

Maternal Anxiety and Child Behavioral Problems: Mediating and Moderating Processes

Shannon L. Harper

The College at Brockport



The College at
BROCKPORT
 State University of New York
 Department of Psychology

M.A. WRITTEN THESIS APPROVAL FORM

Student's Name: Shannon Harper

Date of Thesis Defense: July 29, 2011

Title of Thesis: Maternal Anxiety and Child Behavior Problems: Mediating and Moderating Processes.

Date of Receipt of Final Written Thesis: 7/21/11

Thesis Committee Approval: (To be signed after receipt of the FINAL approved copies of the thesis; one copy must be original)*

[Signature] 7/20/11
 Thesis Advisor Date

[Signature] 7/20/11
 Committee Member Date

[Signature] 7/20/11
 Committee Member Date

 Committee Member Date

*This form (signed) and the approved copies (2) of the thesis, including all revisions resulting from the oral defense, must be filed with the Graduate Committee Chairperson. Signatures indicate that the attached written thesis is ready for binding and library filing.

Abstract

The purpose of this study was to investigate the complex relationship between maternal anxiety, harsh parenting, and childhood behavioral problems in a sample of at-risk parents. The Fragile Families and Child Wellbeing Study, which provided longitudinal data from a large and diverse population of families and their newborn children, was utilized to examine the intervening variables that might affect the relations between anxiety and child behavior problems. The results of this study indicated that harsh parenting served as a partial mediator of the relations between anxiety and subsequent behavior problems. Maternal family mental health history, presence or absence of the child's birth father, and child gender on the pattern of relations were examined as moderators of the relation between maternal anxiety and child behavioral outcomes but the analyses failed to support the proposed moderating relations. The implications for considering the effects of maternal anxiety on child behavior problems within a stress-processing model are discussed.

Maternal Anxiety and Child Behavior Problems: Mediating and Moderating Processes

It is clear that maternal mental health characteristics play an important role in determining child behavioral outcomes (Rapee, 2009). However, it is much less clear what the processes are that account for the relations between parental mental health status and child behavioral outcomes. This study will attempt to explain the complex relationship between maternal anxiety and childhood behavioral problems, utilizing a stress-processing framework (Grant et al., 2003). The overarching focus of the study will be to examine whether harsh parenting functions as a mediator between maternal anxiety and childhood behavioral problems. In addition, the moderating effects of different group characteristics such as maternal family history of mental health, presence of the child's biological father in the home, and the child's gender will be investigated. By understanding those characteristics that function to explain or alter the relations between maternal anxiety and child behavioral outcomes, we may gain a greater sense of how maternal mental health operates to determine children's mental health.

Overview of Anxiety

Anxiety disorders are among the most common mental health disorders (First & Tasman, 2004). Parents of young children may be especially prone to anxiety (Crnic, Gaze, & Hoffman, 2005), as worries over finances, childcare issues, and child health care concerns may all contribute to elevated stress (Crnic et al., 2005; Mistry, Stevens, Sareen, De Vogli, & Halfon, 2007). The stress of parenting, and subsequent alterations in maternal mental health, is compounded when parents lack social support or live in environments that otherwise heighten the stresses associated with childrearing (Jensen, Grogan, Xenakis, & Bain, 1989).

Eley and Zavos (2010) estimate that 25% of individuals will meet the criteria for an anxiety disorder at some point in their lives. Among the most common of these anxiety disorders is Generalized Anxiety Disorder (GAD) (Eley & Zavos, 2010). In the Diagnostic and Statistical

Manual, fourth edition (*DSM-IV-TR*), GAD is characterized by “excessive anxiety and worry (apprehensive expectation) occurring for a majority of days during a 6-month period, about a number of events or activities” as well as an inability to control the worry, and a number of physiological symptoms (American Psychiatric Association, 2000). Individuals who suffer from GAD find themselves constantly in a state of worry about many different matters (school, work, children, health, etc.). Using the same DSM-IV criteria Grant et al. (2005) found the 12-month and lifetime prevalence of GAD to be 2.1% and 4.1% respectively, with an increased risk associated with being female. Some researchers believe this number is deceptively low, due in part to the at least 6-month criteria and the debatable definition of “excessive worry” (Ruscio et al., 2007). Using a more broad definition of GAD to include non-excessive worries and only 1-month of persistent symptoms the 12-month and lifetime prevalence jump up to 6.2% and 12.8% respectively (Ruscio et al., 2007). As only a minority of people that likely meet the criteria for an anxiety or mood disorder actually seek medication or counseling therapy (Young, Klap, Shoia, & Wells, 2008), it suggests that the true prevalence of this disorder may be much higher. Given that anxiety affects such a large number of people, this makes studying the development and consequences of anxiety all the more necessary. Understanding how anxious parents may negatively affect the behaviors of their children is of particular importance, so that more can be known about ways to prevent these possibly harmful behavioral effects.

While GAD is much less common in children than in adults (First & Tasman, 2004) children will often display similar anxious, depressed and/or withdrawn behaviors that are commonly classified as “internalizing behaviors” (Kovacs & Devlin, 1998). The term internalizing behaviors can be conceptualized as having disordered emotions or mood (Kovacs & Devlin, 1998). These problems are aptly termed “internalizing” because the disordered moods

and/or emotions occur within the individual, but still can manifest into observable behaviors such as being socially withdrawn (Kovacs & Devlin, 1998). The anxious and inhibited behaviors conceptualized by internalizing disorders have been known to lead to continuing anxiety problems in adulthood (Kagan and Snidman, 1999). Internalizing disorders are not uncommon in children in general, with prevalence rates ranging from just below 10% (Rothen et al., 2009) to between 11% and 13% (Gao, Patterson, Abbott, Carter, & Iusitini, 2007; Siu, 2008). These numbers can dramatically increase (to almost 50%) if the child has a parent with a persistent and reoccurring mental disorder (Gao et al., 2007). These numbers denote the importance of studying individuals with mental disorders such as GAD particularly if they are also parents, as the presence of these disorders can greatly affect the behaviors of their children.

Externalizing disorders in young children have been found to be just as common as internalizing disorders, with prevalence rates ranging from 6-11% and are frequently found to be comorbid with internalizing disorders, particularly if the child's parent has a history of mental illness (Gao et al., 2007). Hyperactive, disruptive, or aggressive behaviors are the types of behaviors often conceptualized as externalizing disorders (Liu, 2004; Campbell, Shaw, & Gillom, 2000). These disordered behaviors are often seen in combination with a number of internalizing behaviors in children, possibly suggesting that they stem from similar underlying processes which manifest as general behavioral problems (Pesenti-Gritti et al., 2008).

Maternal Anxiety's Effect on Childhood Behavior

There is considerable evidence about the distinct effect maternal anxiety in particular can have on childhood behavioral problems. McClure, Brennan, Hammen, and Le Brocque (2001) investigated the effect of both paternal and maternal anxiety on their children's behavioral outcomes. The results indicated that maternal but not paternal anxiety was a significant predictor

for anxiety in children (McClure, Brennan, Hammen, & Le Brocque, 2001). The risk was greatest (almost double) for children whose mother had a lifetime history of anxiety, while paternal anxiety made no significant difference. These results may be indicative of the parent who spends the largest amount of time with the child, and therefore has the greater chance of their anxiety impacting the child in some manner.

