests that maternal behavior may at least partially be a characteristic of the mother rather than purely a reaction to the anxious child (Rapee, 2002).

In related research conducted by Dumas, LaFreniere, and colleagues (Dumas & LaFreniere, 1993; Dumas, LaFreniere, & Serketich, 1995; LaFreniere & Dumas, 1992), mother-child interactions in dyads involving socially competent, average, aggressive, and anxious preschoolers were observed in a laboratory setting and compared with one another on various parenting dimensions and interaction styles. Preschool children were classified as either socially competent, average, aggressive, or anxious-withdrawn based upon teacher ratings, and mother-child interactions during a problem-solving task were subsequently observed. Results indicated

that anxious-withdrawn children expressed more negative affect than the other children and that the mothers of these children failed to reciprocate positive affect or behavior, engaged in a high degree of negative reciprocity and superfluous, coercive control, and were aversive in response to compliance and noncompliance (Dumas & LaFreniere, 1993; Dumas et al., 1995; LaFreniere & Dumas, 1992). Furthermore, when children completed the same problem-solving task with an unfamiliar mother, anxious-withdrawn children generally responded to unfamiliar mothers by ignoring or actively rejecting their overtures, while mothers of anxious children were positive and reciprocal towards unfamiliar children, unlike they had been with their own children (Dumas & LaFreniere, 1993). Consistent with results described above, these results suggest that the interactions between anxious children and their mothers are negative and insensitive and that the power shift favors the mother almost exclusively, leaving the child with insufficient opportunities to assert a developmentally appropriate degree of autonomy. It is necessary to keep in mind, however, that these studies are limited by their correlational nature and by the fact that they focus on a relatively brief sequence of interaction, rather than on the development of such an interaction over time.

In an attempt to address these limitations, LaFreniere and Capuano (1997) subsequently conducted an indicated preventive intervention in order to clarify the direction of effect. Anxious-withdrawn preschool children and their mothers were divided into treatment and control groups, with the treatment group participating in a 20-session intervention program. The goals of this program were to increase the mother's understanding of the developmental needs of the preschool-aged child, promote parenting competence in terms of sensitivity to these needs, alleviate parenting stress, and provide social support. The results of this study indicated that, immediately following this intervention, mothers in the treatment group moderated their level of

control to a more appropriate, less intrusive level, while children in this group showed a decrease in anxious-withdrawn behaviors (LaFreniere & Capuano, 1997). This illustrates the potentially powerful effects that parenting practices can and do have on a child's behavior.

An additional line of research has examined more specifically ways in which parents of anxious children model, prompt, and reinforce anxious behaviors in their children. In one study, participants were presented with ambiguous situations requiring them to generate interpretations and behavioral plans (Chorpita, Albano, & Barlow, 1996). The influence of parents on children's interpretations was assessed by administering the Ambiguous Situations Questionnaire (ASQ) before and after a family discussion of the situations. Results indicated that anxious children were more likely than control children to devise avoidant solutions after a family discussion (Chorpita et al., 1996). Results consistent with this were also found in a similar study conducted by Barrett, Dadds, Rapee, and Ryan (1996). Using an almost identical procedure, these authors also demonstrated that anxious children and their parents make relatively high numbers of threat interpretations and, therefore, choose avoidant solutions when faced with ambiguous hypothetical social problems. Furthermore, after asking families to discuss with their child how they should deal with ambiguous situations, anxious children were more likely than control children to devise an avoidant solution following this family discussion. More detailed analyses of these family discussions also indicated that parents of anxious children were more likely to reciprocate avoidant solutions and less likely to encourage pro-social solutions compared with parents of nonclinical and aggressive children (Barrett et al., 1996). Similarly, in a study by Suveg and colleagues (Suveg, Zemon, Flannery-Schroeder, & Cassano, 2005), mothers of children with anxiety disorders were found to speak less frequently, use fewer positive emotion words, and discourage emotion discussions in interactions with their children.

Thus, together these results indicate that perhaps parents of anxious children differ from other parents in the way they teach their children to interpret and respond to ambiguous threat cues (Woodruff-Borden et al., 2002). This may lead to the development or maintenance of fear or anxiety through parent-child interactions and the way in which the household functions. Parental socialization has been identified as a key mechanism through which children develop skills necessary to function in emotionally competent ways, and thus parents of anxious children likely play an integral role in the expression of anxiety in their children. As discussed below, whether or not similar relations exist when the anxious individual is the parent rather than the child is only beginning to be understood.

Theories of conditioning and vicarious learning are also relevant to the current discussion of parenting factors associated with child anxiety. Support for the widely held assumption that fears and anxiety can be acquired through conditioning or following observation of a fearful model comes mainly from animal studies and retrospective reports of adults regarding the source of their fears (Merckelbach, deJong, Muris, & van den Hout, 1996). These results have been shown for specific fears as well as for general anxiety disorders, such as social phobia and panic disorder, and they have been reported in both adult and child populations (Ollendick & King, 1991). It is necessary to keep in mind, however, that these studies are limited by their sole reliance on self-report measures and retrospective recall and by their correlational designs, which preclude causal inferences. A more recent observational study examined the acquisition of avoidance behavior in 15- to 20-month-old toddlers through exposure to negative expressions from their mothers in novel situations (Gerull & Rapee, 2002). Results indicated that toddlers showed greater avoidance when their mother's affective expression was negative than when it was positive.

In sum, there has been quite a bit of empirical research linking parenting characteristics to anxious symptoms in children. The majority of this research has focused on overprotection or control and insensitivity or rejection, as well as ways in which parents may model or reinforce anxiety in their children. Although much of this research has been limited by the exclusive reliance on retrospective or self-report data, observational studies have also emerged supporting similar relations between parenting and child anxiety. As mentioned above, although familial aggregation of anxiety is apparent, the mechanisms of anxiety transmission within families are not clear. Thus, these parenting characteristics that have established relations to child anxiety represent possible mediating variables to examine in the transmission of anxiety from parent to child. Not only will this provide a better understanding of anxiety development in young children, but it will also help determine whether these parenting practices are risk factors for anxiety that are independent of parental anxiety or whether they are themselves associated with parental anxiety.

#### *Parental Anxiety and Parenting*

Despite clear links between parental anxiety and child anxiety and between parenting and child anxiety, research is only beginning to assess the parenting of adults with anxiety disorders and the ways in which these adults interact with their children (Woodruff-Borden et al., 2002). In one study, parenting among mothers of 7- to 14-year-old children during structured conversations was assessed (Whaley et al., 1999), and results indicated that anxious mothers granted less autonomy, displayed less warmth, and engaged in more catastrophizing and criticism in interactions with their children, whether or not their children had an anxiety disorder, than nonanxious mothers. Consistent with results discussed previously, 50% of the children of anxious parents also had an anxiety disorder. These results suggest that maternal anxiety does

indeed manifest itself in the way in which mothers interact with their children. In a similar study conducted by Woodruff-Borden, Morrow, Bourland, and Cambron (2002), anxious parents and their children (aged 6-12) interacted in two mildly stressful tasks (working on unsolvable anagrams and preparation of a speech followed by delivery of speech). Anxious parents were found to be significantly less engaged and more withdrawn and disengaged during interactions with their children when compared to parents with no present or past diagnosis. There was also a trend towards more negative interactions between dyads with an anxious parent. In addition, although no differences in overall levels of control were found, anxious parents exhibited significantly more control in response to children's display of negative affect (Woodruff-Borden et al., 2002). These results were interpreted as suggesting that perhaps anxious parents tend to withdraw from interactions, leaving their children to cope and struggle through the situation on their own, until expressions of children's negative affect, at which point they may exert excessive control in the interaction. Furthermore, children's expressions of negative affect were interpreted as being uncomfortable for anxious parents and thus attention becomes focused not on the child's needs but rather on decreasing the affect to alleviate parental discomfort (Woodruff-Borden et al., 2002). These are interesting hypotheses that warrant future research attention. Whether or not these relations are specific to anxiety is also a critical issue for future work.

In an additional study, panic-disordered mothers were observed in interactions with their four-month-old infants (Warren et al., 2003). Results indicated that panic-disordered mothers behaved less sensitively with their infants when compared to mothers without a psychiatric diagnosis who were observed in the same situations. Furthermore, in another study of observations of parents' behaviors during a routine non-conflictual play task with their children

(aged 7-12) (Turner et al., 2003), results indicated that although anxious parents did not restrict their child's behaviors and were not more critical, they did report higher levels of distress in response to their child's behaviors. Furthermore, the emotional climate in families with an anxious parent differed significantly from that of families without an anxious parent such that families with an anxious parent were lower on expressiveness and cohesion (Turner et al., 2003). Consistent findings were reported in an additional study exploring the role of perceived parenting behavior in the relation between parent and adolescent anxiety in a high-risk sample (McClure, Brennan, Hammen, & Le Brocque, 2001). In this study, although maternal anxiety did predict the presence of anxiety disorders in children, there was no support for the mediating role of Psychological Control in the association between maternal and child anxiety. More specifically, although maternal Psychological Control predicted child anxiety disorders, maternal anxiety did not significantly predict ratings of Psychological Control. In addition, children of mothers with depressive disorders alone were not at significantly greater risk for developing anxiety disorders, supporting specificity in the transmission of anxiety (McClure et al., 2001).

Although our understanding is far from complete, these studies support important differences in the parenting and dyadic interactions of anxious parents when compared to nonanxious parents. Interestingly, general differences between anxious and nonanxious parents on constructs that have received a great deal of attention in the literature linking parenting and child anxiety, such as parental control or overprotectiveness, are not as apparent. Rather, differences in parental affect and in parental responses to children's negative affect seem to emerge, and although clear patterns are not yet identifiable, this seems to be a promising area for future research. Perhaps the transmission of anxiety from parent to child occurs at the affect level, with subtle negative affect suggesting apprehension and fear and parental affective

responses influencing the development of anxiety over time (Turner et al., 2003). This is consistent with conditioning and vicarious learning theories of anxiety development discussed above and suggests that perhaps the young child of an anxious parent has greater opportunity to learn about threat and avoidant coping than the child of a nonanxious parent. The longitudinal design of the current study allowed these questions to be addressed.

### *Child Risk Status*

The presence of specific risk conditions in the child may add further dimensions to the complexity of anxiety transmission in families. Indeed, from a transactional perspective, it is likely that the role of the environment, including parental psychopathology and parenting, will be more critical given the presence of risk in the child (Sameroff & Chandler, 1975), thus leading to more powerful pathways of influence. This perspective recognizes that a more complete understanding of the processes involved in the development of psychopathology is likely to be achieved by recognizing factors unique to the child and their interaction with family and environmental factors. In support of this, Crnic and Greenberg (1987) found that family factors accounted for 40-60% of the variance in the social and behavioral outcomes of high risk infants, but only 15-20% for normally developing infants. Similarly, Ball and Pianta (1993) found that the relation between maternal support network size and maternal competence in interactions with their children was stronger in high-risk groups than in low-risk groups. Numerous possible child risk factors are relevant to this discussion and likely interact with environmental variables to influence child development. For example, parenting strategies are found to operate differently for children with varying temperaments (Kochanska, 1995), such that the relations between discipline techniques and behavioral and emotional outcomes is moderated by child temperament. In addition to temperament, self-regulatory ability represents another child factor

that likely interacts with environmental variables to influence development (Cole, Michel, & Teti, 1994). It is reasonably well-established that self-regulatory abilities underlie the development of competence, while dysregulation underlies the development of psychopathology in early childhood (Cole et al., 1994).

Early developmental delay represents one particular child factor that may have important influences on the development of anxiety in children. Despite variability in prevalence estimates, children with developmental disabilities are four to five times more likely to have psychiatric disorders, including anxiety, than children without disabilities (Pfeiffer & Baker, 1994). In fact, as many as 40% of children with an intellectual disability suffer from an emotional or behavioral disorder (Ciechomski, Jackson, Tonge, King, & Heyne, 2001). Examining prevalence estimates more specifically for different age groups and individuals with different levels of functioning, especially high rates of psychopathology are found for children aged 5-17, with the highest rates occurring among children with mild to moderate mental retardation (Jacobson, 1990). This co-morbidity of any level of mental retardation and one or more mental disorders is referred to as dual diagnosis (APA, 1994). The majority of research over the past few decades with this population has been epidemiological in nature (Dykens, 2000). However, with this foundation in place, research is now calling for investigations of why children with developmental delays are at an increased risk for psychopathology and how these maladaptive behaviors develop over time (Dykens, 2000).

Family processes, including parenting, may be critical for the emergence of psychiatric disorders in children with developmental delays. Families represent children's primary developmental context for much of their early life, and family processes have repeatedly been shown to play an important role in the development of psychopathology and competence,

including anxiety, in young children without disabilities (Rapee, 1997). Furthermore, there is also a substantial body of literature examining families of children with developmental delays. Overall, these families experience increased stress, excessive caretaking demands, financial burden, and restrictions on leisure and social activities (Baker et al., 2002; Crnic et al., 1983; Gunn & Berry, 1987; Rodrique et al., 1992), likely influencing parental affect and behaviors. Heightened levels of stress are especially apparent in domains related to child rearing, as research has consistently found higher child-related stress in families in which a child has a disability, and this has been demonstrated across different types of disabilities (Baker, Blacher, Kopp, & Kraemer, 1997). Mothers in particular have also reported concerns related to schooling, medical procedures, and independent functioning in the future (Floyd & Gallagher, 1997). In addition, there is evidence of more dyadic conflict and less dyadic pleasure for developmentally delayed children in interactions with both mothers and fathers when compared to typically developing children (Crnic, Gaze, & Hoffman, 2001).

Evidence of increased risk for parental psychopathology or marital difficulties among families of children with developmental delays has been mixed, likely due to methodological limitations of this research (Stoneman & Berman, 1993). There is some evidence, however, that parental depression is increased within these families. For example, Veisson (1999) found that mothers of children with intellectual disabilities experienced significantly more symptoms of depression than both fathers of children with disabilities and parents of typically developing children. A study of Latina mothers of children with mental retardation similarly revealed elevated levels of parental depression, with almost half of these mothers reporting symptoms in excess of a cut-off commonly used to signify the presence of depressive symptomatology (Blacher, Shapiro, Lopez, Diaz, & Fusco, 1997). Parents of children with disabilities have also

been found to report higher levels of negative emotions compared with parents of typically developing children (Veisson, 1999).