Maternal anxiety may not only affect children developing anxious or other internalizing behaviors, but also may increase children's risk for developing externalizing behaviors. Van den Bergh and Marcoen (2004) found that maternal anxiety during pregnancy predicted externalizing behavioral problems in children, such as attention deficit hyperactivity disorder (ADHD). While postnatal maternal anxiety was not an additionally significant predictor of childhood externalizing behavioral problems, the results do implicate the importance of understanding the relationship between maternal anxiety and children's externalizing behavioral problems (Van den Bergh & Marcoen, 2004).

Yoo, Brown and Luther (2009) examined several factors that may lead children to have co-occurring anxious and externalizing behavioral problems. The most significant predictors were children who had mothers of low income and a history of psychiatric illnesses; specifically, children who were exposed to maternal anxiety at some point during their lifetime (Yoo, Brown, & Luther, 2009). Also of note, Yoo et al. (2009) found that children who were displaying both anxious and externalizing problem behaviors had decreased in terms of their academic achievement and scores on intelligence tests when compared to children who displayed only one type of problem behavior or no problem behaviors at all.

Fanti and Henrich (2010) had similar findings about the detrimental effects of co-occurring internalizing and externalizing behavioral problems over a 10-year period. When

children displayed a combination of these behavioral problems they were more likely to engage in risky behaviors, be rejected by peers, associate with deviant peers, and act asocial with most peers when beginning adolescence. Such a wide-array of problems was not seen in children who were not displaying both externalizing and internalizing behavioral problems (Fanti & Henrich, 2010). These findings illustrate the importance of better understanding the causes of co-occurring internalizing and externalizing problem behaviors in children.

Theoretical Perspectives on How Maternal Anxiety May Affect Children's Behavior

Parenting processes may be affected by the occurrence of anxiety disorders, and these mental health characteristics of parents may serve as risk factors for the development of behavioral problems in children (Rapee, 2009). The relationship between parental anxiety and children's behavioral outcomes is complex. However there are a number of theories attempting to explain why certain parental mental health characteristics, such as anxiety, may lead to similar anxious behaviors in children. Most notably, the occurrence of anxiety traits in parents and offspring may be representing shared genetic variation. A study conducted by Ogliari et al. (2010) found a high concordance rate of GAD and other anxiety disorders among monozygotic (MZ) and dizygotic (DZ) twins, with a much higher rate found in MZ twins. Although it may be difficult to completely separate genetics and environmental causes for anxiety (Eley & Zavos, 2010), these results suggest that genetics play an important role in the development of anxiety (Ogliari et al., 2010). Nonetheless, as the concordance rate is far from perfect for MZ twins, non-genetic factors also play a role in determining the development of anxiety disorders in both adults and children.

Aside from genetics, another possible perspective that may account for the transmission of anxiety may be found in social learning theory. This theory states that it is possible for people

to learn behavior “vicariously” through observation of others exhibiting that behavior (Bandura, 1977). A person may then model these behaviors themselves, perhaps expecting them to be reinforced in some way (Bandura, 1977). Several types of anxiety (including generalized or specific phobias) are believed to be transferred through this kind of “vicarious learning” (Askew & Field, 2008). Social learning theory would predict that if a child were to observe their parents expressing anxious behaviors, they themselves would then model those behaviors. In terms of social learning theory and specific phobias the process of this vicarious transmission can happen by a person (child’s mother) exhibiting excessive and irrational fear when confronted with a particular stimulus in the presence of another person (the child) (Bandura, 1977). The child then learns to also exhibit excessive and irrational fear when confronted with the same stimulus. The social learning of anxiety-related behaviors in offspring can happen in much the same way if exposed to a parent with GAD. If a mother is continuously worried about a number of different issues while also caring for a child, the child is likely to not only perceive the mother’s constant anxiety, but also to develop their own feelings of anxiety (Rapee, 2009).

Anxious mothers tend to show much higher levels of distress when their child engages in a number of different activities (Turner, Beidel, Roberson-Nay, & Tervo, 2003). In addition to this, Rapee (2009) found that children are extremely accurate in their perceptions of their mother’s anxious behavior. These accurate perceptions were also predictive of anxiousness in the children (Rapee, 2009). It is possible that children are taught to be anxious about otherwise innocuous situations through observing how their anxious parents’ react to similar situations (Turner et al., 2003). If a child’s parent is constantly and observably anxious, it is likely that the child will experience similar feelings of anxiety towards certain activities and possibly even carry these anxious tendencies across a broad array of situations.

As would be consistent with a genetic or social learning perspective, in general having an anxious parent makes it more likely that a child will display anxious behaviors (Reitman & Asseff, 2010; McClure et al., 2001; Rapee, 2009). This effect occurs even after controlling for a number of demographic characteristics such as education level and socioeconomic status (Loeber, Hipwell, Battista, Sembower, & Stouthamer-Loeber, 2009). It may also be the case that beyond direct transmission via observational or genetic factors, parenting processes may also serve to explain the relation between parental and offspring anxiety disorders.

Several studies have found a connection between controlling or overprotective parenting behaviors and consequent anxious behaviors in their children as well as a relation between controlling or overprotective parental behaviors and parents' own anxiousness (Whaley, Pinto, & Sigman, 1999; Reitman & Asseff, 2010). While controlling and overprotective behaviors by a parent may not always have the same motivation, they often lead to the same behavioral outcome in a child (Whaley et al., 1999; Reitman & Asseff, 2010). For example, a controlling parent may seek to dominate many of a child's activities possibly because they feel the child simply would not do them right (Whaley et al., 1999). An overprotective parent may wish to manage their own child's day to day activities for fear that something bad may happen to the child otherwise (Reitman & Asseff, 2010). These parents may even be forceful in this protection (Gruner, Muris & Merckelbach, 1999). Both of these parenting behaviors can have a similar effect on the child's behavior. These controlling and overprotective parental behaviors may be motivated by a number of reasons, but in the end leave the child feeling incompetent (Whaley et al., 1999). This feeling of incompetence would in turn produce anxiety in children when they are faced with situations without the benefit of parental assistance (Reitman & Asseff, 2010).

A study conducted by Becker, Ginsburg, Domingues, and Tein (2010) also found a relationship between maternal and child anxiety and found that this relationship was mediated by the child's feelings that many things were out of their control. As controlling behaviors are consistent with anxious mothers (Whaley et al., 1999; Reitman & Asseff, 2010), children of anxious mothers displaying feelings that things are out of their control would be an expected consequence. There does appear to be evidence that anxious parents may be more controlling in their parenting, which in turn may lead to more anxious behavior in their children (Whaley et al., 1999; Reitman & Asseff, 2010). However, there are some studies that indicate the path of causation in this relationship may at the very least be reciprocal or possibly even reversed as anxious children also bring out more controlling and overprotective behaviors in their parents (Eley, Napolitano, Lau, & Gregory, 2010).

A similar process is expected by some when examining the role of child temperament in parenting behaviors. Some children have initial behavioral traits (anxiousness, excitability etc.) that may evoke specific parental behavior (Feldman, Greenbaum, Mayes, & Erlich, 1997; Kagan & Snidman, 1999). While parents' behavioral reactions to a child with a difficult temperament may perpetuate and exacerbate the child's difficult behavior, those reactions would not be looked at as the initial cause (Feldman et al., 1997). It is important for any study examining parental effects on children's behavior to also take into account the child's initial temperament.

Brozina and Abela (2006) found that children who were naturally more inhibited with their behaviors (socially withdrawn, shy, apprehensive, etc.) were at an increased risk for displaying anxious symptoms when faced with added stress. In this particular study, the added stress came in the form of "hassles" that the child would experience in their day to day activities. These "hassles" included a myriad of frustrating experiences or demands placed on the child.

The results demonstrated that children who scored high in Behavioral Inhibition (BI) were affected more by an increased number of hassles than those who scored low in BI, and these effects were manifested with a greater number of anxiety symptoms (Brozina & Abela, 2006).

As noted earlier a persistent problem in studying parenting effects of children's behavior problems is that the directionality of the relationship between controlling parents and anxious children is not easily determined as work in this area necessarily relies upon nonexperimental designs. An exception to this is the work of Thirlwall and Creswell (2010), who used experimental work to demonstrate a causal relation by using a within-subject counterbalanced design in which mothers of young children would behave both controlling and autonomy-granting while their children prepared for a small talk. The results indicated that parents who used more controlling methods of parenting produced more anxious behaviors in their children. However, this effect was only found for children who scored higher on a trait anxiety measure before commencement of the experiment. For children who scored low on the trait anxiety measure there was actually a slight decrease in anxious behaviors for the controlling-mother condition compared to the autonomy-granting-mother condition (Thirlwall & Creswell, 2010).

The results of Thirlwall and Creswell's (2010) study would appear to support a diathesis-stress model (Elwood, Mott, Williams, Lohr, & Schroeder, 2009) of anxiety. Children who are naturally anxious for one reason or another would be expected to show an increase in anxiety if put under enough added strain. A mother acting controlling in preparation of a short talk appeared to be enough strain to greatly increase the anxiety of the naturally anxious children, but not the children who had low trait anxiety (Thirlwall & Creswell, 2010). In this study, there was no account taken of a family history of anxiety or other mental disorders to possibly account for the difference between the children high in trait anxiety and those low in trait anxiety.

The diathesis-stress model is used as a perspective in which to view a number of different disorders, including many anxiety disorders (Elwood et al., 2009; Bernstein, Leen-Feldner, Kotov, Schmidt, & Zvolensky, 2006). This model predicts that there is a certain predisposition (diathesis) an individual might have for a disorder and if enough stress is put on that individual the disorder will manifest. For example, a person may possess a predisposition to anxious behavior (such as a family history of anxiety) and is consequently exposed to a stressful environment (perhaps being a single parent). The diathesis-stress model would predict that the combination of these conditions would lead to anxious behavior, rather than either condition alone. However, given the current state of molecular genetics, a predisposition for psychopathology is generally not directly measureable. When two children are exposed to a similar environment but only one of these children displays psychopathology, while another does not, the diathesis-stress model would explain that as the former child possessing some predisposition to the psychopathology that the latter child did not. A family history of anxiety disorders, which could more clearly indicate the presence of genetic risk in children, could potentially serve as a rough index of genetic susceptibility.

Stress Processing Perspective on the Relations between Parental Anxiety and Offspring Behavior Problems

There may be a still more complete and understandable explanation for the connection between maternal anxiety and childhood behavioral problems when viewed through a stress-processing framework. This relationship can possibly be understood through prolonged and excessive exposure to stressors and an inability to adequately cope with those stressors. A child that is exposed to a chronic stressor, such as having an anxious parent, may then be put at an increased risk for developing behavioral problems if faced with any additional stress (Grant et

al., 2003). This could possibly be explained by a difficulty to process and properly handle stress. Repetti, Taylor, and Seeman (2002) conducted a meta-analysis which found that being part of a “risky family” could have detrimental effects on a child’s means for processing emotions, such as stress. “Risky families” were characterized by being full of conflict and aggression, as well as being cold, neglectful and unsupportive (Repetti et al., 2002). These “risky families” were so termed because they represented certain family characteristics that would put a child at an increased risk for having difficulty processing emotions such as stress. Exposure to a continuously anxious parent may consequently make it more difficult for a child to learn adequate means of coping with stress, putting them at an increased risk for manifesting behavioral problems when faced with any additional stress.

Grant et al. (2003) proposed a model examining the effects of stress on child and adolescent psychopathology. This model maintains that stressors contribute to psychopathology in children and adolescents and that this relationship is mediated by different, biological, psychological, or social processes (Grant et al., 2003). In turn, different child characteristics or environmental contexts can moderate this relationship (Grant et al., 2003). The relationship between maternal anxiety and childhood behavioral problems can be examined within this stress-processing model. It is proposed that having an anxious mother will act as a chronic stressor for both the child and the mother. Exposure to this chronic stressor will make it difficult for both the mother and child to process additional stress. For the mother, this added stress is likely to be compounded by child-rearing activities, and may result in harsh parenting.

Maternal Anxiety, Harsh Parenting, and Children’s Behavioral Problems

The connection between maternal anxiety and childhood behavioral problems has been well established (McClure et al, 2001; Yoo et al., 2009) while the process through which

maternal anxiety may lead to childhood behavioral problems is less clear. One possibility is that parents who find themselves under the added stress of an anxiety disorder may be more likely to resort to harsh parenting techniques when disciplining their children.

Harsh parenting may include a variety of physically aggressive behaviors such as spanking with a hand or other physical object, or more verbally aggressive behaviors such as screaming at or threatening the child (Erath, El-Sheikh, & Cummings, 2009; Bailey, Hill, Oesterle, & Hawkins, 2009). While not all parents who use harsh discipline are anxious, it is possible that anxious parents may be at a higher risk for using harsh parenting techniques in their discipline methods.

Being a parent can be quite stressful. Many factors such as age, social support, or socioeconomic status may add to this stress (Lee, 2009; Barlow, 2002; Arditti, Burton, & Neeves-Bothelho, 2010). Maternal stress has been shown to be a predictor for the use of physical punishment (Clement & Chamberland, 2009). A parent who is struggling with excessive anxiety will likely find themselves under a great deal of strain and may not have the adequate mental capabilities to cope. The more strain a parent finds their self under the more likely they will act in an irritable and overly punitive way with their children (Webster-Stratton, 1990). Anxious parents have been shown to have added burdens compared to non-anxious parents and show more distress throughout several aspects in life (Lee, Orsillo, Roemer, & Allen, 2010). This additional strain is likely to make anxious parents feel an above average level of stress in their parenting and may therefore react in harsher punitive ways when disciplining their children.