In sum, it is clear that further research examining the development of psychopathology, including anxiety, among children with developmental delays is warranted. Although these children are clearly at an increased risk for psychopathology, knowledge of the pathways of development is limited. Furthermore, the research reviewed in this section suggests that families of these children differ from families of typically developing children in a number of important ways and that the impact of family processes on child development may be more critical given the risk apparent within the child. Although the majority of the research reviewed did not directly address anxiety development, it does suggest that perhaps the relations among parental anxiety, parenting, and child anxiety, as well as the processes involved in the transmission of anxiety from parent to child, may operate differentially in families of children with developmental delays when compared to families of typically developing children.

*Parent and Child Risk, Parenting, and the Emergence of Child Anxiety: The Current Study*

It seems apparent that anxiety aggregates in families and that certain parenting characteristics are associated with child anxiety. However, research is only beginning to investigate the parenting of anxious adults and the mechanisms of transmission of anxiety within families. Results of recent investigations have provided some indications that perhaps the transmission of anxiety from parent to child occurs at the affect level, either through more overt parenting behaviors related to emotional expression, through modeling and communication of chronic negative affect, wariness, and fear, or through the affective tone of the parent-child relationship. Thus, examining those parenting behaviors and characteristics related to emotional experiences is a promising area for future research. Maternal anxiety and parenting were the

focus of the current study, as the majority of previous research in this domain has focused specifically on mothers and thus relations between parental anxiety, parenting, and child anxiety are less well-known for fathers. The current study extended previous research by focusing on the mediating role of parenting specifically related to emotional experiences in the transmission of anxiety from mother to child. As this research is only in its infancy, parenting behaviors more traditionally associated with child anxiety were also examined as possible mediators of the relations between maternal and child anxiety and contrasted with hypotheses focusing on parenting related to emotional experiences. Furthermore, this study extended previous research by examining these pathways longitudinally during the preschool years, when we first begin to see the emergence of psychopathology. In addition, anxious symptoms, rather than anxiety disorders per se, were focused on. As the outcome point of interest was child anxiety at age five, diagnosable anxiety disorders were expected to be limited. However, significant individual variation in anxious symptoms was expected, with individual differences representing risk for the later development of anxiety disorders. The focus on anxious symptoms also allowed for an examination of processes involved in the early emergence of anxiety, rather than the more typical focus on processes in operation once pathological levels of anxiety are already present. Lastly, the proposed study examined how these processes operate given risk in the child.

There were two major aims of the proposed study. The first aim was to examine unique mechanisms of transmission of anxiety from mother to child across the preschool period by focusing on the mediating role of parenting specifically related to emotional experiences and contrasting these hypotheses with hypotheses related to the mediating role of parenting behaviors more traditionally examined in the child anxiety literature. The second aim was to address the potential impact of a major risk factor by contrasting the processes in operation across the

preschool period for children with developmental delays and for typically developing children. It was predicted that, while the processes will operate similarly for both groups of children, the pathways of influence will be more powerful among families of developmentally delayed children. Within the major study aims, three relations were of particular interest. First, the current study examined the effects of maternal anxiety on parenting (including maternal positivity, maternal negativity, and maternal emotional scaffolding, as well as maternal intrusiveness), the mother-child relationship (both pleasure and conflict), and child anxiety across the preschool period. It was expected that higher maternal anxiety at age three would be predictive of less positivity, more negativity, and poorer emotional scaffolding at age four. Higher maternal anxiety was also expected to be predictive of more mother-child conflict and less mother-child pleasure at age four, as well as higher child anxiety at age five. However, relations between maternal anxiety at age three and maternal intrusiveness at age four were not predicted. Next, the current study also examined the effects of parenting and the mother-child relationship on emerging child anxiety. It was expected that lower positivity, higher negativity, higher intrusiveness, poorer emotional scaffolding, more conflict, and less pleasure at age four would be predictive of higher child anxiety at age five. In addition, the current study examined the mediating role of parenting and the mother-child relationship at age four in the relations between maternal anxiety at age three and child anxiety at age five. It was expected that support for mediational relations involving maternal positivity, negativity, emotional scaffolding, and dyadic pleasure and conflict would be found. Support for mediational relations involving maternal intrusiveness was not expected.

The current study expanded upon previous research in several important ways. It employed a longitudinal, prospective design that allowed for causal inferences to be made. The

current study also recognized the importance of toddlerhood as the context for the emergence of initial anxious symptoms, thus focusing efforts on the early development and precursors of anxiety rather than correlates once anxiety has already emerged. Additionally, the current study attempted to examine mechanisms of anxiety transmission within families and move from simply demonstrating that relations exist to increasing understanding of how and why these relations exist. A combination of observational and self-report measures was utilized, thus avoiding the potential biases inherent in relying solely upon self-report measures. Lastly, comparisons between children with developmental delays and typically developing children added a further dimension of complexity to the study of anxiety development and recognized that a more complete understanding of the processes involved in the development of psychopathology is likely to be achieved by recognizing factors unique to the child and their interaction with family and environmental factors.

### Chapter III: Method

#### *Design Overview*

Data for the current study were drawn from an on-going multi-site, longitudinal investigation of the interrelations among children's developmental status, family processes, and the emergence of psychopathology in young children aged three to nine years (The Collaborative Family Study). More specifically, the larger study focused on the multiple processes involved in the emergence of dual diagnosis in young children. Data for this larger study were collected using a multimethod approach involving questionnaires, interviews, and independent observations in naturalistic and lab-based settings. In addition, children's cognitive abilities were assessed at entry into the study at age three, and again at ages five and nine. The current study utilized longitudinal data collected during naturalistic observations, lab-based observations, and questionnaires when the child was three to five years old and included both typically developing children as well as children with developmental delays.

#### *Participants*

The participants of the current study were 209 children and their families. As described above, these participants were part of the Collaborative Family Study and included both families with typically developing children ( $n = 127$ ) and families with children with developmental delays ( $n = 82$ ). Children were classified as having developmental delays if their Mental Developmental Index (MDI) scores on the Bayley Scales of Infant Development (BSID-II) (Bayley, 1993) at age three were lower than 75 and were classified as typically developing if their MDI scores were greater than 85. Participants of the larger study were recruited from community agencies, such as family resource centers, early intervention programs, preschools, and daycare centers, as well as via flyers in the community. Approximately one-third of the

families were from a rural/suburban community in Central Pennsylvania, and two-thirds of the families were from the Los Angeles area. This multi-site design allowed for a more geographically and ethnically diverse sample. Ethnicity was representative of the populations at each site (see Table 1). Exclusionary criteria for the larger study included: neurological impairment (e.g. cerebral palsy), autism, and history of abuse. Additional demographic information on the participants is presented in Table 2.

Table 1

## Participant Ethnicity Across Sites

	African-American	Asian	Caucasian	Hispanic	Other
Child Ethnicity	6.8%	2.7%	60.3%	16.4%	13.8%

Table 2

## Participant Demographics

	Percentage of Families
Child is male	58.0%
Child is female	42.0%
Child has at least one sibling	71.9%
Average Maternal Age	33.5
Average Paternal Age	36.4
Mother has a Bachelor's degree or higher	47.5%
Father has a Bachelor's degree or higher	53.2%
Median family income	\$50,000 – \$70,000
Annual family income $\leq$ \$15,000 (lowest category)	9.6%
Annual family income $\geq$ \$95,000 (highest category)	16.0%

*Procedure*

*Initial assessment.* Once identified as potential participants for the larger scale investigation, families were contacted by phone and an initial appointment at the home was scheduled for when each child was approximately three years old. During this initial home visit, a trained graduate student experimenter first explained the purposes of the study and the family's participation and role over the following few years. The Bayley Scales of Infant Development (BSID-II) (Bayley, 1993) was next administered, from which the child's Mental Development Index (MDI) was calculated and used to determine whether the child met criteria for inclusion in the developmentally delayed (DD) group or the typically developing (TD) group. In addition,

demographic information was obtained during this initial visit. This information included family members' ethnicity, socioeconomic status, education level, employment status, marital status, and health history. Also, mothers and fathers were each given a booklet containing 13 questionnaires to assess overall child functioning, family functioning, parental attitudes and beliefs, and the parent-child relationship. They were asked to complete the questionnaires independently and return them by mail to the study.

Following this initial visit, a home observation session and an hour-long laboratory session were next scheduled for when each child remained approximately three years old. Home observations were subsequently conducted every six months between the child's third and fifth birthdays, and lab visits were scheduled yearly around the time of the child's birthday. For this study, only data collected from the parent questionnaires when each child was approximately three years old, from home and lab-based observations when each child was approximately four years old, and from interview and parent questionnaires when each child was approximately five years old were utilized.

*Laboratory visits.* Each family was reimbursed \$20 for their participation in lab visits. During these visits, structured mother-child interactions across various contexts designed to assess child regulatory behavior and parenting characteristics were observed. Lab visits were conducted in a small room containing a couch, a small table with two chairs, a locked toy cabinet, and a one-way mirror with curtains. Mothers and children were guided through a series of activities by a trained graduate student experimenter. Lab sessions were videotaped for later coding of child and maternal behaviors. All lab visits followed a standardized protocol outlined in a lab manual that contained an experimenter script and a description of each lab activity. Again, the current study utilized data collected from the lab visit when each child was

approximately four years old. This visit was comprised of seven activities, all of which involved both the mother and the child. These activities included: free-play with age appropriate toys (10 minutes), a clean-up task (3 minutes), an “easy” problem-solving task (2 minutes), a “medium” problem-solving task (3 minutes), a “difficult” problem-solving task (5 minutes), snack time (5 minutes), and a wait task (3 minutes). The problem-solving and wait tasks were designed to elicit child frustration and create a context for maternal scaffolding. The three problem-solving tasks were a series of puzzles of increasing difficulty. The “easy” task was designed to be completed by children with minimal help from their mothers, the “medium” task was designed to be completed with help from their mothers, and the “difficult” task was designed to be impossible to complete individually and even challenging to complete with substantial help from their mothers. Mothers were instructed to first let their child attempt each task on his or her own, and subsequently provide whatever help they thought was needed for the child to successfully complete the task. To create comparable situations across developmental groups, children with developmental delays were given simpler versions of the problem-solving tasks appropriate to their mental age. During the wait task, children were presented with a wrapped present and instructed not to open the present until the experimenter returned to the room. Mothers remained in the room with the child, but were given a series of questionnaires to complete. A similar design has been used in several studies addressing mother-child interactions (Greenberg, Carmichael-Olson, & Crnic, 1992; Kasari, Freeman, Mundy, & Sigman, 1995). In addition, following the structured lab visit when each child was five years old, mothers were also administered the Diagnostic Interview Schedule for Children (DISC; Costello, Edelbrock, & Costello, 1985). Data from this interview were also utilized in the current study.

*Home visits.* Home visits were scheduled for a time when the entire family would be present, typically in the evening around dinnertime. Families were reimbursed \$20 for their participation in the home visit. At the beginning of the visit, each parent completed measures of daily hassles and current mood. Subsequent to this, trained graduate students observed interactions among children and their parents for an hour and a half. Observations were conducted in ten-minute segments, each followed by a five-minute period during which observers rated maternal, paternal, and child behavior, as well as dyadic interactions. The family was instructed to act as they normally would. The present study utilized observations of maternal behavior and mother-child interactions from the home visit when the child was four years old.

#### *Measures*

*Parental anxiety at age three.* As part of the packet of questionnaires completed when the child was three years of age, mothers completed the Symptom Checklist (SCL-35) (Derogatis, 1992). The SCL-35 is a 35-item measure that assesses psychological symptomatology across dimensions of anxiety, depression, hostility, somatization, and interpersonal relatedness. A total severity score as well as domain specific scores can be derived. The Anxiety Scale was of interest in the current study.

*Parenting at age four.* Observational data of parenting and mother-child interactions was taken from both the home observation and the lab visit at age four. For home observations, the experimenter rated child and parent interactions using the Home Observation Coding System (Belsky, Crnic, & Woodworth, 1995). As described above, ratings of individual and dyadic behavior were made after each of six ten-minute observations. Each rating sequence consisted of 26 items, which were rated on a five-point scale ranging from 1 (low) to 5 (high). These

included: 6 maternal items, 6 paternal items, 6 child items, 6 dyadic items, and 2 items assessing parent-child opportunity for interaction. Observers were trained by watching videotaped home observations and by attending live home observations with an experienced observer until reliability was established (defined by over 70% exact agreement and 95% agreement within one with the master coder). To maintain cross-site reliability, a master coder was designated at each site. Reliability was collected regularly within site and across sites using videotapes, as well as using live home observations for within-site reliability. Kappa for within-site reliability at the two sites (Los Angeles, Central Pennsylvania) was .61 and .59, respectively, and for across-site reliability was .64, levels that are considered within acceptable standards (Fleiss, Cohen, & Everett, 1969). The current study focused on maternal positivity, negativity, and intrusiveness, as well as pleasure and conflict in the mother/child dyad. Maternal positivity was characterized by displays of positive regard, warmth, and affection for the child, including both words and expressions. Maternal negativity was characterized by displays of negative regard and hostility for the child, including both words and expressions. Interactions that were adult-centered, where the mother imposed her own agenda on the child characterized maternal intrusiveness. Dyadic pleasure included mutual interest and enjoyment in interactions, while dyadic conflict included mutual negativity or arguing in interactions (see Appendix).

Additional observational data was taken from the lab visit when the child was four years of age. Specifically, maternal emotional scaffolding, rated using the Scaffolding Coding System (Maslin-Cole & Spieker, 1990), was of interest in this study. Maternal emotional scaffolding was rated on a five-point scale ranging from 1 (low) to 5 (high) separately during five tasks: the clean-up task, the three problem-solving tasks, and the delay of gratification task. Coding was done from videotapes by a team of undergraduate research assistants supervised by a graduate

student, who was designated as the master coder. All coding was done in pairs, with final codes representing a consensus between the coders. Reliability was assessed by double-coding approximately 20% of the videotapes, and reliability was maintained at an average Kappa of .6 or higher. Emotional scaffolding was characterized by mothers' ability to make the experience a positive one for the child and one that contributes to the child's sense of self-efficacy. Effective emotional scaffolding included: acceptance of and support for the child's attempts, including explicit praise, even if the attempts were only partially correct or incorrect, sensitivity to the child's emotional state (including attempts to reduce distress), and signs of affective sharing and attunement (see Appendix).