The use of harsh parenting has a considerable impact on the children who experience it. Mckee et al. (2007) found that harsh parenting (including verbal and physical punishment) led to an increase in the children's behavioral problems. This effect was seen in both male and female

children (Mckee et al., 2007). Xu, Farver, and Zhang (2009) found that harsh parenting in general led to a rise in aggressive externalizing behaviors in children. One explanation for this would be that harsh parenting techniques (specifically physical punishment) is considerably aggressive in nature, which may in turn teach children to be just as aggressive in their actions. This explanation would not be adequate in explaining why children exposed to harsh parenting also are apt to display a wide array of childhood behavioral problems including internalizing behavioral problems (Loeber, et al., 2009; Bender et al., 2007). Examining the effects harsh parenting has on childhood behavioral problems may be better understood when viewed through the stress-processing model proposed by Grant et al. (2003). Anxious mothers' difficulty in processing stress may be manifested by the use of harsh parenting in their discipline techniques. In turn, the child is placed under added stress (harsh parenting) and their inability to cope may then manifest into childhood behavioral problems. Harsh parenting by parents may mediate the relationship between maternal anxiety and childhood behavioral problems. Anxious parents are likely to be more harsh and punitive with their children than non-anxious parents (Webster-Stratton, 1990). In turn the use of harsh parenting has been shown to lead to both externalizing and internalizing behavior problems in children (Mckee et al., 2007; Loeber et al, 2009).

Moderating Variables: Maternal Family Mental Health History

The relationship between maternal anxiety, harsh parenting, and childhood behavioral problems may not be the same for all parents and children. There are a number of other factors that should be considered that could strengthen or weaken this relationship. One of these factors is a history of family mental health problems. The stress-processing model proposed by Grant et al. (2003) indicates that certain predispositions can moderate the role of stressors on childhood behavioral problems. Having a family history of mental health problems can do this in a number

of ways. First, there is the possibility of a genetic transmission of the mental health problems. In addition, a family history of mental health problems could lead to some social consequences for the child, such as negative parenting behaviors (Baydar, Reid, Webster-Stratton, 2003).

A study conducted by Loeber et al. (2009) found that a family history of mental health problems significantly predicted multiple mental health problems in adolescents. In addition, Baydar et al. (2003) found that mothers who had mental health risk factors were more likely to demonstrate poorer parenting practices than mothers without such risk factors. A possible rationale for this relationship may be that family mental health history represents a continuing maladaptive pattern of behaviors. Children in a household in which they are exposed to their parents' mental health problems may be chronically stressed, which can lead to deficits in self-guided regulatory strategies, leading them to develop a mental disorder such as GAD (Gao et al., 2007). When that individual becomes an adult they then expose their child to the same maladaptive patterns of behavior they their self were exposed to. Due to this, a maternal family history of mental health problems is predicted to put the mother at an increased risk of becoming clinically anxious and therefore will strengthen the relationship between maternal anxiety, harsh parenting and childhood behavioral problems.

Moderating Variables: Presence of Father in the Home

The presence of the child's biological father in the home has the potential to be another moderating variable for the relationship between maternal anxiety, harsh parenting, and childhood behavioral problems. The absence of a child's biological father in the home is associated with increased stress in both the mother and the child (Lee, 2009) When looking at this relationship through a stress-processing model, the presence of a biological father in the home will likely affect the amount of added stress felt by both the mother and the child.

The absence of the child's biological father in the home could also have a significant impact of the mother's use of harsh parenting techniques. Lee (2009) found that single mothers were more likely than non-single mothers to spank their children. These findings are consistent with the expectation that mothers under added stress (such as single mothers) will be more likely to use harsh parenting techniques. An anxious mother who also is a single parent should be even more likely to use harsh parenting techniques as they will be facing even more stress.

The presence or absence of the biological father in the home may also have a more direct effect on the child's behavioral problems. Without their father present in the home, the child will have only their anxious mother acting as both a chronic stressor and sole disciplinarian. The presence of the father in the home may act as a potential buffer for the child so that an anxious mother is not quite as stressful for the child.

Moderating Variables: Child Gender

A final moderating variable for the relationship between maternal anxiety, harsh parenting, and childhood behavioral problems that will be investigated in this study is the gender of the child. This variable has the potential for affecting the relationship between maternal anxiety, harsh parenting, and childhood behavioral problems in several ways. In general boys are subjected to more verbal and physical forms of punishment than girls (Mckee et al., 2007). This may be due to boys acting out more than girls (therefore requiring more discipline), but may also be due to parents' beliefs that boys naturally have a stronger disposition and are less affected by more lenient discipline methods than girls (Mckee et al., 2007).

Miner and Clarke-Stewart (2008) found that boys tended to display higher amounts of externalizing behaviors than girls, and that this was predicted by harsher maternal punishment as well as a higher frequency of maternal punishment. Gaylord, Kitzmann, and Lockwood (2003)

found that an increase in family stressors were more strongly associated with internalizing problems in boys than with girls. These results suggest that boys are more vulnerable to developing behavioral problems than girls when exposed to an increased level of stress, such as the maternal use of harsh parenting techniques.

Smith, Ray, Stefurak, Zachar (2007) found that boys are more sensitive in their ratings of different methods of discipline. While girls rated mild and moderate levels of discipline as virtually the same in terms of appropriateness, boys made distinctions between mild and moderate levels of discipline by rating mild levels of discipline as less appropriate than moderate levels of discipline (Smith et al., 2007). In addition to this, boys were more likely than girls to rate moderate and severe levels of discipline as effective. These results would appear to suggest that boys find severe punishments more effective than milder forms of discipline.

It may also be possible that boys will be less affected by the relationship between harsh parenting and childhood behavioral problems. Erath, El-Sheikh, and Cummings (2009) found a connection between the use of harsh parenting and externalizing problems for children. This effect was moderated by Skin Conductance Reactivity Level (SCRL). Children with low SCRL were more likely to display externalizing behaviors when exposed to harsh parenting techniques and this effect was found to be much stronger in boys than in girls (Erath et al., 2009). In general, boys showed lower arousal when exposed to harsh parenting, indicating that they may be less affected by it (Erath et al., 2009). This could weaken the relationship between maternal anxiety, harsh parenting, and childhood behavioral problems.

While it can be expected that boys will receive harsher parenting than girls (Mckee et al., 2007) the effect that this may have on the relationship between maternal anxiety, harsh parenting, and childhood behavioral problems is not currently known.

Hypotheses

Hypothesis #1: Maternal anxiety will predict more childhood behavioral problems.

As would be consistent with much of the literature, this study predicts that maternal anxiety will put children at an increased risk for developing a number of childhood behavioral problems.

While many research articles look specifically at the connection between maternal anxiety and internalizing disorders, this study will combine the externalizing and internalizing disorders in children and examine them as a single indicator of childhood behavioral problems (Grimbos & Granic, 2009; Crijnen, Achenbacj, & Verhulst, 1997). This study will also test the hypothesis that maternal anxiety will be associated with subsequent increased behavior problems in their children, even after controlling for a number of variables such as maternal education and socioeconomic status.

Hypothesis #2: The relationship between maternal anxiety and childhood behavior problems will be mediated by the use of harsh parenting. The second hypothesis of this study predicts that anxious mothers will be more likely to use harsh parenting when disciplining their children, and that the use of harsh parenting will then be connected to the development of behavioral problems in the children. It is predicted that anxious mothers will be put at a higher risk for using harsh parenting due to the added difficulty their anxiety will give them for dealing with stress. In turn the child, who is it at a higher risk for developing behavioral problems from the stress of having an anxious parent will be subjected to still more stress when their mothers use harsh parenting techniques in their discipline. The use of harsh parenting techniques in discipline is the proposed pathway through which maternal anxiety might lead to childhood behavioral problems.

Hypothesis #3a: The relationship between maternal anxiety, harsh parenting, and childhood behavioral problems will be moderated by child gender. The gender of the child will likely affect the relationship between maternal anxiety, harsh parenting, and childhood behavioral problems. There is no prediction as to which child gender (either male or female) will strengthen or weaken the proposed relationship, but it is predicted that the relationship will be different based on child gender as both reactions to harsh parenting and exposure to harsh parenting techniques tend to differ based on child gender (Mckee et al., 2007).

Hypothesis #3b: The relationship between maternal anxiety, harsh parenting, and childhood behavioral problems will be moderated by presence of the child's biological father. The presence of the child's biological father in the home will likely weaken the relationship between maternal anxiety, harsh parenting, and childhood behavioral problems, while the absence of the child's biological father in the home will likely strengthen the relationship. This prediction is based on the assumption that absence of the child's father in the home will increase the amount of stress felt by both the mother and the child. This increased stress should make it more likely that the anxious mother will use harsh parenting techniques and that the child will then display behavioral problems.

Hypothesis #3c: The relationship between maternal anxiety, harsh parenting, and childhood behavioral problems will be moderated by maternal family mental health history. A history of matrilineal mental health issues is predicted to result in an increase in maternal anxiety which will then lead to the use of harsh parenting towards the child and consequent behavioral problems manifested by the child. This should strengthen the relationship between the variables of interest, as it will be an added stress for both the mother and the child that will contribute to an already stressful situation.

Contributions of Study to Previous Work

One common difficulty in much of the literature based on the effects maternal anxiety has on children is using research designs that can give no indication of causation (e.g. Reitman & Asseff, 2010). While there is no way to conduct a true experiment to examine the effects of maternal anxiety on children, the use of longitudinal data can give a more accurate picture of possible causation than other research design by using variables assessed at an earlier time to predict changes in variables assessed at a later time. This proposed study will involve data collected from a large and diverse population. The large sample size included in this study will also allow for analyses with greater statistical power than many previous studies. Through the use of Structural Equation Modeling (SEM) this study may potentially demonstrate more clearly whether maternal anxiety leads to harsh parenting, which then, in turn, leads to childhood behavioral problems.

Methods

Data, Sampling, and Participants

Data. The data for this study were collected as part of a national longitudinal study, the Fragile Families and Child Wellbeing Study (Bendheim-Thoman Center for Research on Child Wellbeing: CRCW, 2009). This study collected data from 20 cities across the United States, a large cohort of families and their children born between 1998 and 2000 (baseline), with additional assessments at 12 months, 30 months, and 48 months after birth. The sample specifically targeted unwed mothers and fathers to represent “fragile families” as these families typically are at greater risk for dissolving and facing socioeconomic troubles (Reichman, Teitler, Garfinkel, & McLanahan, 2001). The collection of this data was a combined effort by Princeton University’s Center for Research and Child Wellbeing and Center for Health and Wellbeing, the Columbia Population Research Center, and The National Center for Children and Families (NCCF) at Columbia University.

Sampling. For more in depth information about the research design and sampling procedures for the Fragile Families Study please see Reichman, Teitler, Garfinkel, and McLanahan (2001). Described below are some highlights of the sampling procedure explained fully in Reichman et al. (2001).

All US cities with a population exceeding 200,000 people or more were initially eligible for this study. These 77 cities were then rated on three particular criteria: welfare generosity, strength of child support system, and strength of local labor market. Welfare generosity was determined based on two conditions. The first of these conditions examined the dollar value of a monthly welfare payment for a family of four. The second condition on which welfare generosity was based considered the dollar value of a monthly payment divided by the median monthly rent for a particular city. For both of these conditions each city was separated into quartiles

(generous, low, and two moderates). If a city had an extreme value in one condition (either generous or low), that was not offset by the opposite extreme value in the other condition, that city was labeled as being “extreme” for welfare generosity (either high or low benefits).

Strength of child support system was established based on three conditions: paternity establishment rate, proportion of Aid to Families with Dependent Children (AFDC) cases with a child support award, and proportion of AFDC cases with payment. The cities were again sorted into quartiles (generous, low, two moderates) and if a city was marked as the same extreme (either generous or low) in two out of the three conditions the city was labeled “extreme” for strength of child support system (strong or weak).

The strength of the local labor market was assessed mostly by using the cities unemployment rate. However, job growth rates and population growth rates were also taken into account for a more accurate picture. Each city was characterized as either having a strong, weak or moderate local labor market.

From here the cities were separated into two groups. The first group of cities had extreme values for all three of their criteria (welfare generosity, strength of child support system, and local labor market) and were then separated into eight possible cells based on the different combinations of extreme criteria scores possible (i.e. generous welfare, strong child support system, strong labor market; generous welfare, strong child support, weak labor market). One city was randomly chosen from each of these eight cells to be sampled from. These were “large sample cities” in which approximately 325 births would be sampled (250 non-marital, 75 marital).

The second group contained all other cities that had at least 1 moderate value. Another 8 cities were selected randomly from this group. These were “small sample cities” in which

approximately 100 births would be sampled (75 non-marital, 25 marital). The final four cities selected were of particular interest to the researchers.

Across these 20 cities 75 hospitals were sampled. Some cities were able to have all of their hospitals sampled, while others were rank-ordered by number of non-marital births per year (to match the desired sample configurations). In some of the larger cities (i.e. New York City) even after rank-ordering the hospitals there was such a large amount that the hospitals selected for sampling were chosen randomly. Sampling within the hospitals was done randomly until the approximate desired quota (75% unmarried parents, 25% married parents) from marital versus non-marital births was complete.