*Child anxiety at age five.* Two sets of data pertaining to child anxiety at age five were utilized in the current study. First, as part of the packet of questionnaires completed when the child was five years of age, mothers completed the Child Behavior Checklist (CBCL) for ages 1 ½ to 5 (Achenbach & Rescorla, 2000). This revised version of the CBCL/2-3 obtains parents' ratings of their children's social, emotional, and behavioral problems. It contains 99-items which are rated as Not True, Somewhat or Sometimes True, or Very or Often True, now or within the past two months. Responses are scored on 7 narrow-band factors labeled Emotionally Reactive, Depressed/Anxious, Somatic Complaints, Withdrawn, Sleep problems, Attention Problems, and Aggression. Internalizing and Externalizing broad-band factors are also computed. In addition, a new feature of the CBCL/1 ½-5 is a profile of DSM-oriented clinical scales. These scales are labeled Affective Problems, Anxiety Problems, Pervasive Developmental Problems, Attention Deficit/Hyperactivity Problems, and Oppositional Defiant Problems. The Anxiety Problems scale was of specific interest in the current study.

In addition, as described above, mothers were administered the DISC at the conclusion of the five-year lab visit. The DISC is a highly structured diagnostic interview covering current DSM criteria for child psychiatric disorders. Respondents are asked about the presence or absence of symptoms that fall under the major diagnostic categories. The DISC has undergone extensive testing, refinement, and revisions and has achieved acceptable levels of reliability and validity (Piacentini et al., 1993). Standard administration was followed, with the exception that parents were asked to prioritize the areas covered. This procedure increases reliability, decreases administration time, and is judged to be more interesting than the standard fixed order of administration (Edelbrock, Crnic, & Bohnert, 1999). Social Anxiety, Separation Anxiety, and Generalized Anxiety modules were of specific interest in the current study.

## Chapter IV: Results

### *Data Reduction*

*Parenting at age four.* For home observation ratings of maternal positivity, maternal negativity, maternal intrusiveness, mother-child conflict, and mother-child pleasure, each of which were rated six times at age four, a mean of the individual ratings was created for each variable. Similarly, a mean rating of maternal emotional scaffolding was created from individual ratings of this variable across the five lab tasks in which it was rated. Internal consistency reliability analyses indicated that all composite variables created were reliable (all alphas  $> .70$ ). In addition, maternal positivity, maternal emotional scaffolding, and mother-child pleasure were combined to form a composite rating of positive parenting at age four. These three parenting variables were all significantly correlated with one another ( $r$ 's = .23 to .62,  $p$ 's  $< .01$ ), and reliability analyses indicated that the positive parenting composite was reliable (alpha = .64). Similarly, maternal negativity, maternal intrusiveness, and mother-child conflict were combined to form a composite rating of negative parenting at age four. These three parenting variables were all significantly correlated with one another ( $r$ 's = .39 to .55,  $p$ 's  $< .001$ ), and reliability analyses indicated that the negative parenting composite was reliable (alpha = .77).

*Child anxiety at age five.* Symptom scores on the Social Anxiety, Separation Anxiety, and Generalized Anxiety modules of the DISC were summed to create a total symptom score for each participant. Intercorrelations among the modules ranged from .13 to .86, and reliability analyses indicated that the total symptom score composite was reliable (alpha = .76). This DISC total symptom score was subsequently standardized and combined with standardized maternal reports on the CBCL Anxiety Problems scale to create a composite rating of child anxiety at age five. Although these two variables were significantly correlated ( $r = .27$ ,  $p < .001$ ), reliability

analyses indicated that this composite variable was not reliable ( $\alpha = .22$ ). Therefore, CBCL and DISC variables were examined individually as outcome measures of child anxiety at age five for all analyses.

### *Preliminary Analyses*

Before the various study hypotheses could be tested, several preliminary analyses were conducted in order to examine relations among key variables. As one of the main aims of the current study was to contrast processes in operation for families of typically developing children (TD) and families of children with developmental delays (DD), all analyses described below were run separately for these two groups.

*Descriptive statistics and group differences.* A series of independent samples t-tests were conducted in order to test for group differences between typically developing children and children with developmental delays across indices of maternal anxiety, maternal parenting and the mother-child relationship, and child anxiety (see Table 3 for descriptive statistics and group differences on key variables). No significant findings emerged on the majority of the variables, indicating that mothers of typically developing children and mothers of children with developmental delays did not differ in their levels of anxiety at age three and did not differ on most indices of parenting or the mother-child relationship at age four. However, mothers of typically developing children exhibited significantly higher levels of emotional scaffolding at age four when compared to mothers of children with developmental delays. In addition, children with developmental delays exhibited significantly higher levels of anxiety at age five based on maternal report on the CBCL when compared to typically developing children.

Table 3

Means, SD, and Group Differences Between Typically Developing Children (TD) and Children with Developmental Delays (DD)

Variable	Group (N)	Mean	SD	t
Maternal Anxiety at age 3	TD (126)	2.98	4.21	-.52
	DD (82)	3.27	3.26	
Maternal Positivity at age 4	TD (124)	2.38	.77	-.25
	DD (82)	2.41	.80	
Maternal Negativity at age 4	TD (124)	1.38	.42	-.86
	DD (82)	1.43	.53	
Maternal Intrusiveness at age 4	TD (124)	1.57	.51	-1.63
	DD (82)	1.70	.62	
Mother-Child Pleasure at age 4	TD (124)	1.58	.55	.88
	DD (82)	1.51	.56	
Mother-Child Conflict at age 4	TD (124)	1.10	.21	-.77
	DD (82)	1.14	.40	
Maternal Emotional Scaffolding at age 4	TD (118)	3.26	.81	2.07*
	DD (75)	2.99	.99	
Positive Parenting Composite at age 4	TD (116)	7.25	1.64	1.47
	DD (75)	6.87	1.87	
Negative Parenting Composite at age 4	TD (124)	4.05	.96	-1.37
	DD (82)	4.27	1.35	
CBCL Anxiety Problems Scale at age 5	TD (123)	2.76	2.62	-2.51*
	DD (82)	3.77	3.06	
DISC Total Symptom Score at age 5	TD (127)	1.15	2.49	-1.20
	DD (82)	1.72	4.37	

\*  $p < .05$

*Parenting at age four.* Bivariate correlations among the various parenting behaviors and mother-child relationship variables at age four were conducted, and numerous significant

correlations emerged for both TD and DD children (see Table 4). In addition, correlations were in the expected direction for both groups, with positive parenting behaviors (positivity, mother-child pleasure, and emotional scaffolding) positively correlated with one another and negatively correlated with negative parenting behaviors (negativity, intrusiveness, and mother-child conflict). Negative parenting behaviors were also positively correlated with one another. In addition, differences in the strength of correlations among parenting behaviors and the mother-child relationship for the two groups were examined using Fisher's  $r$  to  $z$  transformations. Results indicated that individual correlational contrasts between groups were not significantly different from one another.

Table 4

Intercorrelations Among Parenting and Mother-Child Relationship Variables at Age 4 for Typically Developing Children (TD) and Developmentally Delayed Children (DD)

Variable	1	2	3	4	5	6
1. Positivity	—	-.29**	-.21	.59***	-.16	.40***
2. Negativity	-.36***	—	.79***	-.09	.66***	-.25*
3. Intrusiveness	-.13	.62***	—	-.12	.40***	-.21
4. Mother-Child Pleasure	.66***	-.18*	-.19*	—	.04	.28*
5. Mother-Child Conflict	-.09	.45***	.39***	.02	—	-.16
6. Emotional Scaffolding	.32**	-.13	-.05	.16	.03	—

Note: Above diagonal represents correlations for DD children, below diagonal represents correlations for TD children.

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

*Parenting, maternal anxiety, and child anxiety.* Bivariate associations among parenting behaviors at age four and both maternal anxiety at age three and child anxiety at age five were also examined for both TD and DD children (see Table 5). In addition, bivariate associations

between maternal anxiety at age three and child anxiety at age five were also examined for both TD and DD children (see Table 6). Both the Anxiety Problems Scale of the CBCL and the Total Symptom Score on the DISC were examined as measures of child anxiety. For TD children, only one significant association emerged; higher levels of mother-child conflict at age four was associated with higher levels of child anxiety at age five based on maternal report on the DISC. However, given the number of correlations conducted in this analysis (24), and the fact that the  $p$ -value did not reach below  $<.01$ , it is possible that this result represents a chance finding rather than a meaningful finding. There were, however, a few trends in the expected direction noted in the results for TD children, although these associations did not reach statistical significance. Higher levels of maternal anxiety at age three was associated with more maternal negativity and poorer emotional scaffolding at age four. In addition, higher levels of maternal anxiety at age three did significantly predict higher levels of child anxiety at age five based on maternal report on the CBCL ( $r = .17, p = .05$ ). Maternal anxiety was not predictive of child anxiety based on the DISC Total Symptom score ( $r = -.01, p$  ns).

Several significant correlations emerged for the DD children, however. Higher maternal anxiety at age three was associated with less maternal positivity, poorer emotional scaffolding, and less positive parenting at age four. In addition, poorer maternal emotional scaffolding and less positive parenting at age four were associated with higher child anxiety at age five based on maternal report on the CBCL. Furthermore, additional trends in the expected direction were noted in the results for DD children as well. Higher maternal anxiety at age three was associated with less mother-child pleasure at age four. Lower maternal intrusiveness and less mother-child pleasure were associated with higher child anxiety at age five based on maternal report on the CBCL. Overall, more associations between maternal parenting at age four and both maternal

anxiety at age three and child anxiety at age five were found for children with developmental delays when compared to typically developing children, validating the separation of the sample based on child developmental status. In addition, higher levels of maternal anxiety at age three was also predictive of higher levels of child anxiety at age five based on maternal report on the CBCL ( $r = .23, p < .05$ ). Maternal anxiety was not predictive of child anxiety based on the DISC Total Symptom score ( $r = .13, p$  ns).

Table 5

Correlations Between Parenting Behaviors at Age 4 and Maternal Anxiety at age 3 and Child Anxiety at age 5 for Typically Developing Children (TD) and Developmentally Delayed Children (DD)

Variable		Maternal Anxiety	Child Anxiety (CBCL)	Child Anxiety (DISC)
1. Positivity	TD	-.09	-.01	-.08
	DD	-.21+	-.18	-.06
2. Negativity	TD	.16++	-.03	.05
	DD	.17	-.03	.10
3. Intrusiveness	TD	.08	.07	.12
	DD	.03	-.19++	.00
4. Mother-Child Pleasure	TD	-.08	.03	-.08
	DD	-.21++	-.20++	-.08
5. Mother-Child Conflict	TD	.02	.07	.22*
	DD	-.02	.02	.10
6. Emotional Scaffolding	TD	-.16++	.05	.08
	DD	-.27*	-.24*	.14
7. Positive Parenting Composite	TD	-.15	.04	-.04
	DD	-.31**	-.28*	.02
8. Negative Parenting Composite	TD	.12	.04	.14
	DD	.07	-.10	.07

\*\*\*  $p < .001$ ; \*\*  $p < .01$ ; \*  $p < .05$ ; +  $p = .05$ ; ++  $p = .06-.09$

Table 6

Correlations Between Maternal Anxiety at age 3 and Child Anxiety at age 5 for Typically Developing Children (TD) and Developmentally Delayed Children (DD)

Variable		Child Anxiety (CBCL)	Child Anxiety (DISC)
1. Maternal Anxiety	TD	.17+	-.01
	DD	.23*	.13

\*  $p < .05$ ; +  $p = .05$

*Maternal anxiety and parenting.* In order to further explore the relations between maternal anxiety at age three and maternal parenting and the mother-child relationship at age four, a group of “high” anxious mothers was created (top 30% of sample on measure of maternal anxiety) to determine if this variable better operates as a grouped variable rather than a continuous variable. A series of t-tests were conducted in order to test for group differences between “high” anxious and “low” anxious mothers on indices of parenting and the mother-child relationship at age four. No significant findings emerged for either typically developing children or children with developmental delays, indicating that “high” anxious mothers did not differ from “low” anxious mothers in their parenting or in their relationship with their child at age four. This finding supports the decision to treat the measure of maternal anxiety utilized in the current study as a continuous variable, as qualitative differences between “high” and “low” anxious mothers on the variables of interest do not emerge.

*Gender differences.* A series of t-tests were conducted in order to test for gender differences across indices of maternal anxiety, maternal parenting and the mother-child relationship, and child anxiety for both typically developing children and children with developmental delays. No significant findings emerged for either group, indicating that mothers of boys and girls did not differ on their levels of anxiety or in their parenting and relationship

quality with boys versus girls. In addition, girls and boys did not differ in their levels of anxiety at age five. Because differences did not reach significance for either typically developing children or children with developmental delays, subsequent analyses combined data for boys and girls.

### *Hypothesis Testing*

#### *Hypothesis 1: Maternal anxiety as a predictor of parenting behaviors and child anxiety.*

A series of separate regression analyses were conducted to test the hypothesis that maternal anxiety at age three would predict parenting behaviors and the mother-child relationship at age four, as well as child anxiety at age five. These regressions were run to help set the conditions to test subsequent mediational processes. Maternal anxiety was entered individually on Step 1 of each equation, and the various parenting, mother-child relationship, and child anxiety variables were entered separately as dependent variables (resulting in 10 different regressions for each group). Again, all analyses were run separately for typically developing children (TD) and for children with developmental delays (DD), and both the CBCL Anxiety Problems scale and the DISC Total Symptom score were examined individually as outcome measures of child anxiety. Similar to the correlation results reported earlier, for TD children maternal anxiety at age three did not significantly predict maternal parenting or the mother-child relationship at age four. There were, however, a few trends in the expected direction noted in the results for TD children, although these associations did not reach statistical significance. Higher levels of maternal anxiety at age three was associated with more maternal negativity and poorer emotional scaffolding at age four. Higher levels of maternal anxiety at age three did predict higher levels of child anxiety at age five based on maternal report on the CBCL. Maternal anxiety was not predictive of child anxiety based on the DISC Total Symptom score (see Table 7).