Participants. The total number of participants ($N=4897$) for this study was obtained from the Fragile Families database. Sampling in the first two cities was treated initially as a pilot study. Some measures and specific items were added and changed as the study developed (Reichman et al., 2001). Due to these differences the participants from the first two cities ($n=656$, 13.4%) were excluded from this proposed study. The participants in the remaining 18 cities have consistent measures and represent the sample for this project ($N=4241$, 86.6%). At baseline the sample consisted of 2,221 boys, (52.4%) and 2020 girls (47.6%). The ethnic composition of the study mothers was as follows: non-Hispanic Caucasian ($n = 933$, 22.0%), non-Hispanic African American (2,090, 49.3%), Hispanic ($n=1,050$, 24.8%), or other ($n=163$, 3.8%). At baseline, 1,030 (24.30%) of the mothers were married to the child's birth father while 3, 211 (75.7%) of mothers were not married to the child's birth father. The average poverty ratio for mothers at baseline was $M=2.29$ ($SD=2.44$).

From baseline to 48 months the number of participants decreased from 4241 to 3595 (attrition rate of 15.2%). Reasons for drop-out included: mother died ($n=13$, 2.0%), child died

($n=39$, 6.0%), child put up for adoption ($n=39$, 6.0%), other reason for being ineligible ($n=5$, 0.8%), refusal to continue participation ($n=156$, 24.1%), could not be located ($n=266$, 41.2%), and other reason for non-response ($n=128$, 19.8%).

Data collection procedures. The baseline data was collected in person at the hospital within 1-2 days after the child's birth. The mothers were given an informed consent form to read and sign before beginning the survey process. The mothers were then screened for eligibility for participation (CRCW, 2009). Mothers were excluded from the study if they met any of the following criteria: those who were planning to put the child up for adoption, those for whom the baby's father was not living at the time of the child's birth, those who were not proficient enough in English or Spanish to complete the interview, mothers or babies that were too ill at the time of the baseline interview, and those whose baby died before the interview began (Reichman et al., 2001). Depending on different state and hospital regulations, mothers under the age of 18 may not have been eligible for the study either (Reichman et al., 2001). Less than 5% of mothers approached for interview were deemed ineligible (Reichman et al., 2001).

Measures

See Table 1 for an overview of the timing of the assessments, along with the descriptive statistics for each assessment. After the mother had completed the baseline interview, she was asked for contact information for follow-up interviews. The follow-up interviews for 12 months, 30 months, and 48 months were all completed over the phone. The "in-home" portion of the interviews took place at 30 months and 48 months and was separate from the core (phone) survey. These "in-home" interviews took place in the child's home and also contained assessments completed by the child's mother (CRCW, 2009).

Maternal anxiety. Mothers' were assessed for GAD symptoms at both 12 months and 30 months through a series of questions originating from the Composite International Diagnostic Interview-Short Form (CIDI-SF; Kessler, Andrews, Mroczek, Ustun, & Wittchen, 1998). The CIDI-SF uses 20 items and creates a reliable probability caseness that a person would or would not be diagnosed with GAD (Kessler et al., 1998). The original CIDI had 38 questions devoted to GAD and was created to be a structured interview to enhance the reliability of diagnosing several disorders (including GAD), specifically in research involving large amounts of data collection (Andrews & Peters; 1998). The CIDI has been found to have good inter-rater reliability and test-retest reliability as well as good construct validity (Andrews & Peters, 1998). The CIDI-SF was developed based of the CIDI using fewer items but still maintaining the reliability of the original measure (Kessler et al., 1998).

Individuals who complete the CIDI-SF are given a probability caseness of 1 or 0. A probability caseness of 1 would indicate would indicate with 96.6% certainty that the individual would be diagnosed with GAD if given the full CIDI, whereas a score of 0 would indicate with 99.8% certainty that an individual would not be diagnosed with GAD if given the full CIDI (Kessler et al., 1998). The CIDI-SF includes questions formed from the diagnostic criteria for GAD from the DSM-IV (American Psychiatric Association, 2000). A sample of questions from the CIDI-SF include: "During the past 12 months, did you have a period lasting one month or longer when most of the time you felt worried, tense, or anxious?" and "(Did/Do) you worry about one particular thing, such as your job security or the failing health of a loved one, or more than one thing?" The CIDI-SF also assesses the duration and severity of any extreme worries felt by an individual (Kessler et al., 1998). Questions pertaining to the types of worries and whether

or not the participants have had contact with a health care professional were omitted from the survey because these questions play no part in generating the probability estimations.

The assessment for GAD using the CIDI-SF was used for all mothers at 12 months and 30 months. Each mother was given a probability caseness of either 0 or 1 depending on their responses to the CIDI-SF. Individuals were given a score of 1 if they indicated that: 1) they had experienced a period of worry that lasted at least 6 months in the past year, 2) that the worry was excessive, 3) that it occurred more days than not, 4) was about multiple things, 5) difficult to be controlled or to be put out of mind, 6) and the presence of at least 3 physiological symptoms. At 12 months the total number of individuals that scored at 1 on this measure was 125 (3.4%) and the total number of individuals that scored a 0 on this measure 3656 (96.6%). At 30 months the total number of individuals that scored at 1 on this measure was 167 (4.6%) and the total number of individuals that scored a 0 on this measure 3490 (95.4%). See Appendix A for the full list of items used in this variable.

Childhood behavioral problems. A maternal report of the child's externalizing and internalizing behaviors were administered at 48 months. The items used for this measure were selected from the Child Behavior Checklist CBCL/4-18 (Achenbach, 1991). The original CBCL/4-18 contains 113 items that assess a wide range of children's behaviors including anxious/depressive behaviors, withdrawn behaviors, thought problems, attention problems, social problems, somatic complaints, aggressive behavior, and delinquent behavior (Achenbach, 1991). This measure is widely used and has been found to have high amounts of construct validity, with high positive correlations between the related scales (Dedrick, Greenbaum, Friedman, & Wetherington, 1997). Anxious/depressive behaviors and withdrawn behaviors combine to form

“internalizing problems” and aggressive behavior and delinquent behavior combine to form “externalizing problems.”

The survey questions used to create the childhood behavioral problems variable for this study were taken from both the core mother survey at 48 months and the in-home survey taken at 48 months. Mothers answered each item on a 0-2 point scale, indicating if the behavior was “not true” about their child (0), “sometimes/somewhat true about their child” (1), or “very true or often true” about their child (2). Certain items were omitted from the original CBCL/4-18 dealing with somatic complaints and other problems that were not applicable to such young children such as, drug and alcohol use, skipping school, and sexual behaviors. A final total of 52 items were included in the childhood behavioral problems variable. Anxious/depressive behaviors were assessed with 13 items including, “he/she complains of loneliness.” Withdrawn behaviors were assessed with 9 items including, “he/she would rather be alone than with others.” Aggressive behaviors were assessed with 20 items including, “he/she argues a lot.” Delinquent behaviors were assessed by 10 items including, “he/she lies or cheats.” The 22 items for anxious/depressive behaviors and withdrawn behaviors represent “total internalizing behaviors” (Cronbach’s $\alpha=.75$) The 30 items aggressive behaviors and delinquent behaviors represent “total externalizing behaviors” (Cronbach’s $\alpha=.85$). See Appendix B for the full list of items used in this variable.