Table 7

Separate Regression Analyses for Maternal Anxiety Predicting Parenting Behaviors and Child Anxiety for Typically Developing Children (TD) and Developmentally Delayed Children (DD)

Regression Dependent Variables	Group	<i>R</i>	<i>R</i> <sup>2</sup>	<i>B</i>
1. Positivity	TD	.09	.01	-.09
	DD	.21	.05	-.21+
2. Negativity	TD	.16	.03	.16++
	DD	.17	.03	.17
3. Intrusiveness	TD	.08	.01	.08
	DD	.03	.00	.03
4. Emotional Scaffolding	TD	.16	.03	-.16++
	DD	.27	.07	-.27*
5. Mother-Child Pleasure	TD	.08	.01	-.08
	DD	.21	.04	-.21++
6. Mother-Child Conflict	TD	.02	.00	.02
	DD	.02	.00	-.02
7. Positive Parenting Composite	TD	.15	.02	-.15
	DD	.31	.10	-.31**
8. Negative Parenting Composite	TD	.12	.01	.12
	DD	.07	.01	.07
9. Child Anxiety (CBCL)	TD	.17	.03	.17+
	DD	.23	.05	.23*
10. Child Anxiety (DISC)	TD	.01	.00	-.01
	DD	.13	.02	.13

\*\*  $p < .01$ ; \*  $p < .05$ ; +  $p = .05$ ; ++  $p = .06-.09$

For DD children, however, maternal anxiety at age three significantly predicted parenting at age four such that higher maternal anxiety at age three was predictive of less maternal positivity, poorer emotional scaffolding, and less positive parenting at age four (see Table 7).

Furthermore, additional trends in the expected direction were noted in the results for DD children as well. Higher maternal anxiety at age three was associated with less mother-child pleasure at age four. In addition, higher levels of maternal anxiety at age three was also predictive of higher levels of child anxiety at age five based on maternal report on the CBCL. Maternal anxiety was not predictive of child anxiety based on the DISC Total Symptom score. These results indicate that maternal anxiety at age three is more predictive of later parenting behaviors and child anxiety for children with developmental delays than for typically developing children, although processes do appear to operate in similar directions for both groups of children. This suggests that there may be an important impact of this early risk condition within the child that serves to make pathways of influence within the family more powerful across the early preschool period.

*Hypothesis 2: Parenting behavior as a predictor of child anxiety.* Step-wise regressions were conducted to test the hypothesis that maternal parenting and the mother-child relationship at age four would predict child anxiety at age five. All parenting behaviors and mother-child relationship variables of interest were entered simultaneously in this regression, resulting in six predictors, and different models emerged based upon the unique, individual contributions of the variables. For typically developing children, maternal parenting and the mother-child relationship at age four did not significantly predict child anxiety based on maternal report on the CBCL, as the six predictors together accounted for a total of 3% of the variance (see Table 8). Based on maternal report of child anxiety on the DISC, mother-child conflict at age four emerged as a single significant predictor of child anxiety at age five, accounting for 5% of the variance, with the other parenting variables adding little unique variance to the prediction of child anxiety above and beyond mother-child conflict (see Table 9). For children with developmental delays, maternal emotional scaffolding at age four emerged as the most powerful

and significant predictor of child anxiety at age five based on maternal report on the CBCL, accounting for 6% of the variance (see Table 10). Again, the other parenting variables and mother-child relationship variables did not emerge as significant predictors of child anxiety above and beyond emotional scaffolding. Based on maternal report on the DISC, parenting and the mother-child relationship did not significantly predict child anxiety (see Table 11).

Table 8

Stepwise Regression Analysis for Parenting Behavior Predicting Child Anxiety (CBCL) for Typically Developing (TD) Children

Models	<i>R</i>	<i>R</i> <sup>2</sup>	<i>R</i> <sup>2</sup> Δ	<i>F</i> <sub>chn</sub>	<i>B</i>	<i>F</i> <sub>eqn</sub>
1. Intrusiveness	.08	.01	.01	.71	.08	.71
2. Negativity	.13	.02	.01	1.03	-.12	.87
3. Mother-Child Conflict	.15	.02	.01	.68	.09	.81
4. Emotional Scaffolding	.15	.02	.00	.21	.04	.65
5. Positivity	.16	.03	.00	.33	-.06	.58
6. Mother-Child Pleasure	.18	.03	.01	.64	.11	.59

Table 9

Stepwise Regression Analysis for Parenting Behavior Predicting Child Anxiety (DISC) for Typically Developing (TD) Children

Models	<i>R</i>	<i>R</i> <sup>2</sup>	<i>R</i> <sup>2</sup> Δ	<i>F</i> <sub>chn</sub>	<i>B</i>	<i>F</i> <sub>eqn</sub>
1. Mother-Child Conflict	.23	.05	.05	6.12*	.23*	6.12*
2. Mother-Child Pleasure	.25	.06	.01	1.18	-.10	3.66*
3. Emotional Scaffolding	.26	.07	.01	.89	.09	2.73*
4. Negativity	.27	.07	.00	.23	-.05	2.09
5. Intrusiveness	.28	.08	.01	.68	.10	1.80
6. Positivity	.28	.08	.00	.45	-.09	1.57

\*  $p < .05$

Table 10

Stepwise Regression Analysis for Parenting Behavior Predicting Child Anxiety (CBCL) for Developmentally Delayed (DD) Children

Models	<i>R</i>	<i>R</i> <sup>2</sup>	<i>R</i> <sup>2</sup> Δ	<i>F</i> <sub>chn</sub>	<i>B</i>	<i>F</i> <sub>eqn</sub>
1. Emotional Scaffolding	.24	.06	.06	4.52*	-.24*	4.52*
2. Intrusiveness	.32	.10	.04	3.40	-.21	4.04*
3. Mother-Child Pleasure	.36	.13	.03	2.53	-.18	3.59*
4. Negativity	.41	.16	.03	2.72	.30	3.44*
5. Positivity	.41	.17	.00	.06	-.04	2.73*
6. Mother-Child Conflict	.41	.17	.00	.00	.01	2.24+

\*  $p < .05$ ; +  $p = .05$

Table 11

Stepwise Regression Analysis for Parenting Behavior Predicting Child Anxiety (DISC) for Developmentally Delayed (DD) Children

Models	<i>R</i>	<i>R</i> <sup>2</sup>	<i>R</i> <sup>2</sup> Δ	<i>F</i> <sub>chn</sub>	<i>B</i>	<i>F</i> <sub>eqn</sub>
1. Negativity	.16	.03	.03	2.02	.16	2.02
2. Emotional Scaffolding	.25	.06	.03	2.53	.19	2.30
3. Mother-Child Pleasure	.27	.07	.01	.90	-.11	1.83
4. Intrusiveness	.28	.08	.01	.65	-.15	1.53
5. Positivity	.29	.08	.00	.13	-.06	1.23
6. Mother-Child Conflict	.29	.08	.00	.07	.04	1.03

*Hypothesis 3: Parenting behavior as a mediator of the relations between maternal and child anxiety.* Hierarchical regression analyses were conducted in order to test the hypothesis that parenting behaviors and the mother-child relationship mediate the relations between maternal anxiety and child anxiety. Following a basic Baron and Kenny (1986) model for testing mediation, only those parenting behaviors or mother-child relationship variables that were significantly associated with both maternal anxiety at age three and child anxiety at age five were examined as potential mediators. For typically developing children, no parenting variables satisfied the criteria to be tested as possible mediators. For children with developmental delays, however, two possible parenting variables (emotional scaffolding and the positive parenting composite) met criteria to be tested as potential mediators. Thus two separate hierarchical regressions were conducted by entering parenting variables first on Step 1 of the equation, followed by maternal anxiety at age three on Step 2 of the equation. Decrements in the predictive significance of maternal anxiety at age three to child anxiety at age five were found when each of these parenting variables was entered first into the equation, with the beta values

changing from significant to non-significant, suggesting that maternal parenting at age four partially mediates the relations between maternal anxiety at age three and child anxiety at age five for children with developmental delays (see Tables 12 and 13). As parental intrusiveness was not associated with either maternal anxiety or child anxiety in the current study, it was not possible to contrast mediational hypotheses focusing on this traditional variable associated with child anxiety with hypotheses focusing on parenting related to emotional experiences.

Table 12

Hierarchical Regression Analysis for Emotional Scaffolding Mediating the Relation Between Maternal and Child Anxiety for Developmentally Delayed (DD) Children

Variable	<i>R</i>	<i>R</i> <sup>2</sup>	<i>R</i> <sup>2</sup> Δ	<i>F</i> <sub>chn</sub>	<i>B</i>	<i>F</i> <sub>eqn</sub>
Step 1: Emotional Scaffolding	.24	.06	.06	4.52	-.24*	4.52*
Step 2: Maternal Anxiety	.29	.09	.03	2.13	.17	3.36*

\* *p* < .05

Table 13

Hierarchical Regression Analysis for Positive Parenting Composite Mediating the Relation Between Maternal and Child Anxiety for Developmentally Delayed (DD) Children

Variable	<i>R</i>	<i>R</i> <sup>2</sup>	<i>R</i> <sup>2</sup> Δ	<i>F</i> <sub>chn</sub>	<i>B</i>	<i>F</i> <sub>eqn</sub>
Step 1: Positive Parenting	.28	.08	.08	6.34	-.28*	6.34*
Step 2: Maternal Anxiety	.32	.10	.02	1.62	.15	4.01*

\* *p* < .05

*Hypothesis 4: Group differences in pathways of influence.* Although several differences in the significance of associations among key variables for typically developing children compared with children with developmental delays emerged, further analyses were conducted in order to determine whether or not these differences were meaningful. Differences in the strength

of correlations between maternal anxiety, parenting and the mother-child relationship, and child anxiety for the two groups (correlations reported in Table 5) were examined using Fisher's  $r$  to  $z$  transformations. These results indicated that correlations were generally not significantly different from one another. In fact, significant differences emerged in only 2 of 24 comparisons (minimally better than chance); the correlation between emotional scaffolding at age four and child anxiety at age five based on maternal report on the CBCL was significantly stronger for DD children compared with TD children ( $p = .05$ ). In addition, the correlation between the positive parenting composite at age four and child anxiety at age five based on maternal report on the CBCL was also significantly stronger for DD children compared with TD children ( $p = .03$ ).

## Chapter V: Discussion

The current study investigated mechanisms of transmission of anxiety from mother to child across the preschool period, with particular attention to the mediating role of parenting specifically related to emotional experiences. Contrasts in these processes between families of children with and without developmental delays allowed for further exploration of transactional processes in mechanisms of effect related to the presence of risk.

In contrast to the generally modest findings in the absence of child risk, findings in the presence of risk were notably more powerful. Although maternal anxiety during early childhood appeared associated with later child anxious symptoms regardless of risk status, only in the presence of risk was a mechanism of effect able to be identified. More specifically, a lack of positive parenting behaviors mediated the relations between maternal anxiety in early childhood and later child anxiety in the presence of child risk. As hypothesized, family factors appeared more salient under conditions of risk and served to intensify and realize the risk of early maternal anxiety (Sameroff, 1995). Specific study results will illustrate the contributions and implications of these findings for future research and clinical practice.

### *Parental Anxiety and Child Anxiety: Familial Aggregation*

As noted above, there appears to be a connection between maternal anxiety during early childhood and child anxious symptoms two years later regardless of the presence of risk. This is consistent with previous research that has repeatedly demonstrated a familial link between parental and child anxiety (Biederman et al., 1991; Last et al., 1991; Turner et al., 1987; Woodruff-Borden et al., 2002) and supports the conceptualization of parental anxiety as a risk factor for the later development of child anxiety. Furthermore, the current results build upon previous research by extending findings longitudinally and demonstrating that parental anxiety

operates as a risk for child anxiety across a longer period of time. This risk is also operative during the preschool period, a critical developmental stage for the emergence of self-regulatory skills (Kopp, 1992). Anxiety can be conceptualized as a regulatory disorder that impedes the effective modulation of arousal, behavior, cognition, and affect (Fox, 1994), and exposure to the risk of maternal anxiety during this particularly sensitive time period, where we begin to see a shift from co-regulation to self-regulation, may have long-term developmental implications for the emergence of anxious symptoms in children.

The fact that only modest amounts of the variance in child anxious symptoms could be explained by parental anxiety is also consistent with past work. Multifinality is likely operative in this context and highlights the fact that there is a divergence in outcomes for children of anxious parents. Although having an anxious mother seems to predict increased risk for anxious symptoms in children, it does not directly result in this outcome. As development is a dynamic process, involving multiple transactions between the child and his or her environment, it is critical to understand what takes place across time to influence ultimate outcome (Cummings et al., 2000). In the current study, it was hypothesized that child and family characteristics and their transactions over time are responsible for these differential outcomes. Identifying such mediating and moderating factors in the familial transmission of anxiety from parent to child will ultimately provide a clearer understanding of adjustment over time and allow us to design more specific and effective prevention programs to target populations at risk and counter the potentially detrimental effects of parental anxiety on children.

Results of the current study also suggest that parental anxiety does not need to reach the level of diagnosable disorder to influence later child anxious symptoms; rather, even more subtle measures of anxious symptoms in parents are associated with child anxious symptoms several

years later. It is important to recognize that maternal anxiety in the current study was measured by self-report of anxious symptoms on a questionnaire and was treated as a continuous variable in all analyses. Conceptually, this dimensional measure of maternal anxiety was thought to provide a more continuous perspective on degrees of anxiety ranging from normal to abnormal (Cicchetti & Cohen, 1995). Thus, increasingly greater amounts of maternal anxiety were expected to represent a greater risk for the development of certain parenting behaviors and child anxious symptoms. In the current study, treating maternal anxiety as a continuous variable was supported statistically by the fact that significant differences between categorically “high” and “low” anxious mothers on parenting behaviors and child anxiety did not emerge. This suggests that rather than there being a threshold for risk associated with maternal anxiety based on the measure utilized, maternal anxiety operated as hypothesized with increasingly greater amounts of maternal anxiety associated with greater risk.