Harsh parenting. The harsh parenting variable for was constructed using items from the Parent-Child version of the Conflict Tactics Scales (CTSPC; Straus, Hamby, Finkelhor, Moore, & Runyan, 1998) which are based off an earlier version of Conflict Tactic Scales (CTS; Straus, 1990). These scales contain items pertaining to “psychological aggression”, “physical aggression”, “non-violent discipline”, and “neglect.” Participants are asked how many times they

have engaged in a number of disciplinary actions, which fall under the previously mentioned categories, in the past year. The CTSPC has also demonstrated good discriminant and construct validity finding that nonviolent discipline, such as giving the child a timeout, is significantly correlated with physical discipline ($r=.39$) since both are “legal and normative ways of controlling misbehavior” (p. 257; Straus et al., 1998). The nonsignificant correlation between nonviolent discipline and severe physical assault ($r=.04$) demonstrates discriminant validity (Straus et al., 1998).

“Psychological aggression” contains 5 items such as, “shouted, yelled, or screamed at ‘child’ ” and “physical aggression” contains 5 items such as, “spanked him/her on the bottom with your bare hand.” Acts of psychological and physical aggression in discipline are often highly correlated, and will be combined in this study to represent the overall construct of “harsh parenting” (e.g., Erath et al., 2009).

Each participant was asked how often in the past year they engaged in a number of disciplinary behaviors. The possible choices were: never, once, twice, 3-5 times, 6-10 times, 11-20 times, more than 20 times, or yes, but not in the past year (Straus et al., 1998). Indicating “never” would give the participant a score of “0” for a particular question. “Yes, but not in the past year” was given a corresponding value of “0.5.” A response of “once” was given a value of “1” and “twice” was given a value of “2.” For the remaining choices the median number of the interval was chosen as the corresponding value. For example choosing “3-5” times would receive a value of “4.” If the participant chose “greater than 20 times” for a measure a corresponding value of “25” was assigned to the response. These methods are consistent with the scoring procedures in Straus et al. (1998). All of the items representing “psychological aggression” and

“physical aggression” were averaged and combined into one variable of “harsh parenting” at 30 months (Cronbach’s $\alpha = .77$) and 48 months (Cronbach’s $\alpha = .76$).

An important difference from the original CTSPC and the scale included by the Fragile Families study is that a total of 8 items were omitted from the original. These 8 items were of the most violent nature for both psychological and physical aggression and were thought to be too sensitive to be included in the Fragile Families survey. Examples of the omitted items are: “Hit him/her with a fist” or “threatened him/her with a knife or gun”. See Appendix C for the full list of items used in this variable.

Maternal family history of depression or anxiety. This variable was constructed based on a series of questions asked to mothers at 30 months or 48 months. The information for the maternal family history was only gathered at one of these two times. For example, if the mother was asked questions about their family history of depression or anxiety at 30 months, these questions were not asked again at 48 months.

A total of 16 items were used in the creation of this variable (CRCW, 2009). These items assessed whether each participants’ biological mother and biological father displayed past history of depressed mood or anxiousness, whether they ever sought treatment for this, and whether they ever attempted suicide. Some examples of these survey questions are “did your biological father ever have periods lasting two weeks or more when he was depressed, down in the dumps, or blue most of the time?” and “did your biological mother have periods of a month or more when he was constantly nervous, edgy, or anxious?” For each question the participant indicated either “yes” or “no” as it pertains to their biological parents. For this measure each individual was scored with either a “1” or a “0”. An individual would receive a score of “1” if they answered “yes” to any of the 16 items and would receive a score of “0” if they answered

“no” to every item. A score of “1” would indicate a family history of depression or anxiety whereas a score of 0 would indicate a lack of family history of depression or anxiety. The total number of mothers who received a 1 for maternal family mental health history was 1635 (50.5%) and the total number of mothers who received a 0 for maternal family mental health history was 1601 (49.5%). See Appendix D for the full list of items used in this variable.

Presence of father. This variable was constructed based on mother’s report on whether she and the child’s birth father are married and/or living together all or most of the time at baseline, 12 months, 30 months, and 48 months and is represented by either a “0” or a “1”. If the mother indicated that she and the child’s biological father were married and/or living together all or most of the time at all of these time points, the participant was defined as having a father present ($n=1119$, 50.7%). The father was defined as absent if the father did not live in the home with the child during all of these points ($n=1088$, 49.3%).

Control variables. Maternal age, maternal socioeconomic status, maternal educational level, and child negative emotionality were assessed and controlled for in this study. Maternal age was established at baseline. Mother’s socioeconomic status was assessed by examining their poverty ratio at baseline ($M=2.29$, $SD=2.44$), 12 months ($M=1.88$, $SD=2.16$), 30 months ($M=1.96$, $SD=2.56$), and 48 months ($M=1.94$, $SD=2.22$). Poverty ratio is calculated by taking the household income and dividing it by the poverty threshold. These four poverty ratios were averaged for all individuals in order to have one variable to represent socioeconomic status. The averaged poverty ratio variable values range from 0 to 24.97.

Mother’s educational level was assessed at baseline by self-report. This education variable ranged from 1 to 7. A response of 1 indicated no formal schooling ($n=3$, <1%), a response of 2 indicated less than 8th grade ($n=178$, 4.2%), a response of 3 indicated some high

school ($n=1221$, 28.8%), a response of 4 indicated a high school diploma or GED ($n=1307$, 30.8%), a response of 5 indicated some college or technical school ($n=1064$, 25.1%), a response of 6 indicated a Bachelor's degree ($n=314$, 7.4%), and a response of 7 indicated graduate school ($n=151$, 3.6%).

Child's negative emotionality was assessed as a type of difficult child temperament at 12 months using items specific to negative emotionality from the EAS Temperament Survey for Children: Parental Ratings (Buss & Plomin, 1984). Goldsmith, Buss, Plomin and Rothbart (1987) defined emotionality as existing on a continuum from "an almost stoic lack of reaction to intense emotional reactions that are out of control" (p. 512) with the latter description representing negative emotionality. The scale used for this study included 3 out of the 5 items used to assess child negative emotionality from the original measure. For each item the child's mother would rate on a scale from 1 to 5 how much a statement was like their child, 1 indicating "not at all like my child" and 5 indicating "very much like my child." The 3 items included "he/she often fusses and cries", he/she gets upset easily", and he/she reacts strongly when upset" (Cronbach's $\alpha = .60$). See Appendix E for a full list of items used for this variable.

Results

Hypothesis #1: Maternal Anxiety will predict more Childhood Behavioral Problems.