This approach to the measurement of maternal anxiety differs from the majority of empirical research examining the familial transmission of anxiety, which relies on diagnosable anxiety disorder status to determine risks associated with parental anxiety (Biederman et al., 1991; Last et al., 1991; Turner et al., 1987). Despite differing measurement approaches, results were rather consistent. This is in fact logical, as those receiving a formal clinical diagnosis (e.g., maternal anxiety disorder) are also likely to score high on valid and reliable dimensional measures of maternal anxiety. Future research examining maternal anxiety using both a symptom-based, continuous approach, as well as a categorical, diagnostic-based approach would be of value and would serve to create a more complete understanding of specific and general risks associated with maternal anxiety. As suggested by Cummings and colleagues (Cummings et al., 2000), using these two complementary measurement approaches together may be

particularly heuristic and may increase understanding of whether or not differential risks are associated with clinical versus sub-clinical levels of anxiety. Additionally, anxiety is unique in that there are several subtypes, and mothers with one subtype may exhibit different behavioral or emotional correlates of their anxiety (Kaitz & Maytal, 2005). Therefore, utilizing both a continuous approach and a diagnostic-based approach may be particularly useful in specifying the exact nature of risks associated with maternal anxiety.

Similarly, the outcome of interest in the current study was child anxious symptoms at age five, rather than diagnosable anxiety disorders. Child anxiety was measured in two ways, maternal report on a questionnaire (CBCL) and maternal report on a structured, diagnostic interview (DISC). Although the two measures of anxiety were associated with each other as expected (the relation was not particularly strong, however), combining these two measures resulted in an unreliable composite. In addition, there was a general lack of findings regardless of risk status when using the DISC as a measure of child anxiety. Although this was contrary to predictions and somewhat surprising, perhaps these results are reflective of the administration procedure followed for the DISC. Standard administration was generally followed, however parents were asked to prioritize the areas covered and only those areas in which they expressed concern were administered. Research has demonstrated that this procedure increases reliability, decreases administration time, and is judged to be more interesting than the standard fixed order of administration (Edelbrock, Crnic, & Bohnert, 1999). However, as a result of this procedure, only a limited number of mothers were actually administered the anxiety modules of the DISC, which resulted in a restricted range and skewed distribution of scores. Although it is not possible to determine whether administration of all modules to all participants would have led to

increased anxiety scores, it is important to recognize the administration procedures when interpreting results.

### *Parenting and Child Anxiety*

Although children with an anxious parent are at greater risk for developing anxious symptoms themselves when compared to children without an anxious parent, not all children who experience this risk factor proceed to develop anxious symptoms (Biederman et al., 1991; Cicchetti & Cohen, 1995; Last et al., 1991; Turner et al., 2003; Woodruff-Borden et al., 2002). Therefore, it is critical to examine those environmental variables that may contribute to the familial transmission of anxiety by mediating the relations between parental and child anxiety. Parenting and the parent-child relationship represent particular environmental experiences that may play an important role in the development of anxious symptoms in children (Turner et al., 2003; Vasey & Dadds, 2001). There is extensive research indicating that many different aspects of parenting, including parental overprotection or control and parental insensitivity, rejection, or lack of warmth, affect anxious symptoms in children (Donovan & Spence, 2000; Dumas et al., 1995; Hudson & Rapee, 2001; Khrone & Hock, 1991; Messer & Beidel, 1994; Rapee, 1997). In the current study, it was hypothesized that the constellation of lower positivity, higher negativity, higher intrusiveness, poorer emotional scaffolding, more conflict, and less pleasure at age four would be predictive of higher child anxiety at age five for both typically developing children and children with developmental delays. However, results indicated that maternal parenting and the quality of the mother-child relationship did not significantly predict later child anxious symptoms for typically developing children.

The lack of findings for typically developing children is somewhat inconsistent with previous research, with the one minor exception that higher levels of mother-child conflict was

predictive of higher levels of child anxiety as rated on the DISC. Several aspects of the current study may shed light on these inconsistent results. In the current study, the majority of maternal parenting behaviors and the quality of the mother-child relationship were assessed during unstructured, naturalistic home observations and using a global rating scale. This observational context was selected due to the fact that it was hypothesized to most closely represent the daily home environment of families and best capture interactions between parents and children that typically occur on a daily basis and are ultimately responsible for shaping development (Belsky et al., 1995). Further, associations between parenting and child anxiety were examined longitudinally across a one-year period. In contrast, the majority of previous research supporting associations between parenting and child anxiety through observational designs were cross-sectional in nature and utilized laboratory environments including problem-solving tasks or other stressful situations involving some challenge to assess maternal behaviors (Dumas & LaFreniere, 1993; Dumas et al., 1995; Hudson & Rapee, 2001; Krohne & Hock, 1991; LaFreniere & Dumas, 1992). Perhaps the design of the current study did not provide an adequate context to capture those parenting behaviors that influence later anxiety in children across longer periods of time, especially since the current study was focused on anxious symptoms rather than disorders per se. Maybe parenting in emotionally-challenging situations, rather than parenting in non-stressful contexts, represents the key influence on the later development of child anxious symptoms, as this context provides parents with a critical opportunity to teach children how to cope with stressors. An alternate hypothesis is that while certain parenting behaviors can be directly associated with child anxiety in discrete interactions at a single point in time, associations between parenting and child anxiety across time and stages of development are more complex and dynamic and may need to be examined within the context of other intrinsic and extrinsic

variables affecting pathways of development (Cummings et al., 2000). Concurrent direct links between parenting and child anxiety are only one dimension of a more complex process affecting the development of child anxious symptoms across time.

Consistent with transactional theory (Sameroff & Chandler, 1975), the presence of risk created a context for more powerful associations between parenting and child anxiety a year later, although such findings were not ubiquitous in this study. Interestingly, a lack of positive parenting behaviors, rather than increased negative parenting behaviors, was predictive of later child anxiety. Previous research has demonstrated links between parental lack of warmth and child anxiety (Donovan & Spence, 2000), which may suggest that positive parenting is critical in fostering the development of safety, security, and acceptance in children, as well as teaching them important self-regulation skills (Parker, 1983). From an attachment perspective, children's early experiences with their caregiver play a critical role in influencing individual differences in emotional regulation. In fact, emotional regulation is thought to be influenced by the attachment relationship through the child's expectations of the parent's behavior (Cassidy, 1994). Children whose parents demonstrate positive, engaged behaviors, especially in response to affective signals, experience an enhanced sense of self-efficacy in regulating emotions and experiences of negative affect become less threatening (Cassidy, 1994). In contrast, a lack of positive behaviors leads to expectations that a parent is unavailable to assist in times of stress and places a child at risk for regulatory difficulties, which in the current study was manifested by increased anxious symptoms. Furthermore, without the dependable availability of an external source (e.g., mother) to facilitate regulation of emotions during this critical developmental period, children are left to manage discomfort and stress on their own (Kaitz & Maytal, 2005). Similar to explanations of results described above, an alternate hypothesis is that while increased negative parenting

behaviors may be associated with child anxiety concurrently (especially with disorder), it is a lack of positive parenting that emerges as a critical influence on later sub-clinical child anxious symptoms when examining the dynamic process across time.

Maternal emotional scaffolding in particular emerged as the most powerful predictor of child anxiety at age five, and this was true regardless of risk. Conceptually, emotional scaffolding may be especially key because parents who fail to demonstrate acceptance of children's negative emotions or minimize children's expressions of negative affect increase children's sensitivity to anxiety by hindering the development of emotion regulation and the ability to learn to tolerate negative affect. In contrast, high levels of emotional scaffolding communicates to the child that the parent understands his or her specific experiences of negative affect and provides a context to learn self-regulation skills (Gottman et al., 1997). These findings are also consistent with research demonstrating that mothers of children with anxiety disorders use fewer positive emotion words and discourage emotion discussions in interactions with their children (Suveg et al., 2005).

In addition, from a methodological perspective, emotional scaffolding was the only parenting variable assessed in a laboratory context rather than a naturalistic home environment. Perhaps this context was better able to capture parental reactions that influence the later development of child anxious symptoms, particularly because it included multiple ratings across a variety of emotionally challenging mother-child problem-solving scenarios. A lack of emotional scaffolding in such a stressful context is significant, as it potentially leaves the child in a stressful situation without much support or assistance. Furthermore, the construct of emotional scaffolding represented a more specific dimension of parenting that was particularly tied to parental emotional response, in contrast to the more global nature of other parenting behaviors

examined (Gottman et al., 1997). Although emotional scaffolding is consistent with more global constructs of positive parenting behaviors, perhaps this specific construct best captures those aspects of parenting that have the greatest impact upon the development of anxious symptoms in children across time. These results also support study hypotheses that parenting related to emotional experiences may be particularly important in the translation of risk for anxiety from mother to child.

Although maternal intrusiveness tended to be associated with child anxiety, the direction of this association was inconsistent with previous research. Lower maternal intrusiveness at age four predicted higher child anxiety at age five. One possible explanation for this finding involves the specific risk status of the sample. While typically developing children may experience intrusiveness as excessive control which affects their perceptions of mastery over the environment, perhaps children with developmental delays require an increased level of control over their environment to feel secure especially at the young age of four, and do not experience it in the same way as typically developing children. Furthermore, from a methodological perspective, although there was some variability in maternal intrusiveness as rated during naturalistic home observations in the current study, mean levels of intrusiveness were rather low overall. Perhaps this low level of intrusiveness actually operates differently for children with delays than higher levels traditionally associated with risk for anxiety in typically developing populations. In support of this, previous research has distinguished between constructs of intrusiveness and directiveness and demonstrated that although intrusiveness and directiveness both operate as risks for typically developing children, directiveness is actually beneficial for children with developmental delays (Marfo, 1992). Perhaps the construct of intrusiveness in the

current study, due to the low levels overall, actually operated similarly to constructs of directiveness discussed in previous research.

### *Maternal Anxiety and Parenting*

Although maternal anxiety during early childhood was hypothesized to predict certain later parenting behaviors and the quality of the mother-child relationship, few associations emerged for typically developing children. Similar to the lack of associations between parenting and child anxiety among typically developing children described above, this general lack of significant findings was also surprising and somewhat inconsistent with previous research supporting important differences in the parenting and dyadic interactions of anxious parents when compared to nonanxious parents (Turner et al., 2003; Warren et al., 2003; Whaley et al., 1999; Woodruff-Borden et al., 2002). Once again, however, several aspects of the current study which were highlighted previously in discussing the lack of associations between parenting and child anxiety may also shed light on these results.

The majority of previous research examining parenting among anxious mothers has utilized a clinical sample and a cross-sectional design (Turner et al., 2003; Warren et al., 2003; Whaley et al., 1999; Woodruff-Borden et al., 2002). In contrast, as noted previously, a self-report measure of maternal anxiety was utilized in the current study and associations were examined longitudinally. A clinical sample was not selected, nor were mothers assessed for the presence of diagnosable disorders. Although a range in anxious symptomatology was endorsed, few mothers actually reached threshold for a diagnosable anxiety disorder. In contrast to its predictions to child anxiety, perhaps maternal anxiety does indeed need to reach a certain level of severity or threshold in order to have a significant impact upon parenting behaviors across time. On the other hand, perhaps maternal anxiety, even at a sub-clinical level, does indeed have

effects upon parenting, but the processes in operation are more subtle, especially when assessed across time in naturalistic environments, and thus require greater statistical power than the current study was able to provide. Indeed, several trends in the data were noted and were in expected directions. In the literature examining the effects of depressive symptomatology on children's functioning, the importance of distinguishing between depressive symptomatology based on self-report instruments and those based on direct clinical interviews and formal diagnostic criteria has been repeatedly emphasized (Cummings et al., 2000), and the same may be true for maternal anxiety.

While maternal anxiety may be directly associated with certain parenting behaviors in discrete interactions at a single point in time, perhaps associations between maternal anxiety and parenting across time and stages of development are more complex and dynamic and need to be examined within the context of other intrinsic and extrinsic variables affecting pathways of development (Cummings et al., 2000). The chronicity of maternal anxiety across the time period examined may also play a critical role in determining the ultimate effects on parenting behaviors and the quality of the parent-child relationship. Although research on parenting practices among anxious parents is only emerging, findings from related literature examining the parenting practices of depressed parents support this hypothesis and suggest that the degree of risk for maladaptive parenting behaviors is a function of the chronicity of parental depression, with risk increasing when the chronicity of depression is greater (Campbell, Cohn, & Meyers, 1995).

Consistent with previous results, the presence of risk created a context for more powerful associations between maternal anxiety and parenting behaviors one year later, although such findings were again not ubiquitous in this study. Maternal anxiety was predictive of a lack of later positive parenting behaviors rather than increased negative parenting behaviors, supporting

similar research that demonstrated anxious parents display less warmth, are less engaged and more withdrawn, and are less expressive in interactions with their children (Turner et al., 2003; Whaley et al., 1999; Woodruff-Borden et al., 2002). Although it was also hypothesized that maternal anxiety would be predictive of higher levels of later maternal negativity and more mother-child conflict, perhaps the lack of findings here is a result of the context utilized to assess parenting in the current study. Anxious parents tended to withdraw and disengage from interactions with their children under non-anxiety provoking, low stress situations. In contrast, perhaps under emotionally-challenging conditions of increased stress, maternal anxiety would be greater and it would be increasingly difficult for mothers to withdraw from their children. As a result, mothers may respond with increased negativity in an attempt to manage their children's behaviors and ultimately reduce their own levels of distress and discomfort in these contexts. This interpretation is consistent with previous research in which no differences in overall levels of negativity were found between anxious parents and parents without a psychiatric diagnosis, but anxious parents were found to exhibit significantly more negativity and control in response to children's display of negative affect (Woodruff-Borden et al., 2002).

While maternal anxiety may be associated with both increased negativity and decreased positivity concurrently, it is the influence on positive parenting that emerges as being most salient when dynamic processes are examined across time. Furthermore, higher maternal anxiety at age three was not predictive of higher maternal intrusiveness at age four regardless of risk status. This is consistent with emerging observational research in which general differences between anxious and nonanxious parents on measures of parental control or overprotectiveness were not supported (McClure et al., 2001; Turner et al., 2003).

### *Mechanism of Effect*

Under conditions of risk, maternal anxiety was predictive of a lack of positive parenting behaviors one year later. In addition, a lack of positive parenting behaviors was subsequently predictive of later child anxious symptoms. Results support a mechanism of transmission of anxiety from mother to child in the presence of risk in which a lack of positive parenting behaviors mediated the relations between maternal anxiety in early childhood and later child anxiety. Consistent with basic transactional models, and as hypothesized, family factors appeared more salient under conditions of risk and served to intensify and realize the risk of early maternal anxiety (Sameroff, 1995). Maternal emotional scaffolding in particular emerged as the strongest mediating variable between early maternal anxiety and subsequent child anxious symptoms. As discussed previously, emotional scaffolding may play a strong role in this mechanism due to the fact that anxious mothers are at particular risk for poor emotional scaffolding, perhaps due to their own levels of distress and discomfort with negative emotions, which subsequently increases children's sensitivity to anxiety by hindering the development of emotion regulation and the ability to learn to tolerate negative affect (Gottman et al., 1997). Not only do the current findings provide some initial understanding of mechanisms of anxiety transmission within families, they also move from simply demonstrating that relations exist to increasing understanding of how and why these relations exist. Furthermore, current findings provide some initial support for the hypothesis that perhaps the transmission of anxiety from parent to child occurs at the affective level, with parenting behaviors specifically associated with emotional experiences emerging as more salient for the transmission of anxiety over time from mother to child than traditional parenting behaviors, such as parental control or intrusiveness, associated with child anxiety. Indeed, emerging evidence from the literature on maternal

depression suggests that socioemotional processes play a particularly important role in explaining links between parental depression and child development, especially in comparison to the cognitive symptomatology of depression (Cummings et al., 2000). Contrasting affective and cognitive processes is a promising area for future research, with significant implications for understanding complex developmental processes influencing child functioning over time and ultimately designing more specific and effective prevention and intervention programs to promote adaptive functioning.

### *Summary and Limitations*

The current study extended understanding of the relations among parental anxiety, parenting, and child anxiety across the preschool years and demonstrated that family factors may be more salient under conditions of risk. There appears to be a connection between maternal anxiety during early childhood and child anxiety symptoms two years later regardless of the presence of risk, and parental anxiety does not seem to need to reach the level of diagnosable disorder to influence later parenting behaviors and child anxiety. In addition, results illustrated a mechanism of transmission of anxiety from mother to child in the presence of risk and suggested that a lack of positive parenting behaviors, rather than increased negative parenting behaviors, is critical in the transmission of anxiety within families of children with developmental delays. Lastly, the current study clearly illustrates that the relations among parental anxiety, parenting, and child anxious symptoms are complex, and future research in this area must address the way these processes operate across time.

Several limitations of the current study are relevant to interpretations of the results. Recognition of these limitations also highlights important avenues for future research in this area. As discussed above, maternal anxiety in the current study was measured solely by self-

report of anxious symptoms on a questionnaire, the Symptom Checklist (SCL-35) (Derogatis, 1992). Research suggests, however, that scores on the anxiety scale of this measure are highly correlated with scores on other scales of the questionnaire, most notably the depression scale (Derogatis, 1992). Although previous research suggests specificity in the transmission of anxiety within families (McClure et al., 2001), the manner in which maternal anxiety was measured in the current study makes it challenging to determine if results are linked to anxiety in particular or to the presence of disorder or distress in general. Further exploration of the specificity of relations is critical in understanding mechanisms of effect in the development of anxious symptoms in children.

In addition, while assessments of parenting behaviors and the quality of the parent-child relationship utilized observational data, the current study relied solely on parental report measures of child anxious symptoms at age 5, the Anxiety Problems scale of the CBCL and the Social Anxiety, Separation Anxiety, and Generalized Anxiety modules of the DISC. Furthermore, as noted above, administration procedures for the DISC limited the number of mothers who were actually administered the anxiety modules, resulting in a restricted range and skewed distribution of scores. Perhaps these outcome measures do not fully capture the complex nature of anxious symptoms in young children. In fact, Dadds, Rapee, and Barrett (1994) have suggested that adopting an observational methodology may be especially important in understanding child anxiety. Due to the internal nature of the anxious experience, operationalizing and assessing anxiety in naturalistic contexts will likely be challenging, but it may nonetheless be an important complement to self-report and parent-report measures. Utilizing a multimethod, multi-informant approach is ultimately needed to recognize the

complex nature of anxiety in children and provide a more comprehensive understanding the relations among parental anxiety, parenting, and child anxiety.

The current study was also limited by reliance on maternal report measures to assess both parental anxiety in early childhood as well as later child anxiety. Although there was a two-year time difference between these two assessments, it is nonetheless important to recognize the potential impact of reporting biases on the current findings. In fact, research indicates that there is indeed a tendency for anxious mother to over-report symptoms of anxiety in their children, with maternal anxiety accounting for up to 19% of the variance in concurrent ratings of child anxiety in certain studies (Bernstein, Layne, Egan, & Nelson, 2005). Additional research utilizing a multi-method, multi-informant approach to measuring parental and child anxiety is now warranted. Furthermore, only one parent was assessed in the current study, and although this allowed for an examination of risk factors and mechanisms of transmission of anxiety within families, assessment of both parents may prove critical for establishing protective factors that lead to resilience in the face of risk (Woodruff-Borden et al., 2002). This is especially important given findings that there is marked divergence in outcomes for children of anxious parents.

Toddlerhood is a key context for the emergence of initial anxious symptoms and precursors to later anxiety disorders, which suggests a focus on the early development of anxious symptoms rather than on the development anxiety disorders per se. However, the majority of research in this area has examined maternal anxiety and parenting behaviors as risk factors for the development of anxiety disorders. Perhaps the processes involved in predicting the development of anxious symptoms, rather than disorders per se, differ. Additional research examining how these processes might operate differently when anxious symptoms versus anxiety

disorders are considered, as well as examining these processes over longer periods of time, is now warranted.

In summary, it is clear that the transmission of anxiety within families involves a complex, multidetermined process and that the role of the family is more salient under conditions of risk. Beginning to understand this process requires consideration of multiple influences and their transactions across time, and the current study only begins to address the dynamic nature of this process. Future research should address the roles of additional potentially important mediating variables or risk variables that may be critical in this process. Longitudinal research investigating the multiple transactions between the child and his or her environment using both observations and report data should prove most worthwhile for understanding mechanisms of transmission of anxiety within families and the ultimate emergence of anxious symptoms in young children.

## References

- Achenbach, T. M., & Rescorla, L. A. (2000). *Manual for ASEBA Preschool Forms & Profiles*. Burlington, VT: University of Vermont, Research Center for Children, Youth, & Families.
- American Psychiatric Association. (1980). *Diagnostic and statistical manual of mental disorders* (3<sup>rd</sup> ed.). Washington, DC: Author.
- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4<sup>th</sup> ed.). Washington, DC: Author.
- Baker, B. L., Blacher, J. B., Crnic, K. A., & Edelbrock, C. (2002). Behavior problems and parenting stress in families of three year old children with and without developmental delays. *American Journal on Mental Retardation, 107*, 433-444.
- Baker, B. L., Blacher, J., Kopp, C. B., & Kraemer, B. (1997). Parenting children with mental retardation. *International Review of Research in Mental Retardation, 20*, 1-45.
- Ball, R. M., & Pianta, R. C. (1993). Relations between maternal network size and maternal behaviour with five-year-olds across levels of maternal background and child ability. *Early Development and Parenting, 2*, 209-216.
- Baron, R., & Kenny, D. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173-1182.
- Barrett, P. M., Dadds, M. R., & Rapee, R. M. (1996). Family treatment of childhood anxiety: A controlled trial. *Journal of Consulting and Clinical Psychology, 64*, 333-342.
- Barrett, P. M., Dadds, M. R., Rapee, R. M., & Ryan, S. M. (1996). Family enhancement of

- cognitive style in anxious and aggressive children. *Journal of Abnormal Child Psychology*, 24, 187-203.
- Battaglia, M., Bajo, S., Strambi, L., Brambilla, F., Castronovo, C., Vanni, G., et al. (1997). Physiological and behavioral responses to minor stressors in offspring of patients with panic disorder. *Journal of Psychiatric Research*, 31, 365-376.
- Bayley, N. (1993). *Bayley Scales of Infant Development*. San Antonio: Psychological Corporation.
- Belsky, J., Crnic, K., & Woodworth, S. (1995). Personality and parenting: Exploring the mediating role of transient mood and daily hassles. *Journal of Personality*, 63, 905-929.
- Bernstein, G. A., Layne, A. E., Egan, E. A., & Nelson, L. P. (2005). Maternal phobic anxiety and child anxiety. *Journal of Anxiety Disorders*, 19, 658-672.
- Biederman, J., Rosenbaum, J. F., Bolduc, E. A., Faraone, S. V., & Hirshfeld, D. R. (1991). A high risk study of young children of parents with panic disorder and agoraphobia with and without comorbid major depression. *Psychiatry Research*, 37, 333-348.
- Blacher, J., Shapiro, J., Lopez, S., Diaz, L., & Fusco, J. (1997). Family well-being: Latino mothers and their children with mental retardation. *American Journal on Mental Retardation*, 101, 483-496.
- Bregman, J. D. (1991). Current developments in the understanding of mental retardation Part II: Psychopathology. *Journal of the American Academy of Child and Adolescent Psychiatry*, 30, 861-872.
- Bruch, M. A., & Heimberg, R. G. (1994). Differences in perceptions of parental and personal characteristics between generalized and nongeneralized social phobics. *Journal of Anxiety Disorders*, 8, 155-168.

- Cassidy, J. (1994). Emotion regulation: Influences of attachment relationships. In N. Fox (Ed.), *Biological and Behavioral Foundations of Emotion Regulation. Monographs of the Society for Research in Child Development*, 59, 228-249.
- Cummings, S. B., Cohn, J. F., & Meyers, T. (1995). Depression in first-time mothers: Mother-infant interaction and depression chronicity. *Developmental Psychology*, 31, 349-357.
- Chorpita, B. F., Albano, A. M., & Barlow, D. H. (1996). Cognitive processing in children: Relation to anxiety and family influences. *Journal of Clinical Child Psychology*, 25, 170-176.
- Chorpita, B. F., & Barlow, D. H. (1998). The development of anxiety: The role of control in the early environment. *Psychological Bulletin*, 124, 3-21.
- Cicchetti, D., & Cohen, D. J. (1995). Perspectives on developmental psychopathology. In D. Cicchetti & D. J. Cohen (Eds.), *Developmental psychopathology: Vol. 1. Theory and methods* (pp. 3-20). New York: Wiley.
- Ciechomski, L. D., Jackson, K. L., Tonge, B. J., King, N. J., & Heyne, D. A. (2001). Intellectual disability and anxiety in children: A group-based parent skill-training intervention. *Behaviour Change*, 18, 204-213.
- Coie, J. D., Watt, N. F., West, S. G., Hawkins, J. D., Asarnow, J. R., Markman, H. J., et al. (1993). The science of prevention: A conceptual framework and some directions for a national research program. *American Psychologist*, 48, 1013-1022.
- Cole, P. M., Michel, M. K., & Teti, L. O. (1994). The development of emotion regulation and dysregulation: A clinical perspective. *Monographs of the Society for Research in Child Development*, 59, 73-100.
- Costello, E. J., Edelbrock, C., & Costello, A. J. (1985). Validity of the NIMH Diagnostic

- Interview Schedule for Children: A comparison between pediatric and psychiatric referrals. *Journal of Abnormal Child Psychology*, 13, 579-595.
- Crnic, K. A., Friedrich, W. N., & Greenberg, M. T. (1983). Adaptation of families with mentally retarded children: A model of stress, coping, and family ecology. *American Journal of Mental Deficiency*, 88, 125-138.
- Crnic, K., Gaze, C., & Hoffman, C. (2001, April). *Family stress and emerging self regulation in 3 year olds: Contrasting developmentally delayed and typically developing children*. Society for Research in Child Development, Bi-Annual Meeting, Minneapolis.
- Crnic, K. A., & Greenberg, M. T. (1987). Transactional relationships between perceived family style, risk status, and mother-child interactions in two year olds. *Journal of Pediatric Psychology*, 12, 343-362.
- Cummings, E. M., Davies, P. T., & Campbell, S. B. (2000). *Developmental psychopathology and family processes: Theory, research, and clinical implications*. New York: Guilford Press.
- Dadds, M. R., Spence, S. H., Holland, D. E., Barrett, P. M., & Laurens, K. R. (1997). Prevention and early intervention for anxiety disorders: A controlled trial. *Journal of Consulting and Clinical Psychology*, 65, 627-635.
- Derogatis, L. R. (1992). *The Brief Symptom Inventory: Administration, scoring, and procedures manual-II* (second edition). Baltimore: Clinical Psychometric Research, John Hopkins University.
- Donovan, C. L., & Spence, S. H. (2000). Prevention of childhood anxiety disorders. *Clinical Psychology Review*, 20, 509-531.
- Dumas, J. E., & LaFreniere, P. J. (1993). Mother-child relationships as sources of support or

- stress: A comparison of competent, average, aggressive, and anxious dyads. *Child Development, 64*, 1732-1754.
- Dumas, J. E., LaFreniere, P. J., & Serketich, W. J. (1995). "Balance of power": A transactional analysis of control in mother-child dyads involving socially competent, aggressive, and anxious children. *Journal of Abnormal Psychology, 104*, 104-113.
- Dykens, E. M. (2000). Psychopathology in children with intellectual disability. *Journal of Child Psychology and Psychiatry, 41*, 407-417.
- Edelbrock, C., Crnic, K., & Bohnert, A. (1999). Interviewing as communication: An alternative way of administering the Diagnostic Interview Schedule for Children. *Journal of Abnormal Child Psychology, 27*, 447-453.
- Eley, T. C. (1997). General genes: A new theme in developmental psychopathology. *Current Directions in Psychological Science, 6*, 90-95.
- Eley, T. C. (2001). Contributions of behavioral genetic research: Quantifying genetic, shared environmental and nonshared environmental influences. In M. W. Vasey & M. R. Dadds (Eds.), *The developmental psychopathology of anxiety* (pp. 45-59). New York: Oxford University Press.
- Fleiss, J., Cohen, J., & Everitt, B. (1969). Large sample standard errors of kappa and weighted kappa. *Psychological Bulletin, 72*, 323-327.
- Floyd, F. J., & Gallagher, E. M. (1997). Parental stress, care demands, and use of support services for school-age children with disabilities and behavior problems. *Family Relations, 46*, 359-371.
- Fox, N. A. (1994). The development of emotion regulation: Biological and behavioral considerations. *Monographs of the Society for Research in Child Development, 59*

(2-3, Serial No. 240).

Fyer, A. J. (1993). Heritability of social anxiety: A brief review. *Journal of Clinical Psychiatry*, *54*, 10-12.

Gerull, F. C., & Rapee, R. M. (2002). Mother knows best: Effects of maternal modelling on the acquisition of fear and avoidance behaviour in toddlers. *Behavior Research and Therapy*, *40*, 279-287.

Gottman, J. M., Katz, L. F., & Hooven, C. (1997). *Meta-emotion: How families communicate emotionally*. Mahwah, NJ: Erlbaum.

Gray, J. A. (1982). *The neuropsychology of anxiety*. New York: Oxford University Press.

Greenberg, M. T., Carmichael-Olson, H., & Crnic, K. (1992). The development and social competence of a preterm sample at age 4: Prediction and transactional outcomes. In S. L. Friedman, & M. D. Sigman (Eds.), *The psychological development of low-birthweight children: Annual advances in applied developmental psychology*, Volume 6. (pp. 125-141). Norwood, NJ: Ablex Publishing Corporation.

Gunn, P., & Berry, P. (1987). Some financial costs of caring for children with Down Syndrome at home. *Australia and New Zealand Journal of Developmental Disabilities*, *13*, 187-193.

Hudson, J. L., & Rapee, R. M. (2001). Parent-child interactions and anxiety disorders: An observational study. *Behavior Research and Therapy*, *39*, 1411-1427.

Jacobson, J. W. (1990). Do some mental disorders occur less frequently among persons with mental retardation? *American Journal on Mental Retardation*, *94*, 596-602.

Kagan, J. (1994). *Galen's prophecy*. New York: Basic.

Kaitz, M. & Maytal, H. (2005). Interactions between anxious mother and their infants: An integration of theory and research findings. *Infant Mental Health Journal*, *26*, 570-597.

- Kasari, C., Freeman, S., Mundy, P., & Sigman, M. D. (1995). Attention regulation by children with down syndrome: Coordinated joint attention and social referencing looks. *American Journal on Mental Retardation, 100*, 128-136.
- Kendler, K. S., Neale, M. C., Kessler, R. C., Heath, A. C., & Eaves, L. J. (1992). Generalized anxiety disorder in women: A population-based twin study. *Archives of General Psychiatry, 49*, 267-272.
- Kochanska, G. (1995). Children's temperament, mothers' discipline, and security of attachment: Multiple pathways to emerging internalization. *Child Development, 66*, 597-615.
- Kopp, C. B. (1992). Emotional distress and control in young children. In N. Eisenberg & R. Fabes (Eds.), *Emotion and its regulation in early development. New Directions for Child Development, 55*, 41-56.
- Krohne, H. W., & Hock, M. (1991). Relationships between restrictive mother-child interactions and anxiety of the child. *Anxiety Research, 4*, 109-124.
- LaFreniere, P. J., & Capuano, F. (1997). Preventive intervention as means of clarifying direction of effects in socialization: Anxious-withdrawn preschoolers case. *Development and Psychopathology, 9*, 551-564.
- LaFreniere, P. J., & Dumas, J. E. (1992). A transactional analysis of early childhood anxiety and social withdrawal. *Developmental Psychopathology, 4*, 385-402.
- Laraia, M. T., Stuart, G. W., Frye, L. H., & Ballenger, J. C. (1994). Childhood environment of women having panic disorder with agoraphobia. *Journal of Anxiety Disorders, 8*, 1-17.
- Last, C. G., Hersen, M., Kazdin, A. E., Orvaschel, H., & Perrin, S. (1991). Anxiety disorders in children and their families. *Archives of General Psychiatry, 48*, 928-934.
- Last, C. G., Perrin, S., Hersen, M., & Kazdin, A. E. (1996). A prospective study of childhood

- anxiety disorders. *Journal of the American Academy of Child and Adolescent Psychiatry*, 35, 1502-1510.
- MacKinnon, D., Lockwood, C., Hoffman, J., West, S., & Sheets, V. (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods*, 7, 83-104.
- Manassis, K., & Bradley, S. J. (1994). The development of childhood anxiety disorders: Toward an integrated model. *Journal of Applied Developmental Psychology*, 15, 345-366.
- Manassis, K., Bradley, S., Goldberg, S., Hood, J., & Swinson, R. P. (1995). Behavioral inhibition, attachment and anxiety in children of mothers with anxiety disorders. *Canadian Journal of Psychiatry*, 40, 87-92.
- Maslin-Cole, C., & Spieker, S. J. (1990). Attachment as a basis for independent motivation. In M. T. Greenberg, D. Cicchetti, & E. M. Cummings (Eds.), *Attachment in the preschool years: Theory, research, and intervention*. (pp. 245-272). Chicago: University of Chicago Press.
- Marfo, K. (1992). Correlates of maternal directiveness with children who are developmentally delayed. *American Journal of Orthopsychiatry*, 62, 219-233.
- McClure, E. B., Brennan, P. A., Hammen, C., & Le Brocque, R. M. (2001). Parental anxiety disorders, child anxiety disorders, and the perceived parent-child relationship in an Australian high-risk sample. *Journal of Abnormal Child Psychology*, 29, 1-10.
- Merckelbach, H., de Jong, P., Muris, P., & van den Hout, M. A. (1996). The etiology of specific phobias: A review. *Clinical Psychology Review*, 16, 337-361.
- Merikangas, K. R., Avenevoli, S., Dierker, L., & Grillon, C. (1999). Vulnerability factors among children at risk for anxiety disorders. *Biological Psychiatry*, 46, 1523-1535.

- Messer, S. C., & Beidel, D. C. (1994). Psychosocial correlates of childhood anxiety disorders. *American Academy of Child and Adolescent Psychiatry, 33*, 975-983.
- Muris, P., & Merckelbach, H. (1998). Perceived parental rearing behaviour and anxiety disorders symptoms in normal children. *Personality and Individual Differences, 25*, 1199-1206.
- Ollendick, T. H., & King, N. J. (1991). Origins of childhood fears: An evaluation of Rachman's theory of fear acquisition. *Behavior Research and Therapy, 29*, 117-123.
- Oosterlaan, J. (2001). Behavioral inhibition and the development of childhood anxiety disorders. In W. K. Silverman & P. D. A. Treffers (Eds.), *Anxiety disorders in children and adolescents: Research, assessment, and intervention* (pp. 45-71). Cambridge: Cambridge University Press.
- Parker, G. (1983). *Parental overprotection: A risk factor in psychosocial development*. Sydney: Grune & Stratton.
- Pfeiffer, S. I., & Baker, B. L. (1994). Residential treatment for children with dual diagnosis of mental retardation and mental disorder. In J. Blacher (Ed.), *When there's no place like home: Options for Children living apart from their natural families*. (pp. 273-298). Baltimore: Paul Brookes.
- Piacentini, J., Shaffer, D., Fisher, P., et al. (1993). The Diagnostic Interview Schedule for Children- Revised Version (DISC-R): III. Concurrent criterion validity. *Journal of the American Academy of Child and Adolescent Psychiatry, 32*, 658-665.
- Popper, C. W. (1993). Psychopharmacologic treatment of anxiety disorders in adolescents and children. *Journal of Clinical Psychiatry, 54*, 52-63.
- Rapee, R. M. (1997). Potential role of childrearing practices in the development of anxiety and depression. *Clinical Psychology Review, 17*, 47-67.

- Rapee, R. M. (2002). The development and modification of temperamental risk for anxiety disorders: Prevention of a lifetime of anxiety? *Biological Psychiatry, 52*, 947-957.
- Rodrigue, J. R., Morgan, S. B., & Geffken, G. R. (1992). Psychosocial adaptation of fathers of children with Autism, Down Syndrome, and normal development. *Journal of Autism and Developmental Disorders, 22*, 249-263.
- Rosenbaum, J. F., Biederman, J., Gersten, M., Hirshfeld, D. R., Meminger, S. R., Herman, J. B., et al. (1988). Behavioral inhibition in children of parents with panic disorder and agoraphobia: A controlled study. *Archives of General Psychiatry, 45*, 463-470.
- Rosenbaum, J. F., Biederman, J., Hirshfeld-Becker, D. R., Kagan, J., Snidman, N., Friedman, D., et al. (2000). A controlled study of behavioral inhibition in children of parents with panic disorder and depression. *American Journal of Psychiatry, 157*, 2002-2010.
- Rubin, K. H., & Mills, R. S. L. (1990). Maternal beliefs about adaptive and maladaptive social behaviors in normal, aggressive, and withdrawn preschoolers. *Journal of Abnormal Child Psychology, 18*, 419-435.
- Sameroff, A. J. (1995). General systems theories and developmental psychopathology. In D. Cicchetti & D. J. Cohen (Eds.), *Developmental psychopathology: Vol. 1. Theory and methods* (pp. 659-695). New York: Wiley.
- Sameroff, A. J., & Chandler, M. J. (1975). Reproductive risk and the continuum of caretaking casualty. In F. D. Horowitz, M. Hetherington, S. Scarr-Salapatek, & G. Siegel (Eds.), *Review of child development research* (Vol. 4). Chicago: University of Chicago.
- Silove, D. (1986). Perceived parental characteristics and reports of early parental deprivation in agoraphobic patients. *Australian and New Zealand Journal of Psychiatry, 20*, 365-369.
- Stark, K. D., Humphrey, L. L., Crook, K., & Lewis, K. (1990). Perceived family environments of

- depressed and anxious children: Child's and maternal figure's perspectives. *Journal of Abnormal Child Psychology*, 18, 527-547.
- Stoneman, Z., & Berman, P. W. (1993). *The effects of mental retardation, disability, and illness on sibling relationship: Research issues and challenges*. Baltimore: Brookes.
- Strauss, C. C., Frame, C. L., & Forehand, R. (1987). Psychosocial impairment associated with anxiety in children. *Journal of Clinical Child Psychology*, 16, 235-239.
- Suveg, C., Zemon, J., Flannery-Schroeder, E., & Cassano, M. (2005). *Journal of Abnormal Child Psychology*, 33, 145-155.
- Turner, S. M., Beidel, D. C., & Costello, A. (1987). Psychopathology in the offspring of anxiety disorders patients. *Journal of Consulting and Clinical Psychology*, 55, 191-202.
- Turner, S. M., Beidel, D. C., Roberson-Nay, R., & Tervo, K. (2003). Parenting behaviors in parents with anxiety disorders. *Behaviour Research and Therapy*, 41, 541-554.
- Vasey, M. W., & Dadds, M. W. (2001). *The Developmental Psychopathology of Anxiety*. New York: Oxford University Press.
- Veisson, M. (1999). Depression symptoms and emotional states in parents of disabled and non-disabled children. *Social Behavior and Personality*, 27, 87-98.
- Warren, S. L., Gunnar, M. R., Kagan, J., Anders, T. F., Simmens, S. J., Rones, M., Wease, S., Aron, E., Dahl, R. E., & Sroufe, 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.
- Whaley, S. E., Pinto, A., & Sigman, M. (1999). Characterizing interactions between anxious mothers and their children. *Journal of Consulting and Clinical Psychology*, 55, 229-235.
- 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.

## Appendix: Observational Coding Systems

### Parent Ratings

#### Positivity

Expression of positive regard or affect, warmth, affection. The parent's positive feelings toward the child, expressed during interaction with the child, taking into account particularly the intensity of these feelings. Speaks in warm tone of voice, has expressive face, smiles, laughs with child, is relaxed and at ease, is enthusiastic about child, praises child, seems to enjoy child, listens, watches, remains attentive, looks into child's face when talking to him/her. Spontaneity refers to taking advantage of an opportunity for interaction as it is presented. Keep in mind the uniformity of positive affect, and also be aware of the "brightness" in vocal quality.

1 = Not at all positive- Parent does not display true positive regard for the child, either in words in expressions. If positive expressions (laughing, smiling) do occur, they appear to be inappropriate to the situation or an inaccurate reflection of the parent's feelings.

2 = Minimally positive (lukewarm)- Infrequent or weak signal(s) of positive affect are shown. Their intensity and frequency are low.

3 = Moderately positive- Greater frequency and intensity of positive affect is shown, as compared to the rating of 2, but the parent demonstrates virtually no spontaneity.

4 = Very positive- Greater frequency and intensity of positive affect is shown, compared to the rating of 3. Also evidence of some spontaneity is observed in parent's demonstration of positive affect. What makes this rating different than a score of 5 is that the parent is not characteristically positive; there may be rare moments of flat and/or negative affect.

5 = Predominantly positive- Parent is predominantly positive, both in terms of facial and vocal expressions. The parent does not appear to be bored, discontent, or vocally harsh and disruptive. Affect is consistently positive and spontaneity is characteristic and appropriate. Parent shows a range of expressions that are virtually always positive.

#### Negativity

Expression of negative affect (e.g., hostility) toward the child, considering both the intensity and frequency of the expression of negative affect. If the intensity of the negative affect is low to moderate, the rating is made primarily on the frequency. If there is high intensity, the frequency is considered and the rating is moved up one point on the scale. Some negative behaviors include: disapproval, tense body, negative voice when correcting, abruptness, tense facial muscles, strained expression, threatening the child, punishing the child without explanation.

1 = Not at all negative- No evidence of anger, distrust, frustration, impatience, disgust, general dislike or other negative behaviors is observed in parent's face or voice.

2 = Minimally negative- Low frequency, low-moderate intensity. Only one or two instances of negative affect with moderate or low intensity of negative expression.

3 = Moderately negative- Low to moderate frequency, high intensity. More than two instances of negative affect are observed (about 3 or 4), or 1 particularly intense expression of negative regard.

4 = Strikingly negative- Higher frequency and intensity of negative affect/regard are observed, when compared to a rating of 3. Yet, the parent is not characteristically negative during interactions with the child, as with a rating of 5. Parents are simply more negative than positive in their affective expressions.

5 = Predominantly negative- Feelings of negative affect or regard are expressed strongly and quite frequently (e.g., unnecessarily harsh when prohibiting child's behavior, constant sarcasm and cynicism in tone of voice). The overriding affect influencing the parent-child interactions is characteristically negative.

### Intrusiveness

Intrusive interaction is definitely adult-centered rather than child-centered. Intrusive parents impose their agenda on the child despite signals from the child that a different activity, level, or pace of interaction is needed. High arousal, vigorous physical interaction, or a rapid pace are not, by themselves, indicative of intrusive overstimulation- if a child responds positively with sustained interest and is not engaging in defensive behaviors. It is when the child averts his/her gaze, turns away, or expresses negative affect and the parent continues or escalates his/her activity that intrusive behavior is evident. Overstimulation is also apparent when the parent does not allow the child a turn or an opportunity to respond at his/her pace. Some intrusive parents persist in demonstrating toys to the child long after they have gained the child's interest and the child obviously wants to manipulate the toy him/herself. These parents appear unable to relinquish control of the interaction in order to facilitate the child's exploration or regulation of the activity. Another controlling, intrusive behavior is displayed by parents who overwhelm the child with a rapid succession of toys or approaches, not allowing him/her time to react to one before another occurs. Extreme intrusiveness can be seen as over control to the point where the child's autonomy is at stake. It should be kept in mind that a parent can become involved in play with the child without being highly intrusive.

Specific behaviors characterizing intrusive interaction include failing to modulate behavior that the child turns away from, defends against, or expresses negative affect to; offering a continuous barrage of stimulation or toys; not allowing the child to influence the pace or focus of play or interaction; taking away objects while the child still appears interested; not allowing the child to handle toys he/she reaches for; insisting that the child do something (play, eat, interact) in which he/she is not interested; not allowing child to make choices. Remember that the child and parent do not have to be involved in the same activity for the parent to still impose his/her agenda on the child.

1 = Not at all intrusive- There are almost no signs of parent intrusive behavior.

2 = Minimally intrusive- While the parent shows evidence of intrusiveness, it is inconsistent and non-directive. Parent may initiate interactions with and offer suggestions to the child that occasionally are not welcomed by the child. If the child engages in defensive behavior, the parent persists for no more than a brief time, and then changes to a different activity. The parent continues his/her activity after the child engages in defensive behavior but she does not escalate her activity.

3 = Inconsistently intrusive- Parent is characteristically incoherent in this regard; periods of blatant intrusiveness are intermixed with periods of sensitive, responsive interaction.

4 = Moderately intrusive- Parent intrusiveness occurs with moderate frequency. The parent is more intrusive than not.

5 = Highly intrusive- Parent is consistently intrusive. Most of the observation period is marked by the parent completely controlling the interaction, allowing the child little lee-way in his/her play. The parent allows the child little autonomy. The parent essentially negates the child's experience.

### Emotional Scaffolding

Emotional scaffolding is defined as the scaffolder's ability to make the experience a positive and enjoyable one for the child and one that will contribute to the child's sense of accomplishment and efficacy. A scaffolder who provides effective emotional support shows a high level of acceptance of and value for the child's attempts to do the task even if incorrect (e.g., non-critical tone of voice, patience, regular and genuine praise), high sensitivity to the child's emotional state, including responses that effectively reduce child frustration (e.g., empathy), and frequent eye contact, shared smiles or other signs of affective sharing and attunement.

Score 1:

- A. Little or no acceptance of the child is indicated by the mother, which can be shown in one of the following ways:
1. The mother often rejects the child's attempts at the task either by giving feedback to the child that is rejecting or negating in tone, by responding to child attempts with "No", by physically blocking the child's attempts at task, by "undoing" the child's attempts (e.g., undoing picture pieces) presumably because the child has not done it "right", or chastising the child in some way. These mothers are often intrusive, physically and/or verbally. Their feedback lacks constructive comments and the child is left knowing what not to do but is given little or no information about how to do the task correctly. The mother's tone of voice is impatient or abrupt, and she seems to place little value on the child's ideas or strategies about how to do the task.
  2. The mother shows little acceptance and support of the child and his/her attempts at the task. In this case, the mother is under-involved and appears to be emotionally detached. Emotional detachment is often

- indicated in body posture, such as sitting up and away from the child or off to the side of the child, and making little eye contact with the child.
- B. Praise is given infrequently and may be completely absent. If it does occur, it is implicit (e.g., nod of the head or a shrug) or it lacks enthusiasm (e.g., half-hearted or impatient in tone).
  - C. Little sensitivity to the child's emotional state is observed. The mother appears to be either unaware of her child's emotional feelings or ignores them. She may be detached or unsupportive or she may be involved but insensitive to the child's emotional state. She makes no attempt to reduce the child's frustration if it occurs (e.g., she fails to empathize with the child and fails to appropriately reduce the degrees of freedom for the child). She may contribute to the child's sense of frustration through inappropriate pacing or timing of his/her scaffolding behaviors (e.g., continuing to push the child despite signs of frustration, or interfering with child attempts despite some degree of success on the child's part). The child may direct his/her frustration toward the mother by hitting her, kicking her, pushing her away, or other aggressive behavior. Often, these mothers seem uncomfortable with their child's frustration and seem to lack strategies for effectively handling it. They may respond to their child's frustration with frustration of their own.
  - D. Mutual eye contact may occur occasionally during the session, but there are no shared smiles or "four-eyed" smiles. If the child does share an emotional expression with the mother, it is rarely reciprocated.
  - E. Little vicarious enjoyment of the child's successes (or partial successes) is shown. The mother shows little or no vested interest in how well her child succeeds and little or no enthusiasm for the task.
  - F. The mother's contribution to her child's sense of accomplishment and mastery is minimal. If her child does succeed, she does not respond in a manner that would contribute to the child's positive feelings about his/her own sense of efficacy. Some mothers who receive this score may simply lack positive responses to success. Others who receive this score may respond in a negating, critical, or mocking ways that would be expected to be destructive to the child's sense of efficacy.

Score 3:

- A. Moderate acceptance and support of the child is shown by the mother. However, the mother's acceptance and support is either inconsistent during the session or is consistent, but at a moderate level only.
  - If inconsistent: The mother is tuned in, supportive, and accepting during part of the session, but is also tuned out, detached, impatient, rejecting, or negating at other times.
  - If consistent: The level and quality of emotional acceptance and support is moderate. In this case, the mother generally accepts the child's attempts at the task, however, she may be matter-of-fact in tone, or restricted in emotional expression or a little impatient (e.g., too task-directed). She does not reject her child's attempts at the task outright, however, her indications of acceptance may be implicit rather than explicitly shared.
- B. Some praise is given to the child, however, it is either consistent but restricted or inconsistent and conditional.

In consistent but restricted: Frequency of praise is consistent but it is restricted in emotional expressiveness (i.e., not delivered in an animated, enthusiastic way). It may seem perfunctory.

If inconsistent and conditional: Praise is given inconsistently during the session, which may take several forms- e.g., the mother withholds praise until full completion of the task, failing to praise the child for success on intermediate steps of the task; or the mother praises some steps toward completion, delivering more praise seems appropriate for these steps; or the mother praises intermediate steps more than full completion., delivering more praise than seems warranted for the intermediate steps. (One mother was observed to reinforce her child's success only on the substeps of the task on which the mother had helped him succeed, but to withhold praise with the child succeeded on his own).

- C. Moderate sensitivity to the child's emotional state is observed. For part of the session, the mother appears to be sensitive to the child's emotional state and responds appropriately at least half of the time. The mother makes at least one attempt to reduce her child's frustration, however, she does not respond on an emotional level (e.g., by making an empathetic statement). Instead, reducing frustration takes the form of technical support (e.g., filling in for the child, repeating a demo, or marking a critical feature). Attempts to reduce frustration are somewhat successful in that the child returns to task and tries again at least for a short period of time. At other times, the mother seems insensitive and unaware of her child's emotional experience. Her pacing and timing or scaffolding behaviors may contribute to her child's frustration.
- D. Affective sharing occurs at a moderate level. The dyad shares some mutual smiles and makes eye contact more than occasionally. Some emotions, especially positive ones, are reciprocated, although some of the mother's responses lack enthusiasm or are a bit curtailed or perfunctory. The mother may also be inconsistent, responding contingently and enthusiastically to the child some times yet failing to respond or responding in a restricted way other times. Some mothers who fall in this category are observed to occasionally respond in what seemed an incongruous manner, that is, an overly bright response or an inappropriately timed response (If inappropriateness and/or incongruity of responses were frequent, the mother would receive a lower score). The child does not seem hesitant to share emotional expressions with the mother.
- E. Moderate vicarious enjoyment of the child's success is shown. The mother shows moderate enthusiasm for her child's attempt, indicated by sustained attention. However, the mother does not seem especially vested in whether her child does well at the task and her indications of vicarious enjoyment tend to be expressed briefly (e.g., a fleeting smile or quick nod of the head) or are somewhat restricted in expression (e.g., mother looks away or down as she smiles at her child's attempts, rather than enthusiastically stating her pleasure).
- F. The mother's responses contribute moderately to her child's sense of accomplishment and mastery. However, her responses to success are either inconsistent or her response is at times restricted, low-level, or conditional. At times, she may appear to value the end goal over the quality of her child's emotional experience.

## Score 5:

- A. Acceptance and support of the child is very high. The mother uses a positive tone of voice throughout, even if her child is not particularly cooperative. She is very supportive of her child's attempts and respects her child's ideas and strategies about how to solve the task (for example, she may modify the approach she is taking to include a strategy offered by her child). When she does give feedback to the child, it is done in a sensitive and supportive way and feedback is excellent, and is not distracting to the child's attempts to work on the task. (See comments below re: contributions to child's sense of efficacy). The mother is not rejecting of, critical of, or impatient with the child (e.g., she does not mock her child's attempts).
- B. Praise and encouragement are given frequently and enthusiastically. Praise is often explicit and is used regularly throughout the task, but is not so frequently as to be distracting or disruptive. The timing of praise is very appropriate and may result in the sharing of positive emotion between mother and child (e.g., "four-eyed" smiles).
- C. High sensitivity to the child's emotional state is shown. The mother seems very tuned into her child's emotional state. For example, if the child becomes frustrated the mother is quick to offer encouragement, reduce degrees of freedom, or offer other support. If the child seems to need a brief respite from the task, the mother is quick to offer a temporary alternative or allow a brief diversion. Mothers who receive this score are able to effectively reduce their child's frustration, and often respond to child frustration with an empathetic statement in addition to any filling in or other technical support they may give. They are also likely to verbalize feelings about the tasks (e.g., "You like that, don't you?" or "I know... it's hard.").
- D. Affective sharing occurs regularly throughout the session and it is positive and enthusiastic in tone. Much mutual eye contact occurs, fairly frequent positive emotion is shared (e.g. "four-eyed" smiles) and the dyad may share some negative emotion, such as frustration. However, if the child is frustrated, it is clear that he/she is frustrated with the task and does not direct that frustration toward the mother in any kind of angry or aggressive gesture. Rather, the child seems to look to the mother for help and support when frustration is encountered. Neither the mother or child show signs of restricting emotional communication with each other. The mother and child seem to be having fun together.
- E. The mother seems to derive much vicarious enjoyment from her child's success (partial or complete). She seems very invested in the outcome of her child's attempts and shows high enthusiasm for the task. She seems to take her job of providing needed support seriously, in that she wants her child to succeed and shows a strong commitment to her part in making that happen. She tends to express her delight and pleasure openly.
- F. The mother's response to her child's success contributes strongly to the child's sense of accomplishment and mastery. She creates a positive environment for work on the task. Her responses are consistent, enthusiastic, and explicit (For example, she tends to directly attribute success to the child by using "you" statements, e.g., "You did it!"). Even if her child does not succeed technically, he or she still derives feelings of pleasure and accomplishment from working on the task. She clearly values the quality of the emotional experience that the child has while working on the task.

## Dyadic Ratings

### Dyadic Pleasure

Enthusiasm, joyfulness, mutual enjoyment, a sense of dyadic “joie de vivre.” A general sense that these two people enjoy being with one another. This may be reflected in energy level, facial expressions, cheerfulness, positive tone and content of conversation between the two individuals.

1 = No mutual enjoyment and/or dyadic enthusiasm (no smiling, no animation).

2 = Slight mutual enjoyment and/or dyadic enthusiasm (1-2 smiles, slight animation).

3 = Moderate enjoyment and/or enthusiasm (3-4 smiles, moderate animation) across more than 1 situation/interaction, or one extended period of mutual enjoyment.

4 = Considerable enjoyment and/or enthusiasm.

5 = Characteristically joyful and enthusiastic.

### Dyadic Conflict

There is evidence of conflict, tension, and/or vented hostility between two individuals. This may be evidenced by an initiation purposefully not responded to (or very minimally), a tense tone of voice, and/or negative comments being directed towards another. Additionally, a curt manner, tense silence, or short comments/commands may characterize the interaction.

1 = No evidence of tension.

2 = One instance of slight tension, such as in tone of voice. Frequency and intensity are low.

3 = Tense tone of voice and few brief utterances as responses on occasion. Frequency of conflict is increased, but intensity is still low to moderate.

4 = Dyad is more often conflictual. A rating of 4 is characterized by an increase in intensity from a rating of 3. For example, initiations are not responded to or negative comments are especially frequent.

5 = Tension or hostility is characteristic of the dyad, as seen by minimal or no response to initiations, hostile tone of voice, and high intensity and/or frequency.

## Vita

Marissa N. Pellegrino

- 2003-2006      Ph.D., The Pennsylvania State University  
University Park, PA  
Major: Clinical Psychology  
Minor: Developmental Psychology
- 2005-2006      Clinical Internship  
Lucile Packard Children's Hospital at Stanford/The Children's  
Health Council  
Palo Alto, CA
- 2000-2003      M.S., The Pennsylvania State University  
University Park, PA  
Major: Clinical Psychology
- 1996-2000      B.S., Summa Cum Laude, Duke University  
Durham, NC  
Major: Psychology  
Minor: Biological Anthropology and Anatomy  
Certificate: Human Development