Correlations. The correlation matrix of all the variables that were examined is represented by Table 2. As would be expected, there was covariation between the predictor, outcome, control and proposed moderating and mediating variables. The magnitude of the significant relations ranged from small to large. All maternal anxiety variables were significantly associated with all behavior problem variables ($.09 \leq r's \leq .12$). All maternal anxiety variables were significantly associated with all harsh parenting variables ($.04 \leq r's \leq .11$), with the exception of relation between maternal anxiety at 12 months and harsh parenting at 48 months ($r=.03$). All harsh parenting variables are significantly associated with all behavior problem variables ($.10 \leq r's \leq .40$). Maternal mental health risk factor was not significantly associated with presence or absence of the child's father, maternal education, marital status or the income-to-needs ratio. Child gender was significantly associated with all harsh parenting variables, externalizing behavioral problems, as well as total behavioral problems ($-.04 \leq r's \leq -.08$), such that males were more likely to receive harsh parenting and receive higher externalizing scores.

Regression Analyses. Given the significant correlation between the aggregate maternal anxiety variable at 12 and 30 months and childhood behavioral problems at 48 months ($r = .12$), an OLS multiple regression analysis was performed to examine further the unique association between maternal anxiety and childhood behavioral problems. In this model, the childhood behavioral problems variable was simultaneously regressed on the aggregate maternal anxiety variable and control variables. The controls included maternal education, maternal age, marital status, maternal income-to-needs ratio, and the child's negative emotionality, all of which were correlated with both the anxiety and behavior problems variable. The results for this analysis are

displayed in Table 3. This table contains both the standardized and unstandardized regression coefficients along with the standard error terms. The overall model was significant, $F(6, 3253)=57.85, p < .001, R^2=.10$. Consistent with the correlation results, several of the control variables included in the regression analysis were also found to be uniquely associated with childhood behavioral problems. Most importantly, the results of the regression analysis support the first hypothesis that maternal anxiety predicts more childhood behavioral problems. Maternal anxiety was subsequently associated with increased childhood behavioral problems, even after controlling for covarying child and contextual control variables.

Hypothesis #2: The Relationship Between Maternal Anxiety and Childhood Behavior Problems will be Mediated by the use of Harsh Parenting.

To examine the relationship between maternal anxiety, harsh parenting, and childhood behavioral problems further a hypothesized model was created using Structural Equation Modeling (SEM; Schumacker & Lomax, 2004). This model is represented in Figure 1.

The hypothesized model examined the predictors of childhood behavioral problems in young children. The latent variable of maternal anxiety is represented by each mothers' score on the CIDI-SF at 12 months and at 30 months. More specifically, whether each mother was found to likely be clinically anxious (a score of 1 on the CIDI-SF) or found unlikely to be clinically anxious (a score of 0 on the CIDI-SF) at 12 months and at 30 months. The latent variable of harsh parenting is represented by a maternal score on the physical and psychological aggression (used in parental discipline) measure used in the CTS-PC. Physical aggression and psychological aggression were first combined to make one harsh parenting variable for both 30 months and 48 months. The measurable scores on the 30-and 48-month parenting variables were used to represent the overall latent variable of harsh parenting. The outcome latent variable representing

childhood behavioral problems is represented by scores on the internalizing and externalizing behavior problem measures from the 48-month assessment.

The first step in examining model fit for the hypothesized model is to employ a χ^2 statistic. It is important to note that when this model was initially run the error term on the externalizing behavioral problems' measure had a slight negative variance (-.006). This is likely due to the positive skew of the data and was corrected by constraining the variance on the error term to zero. This model was found to be significant $\chi^2(7, n=4241) = 36.51, p < .001$. A significant χ^2 indicates that the model has poor fit. This is an expected finding using for this model due to the large sample size. For models which include greater than 200 cases, alternative measures of model fit should be employed that will take into consideration a large sample size (Kenny, 2010). The Root Mean Square Error of Approximation (RMSEA) is a measure of model fit that takes into account degrees of freedom and sample size in calculating model fit. A model that has a RMSEA of less than .05 is considered to be a good fit (Kenny, 2010). For the hypothesized model the RMSEA = .03, 95% CI [.02- .04]. This indicates that the hypothesized model represents the underlying data structure well.

Figure 1 displays the standardized coefficients for each of the parameter estimates, as well as the loadings of the manifest variables on the latent variables. As can be observed, harsh parenting variable represents a partial mediating relationship between maternal anxiety and childhood behavioral problems. Specifically, though maternal anxiety leads directly to childhood behavioral problems, maternal anxiety may also indirectly lead to childhood behavioral problems through the mediating pathway of harsh parenting. Each of the path coefficients between the initial predictor variable, the mediating variable, and the outcome variable was significant. These results suggest that maternal anxiety may lead to greater usage of harsh parenting in discipline,

which in turn would lead to more childhood behavioral problems. A significance test of the combined indirect effects (Maternal Anxiety → Harsh Parenting and Harsh Parenting → Child Behavior Problems) was also performed (Sobel, 1982; Soper, 2011) The Sobel's test was significant ($Z= 3.55, p<.001$), indicating that the combined pathways were significant, thereby supporting the notion that harsh parenting was acting as a partial mediator.

Hypothesis #3a: the relationship between maternal anxiety, harsh parenting, and childhood behavioral problems will be moderated by child gender.

The final set of analyses involved comparing the model fit as it pertained to multiple groups and was separated into three distinct hypotheses examining the possible differences between these groups. While mediating variables represent a proposal explanatory pathway, moderating variables represent when (under what conditions) a certain relation will be changed (Baron & Kenny, 1986). In order to investigate the moderating role of child gender father presence, and matrilineal history of psychopathology, three separate multiple group analyses were performed. The first multiple group analysis that was performed was for child gender. In multiple group analysis in SEM, the pattern of the proposed models are specified and the model fit is evaluated when the models are constrained to be equal for the two groups and when the parameters are free to vary across models. If the model fit is worse (as indicated by the change in χ^2) from the models in which the covariances are not constrained to be equal then it is indicating that the collective set of covariances are different in one of the groups. Subsequent analyses can then be performed to identify the specific parameters or loadings that vary across the two groups. If it is not significantly different, the result is indicating that the model is equivalent across the two groups. Thus, this procedure testing whether the collective set of associations and loadings are different in one group relative to the other, which is the essence of moderation.

When the model was specified for the groups of each of the multiple group analyses, significant negative variances appeared across multiple error terms. As with the reported negative variance for the model in general, this was likely due to the considerable positive skew in the data for several of the manifest variables, particularly harsh parenting at 48 months, and externalizing behavioral problems at 48 months. While the variance was slightly negative on only one term for the original model, when the model was specified for different groups the resulting pattern of data made the model unstable due to the multiple negative variances on several of the terms. Constricting these negative variances to zero as was done with the model in general was not a viable option since the variances were markedly negative and across several terms. Constraining the negative variances to zero for the multiple groups would no longer allow for a confident representation of the variables. Alternative forms of analyses were explored to test the moderating hypotheses.

A 2 x 2 factorial between-subjects analysis of covariance (ANCOVA) was performed to examine the independent and combined influence of childhood behavioral problems at 48 months. The aggregate maternal anxiety variable (whether mothers were clinically anxious at 12 or 30 months versus not clinically anxious at 12 or 30 months) and child gender (male and female) were the between-subject independent variables considered for this first ANCOVA. Covariates included were maternal education, maternal age, marital status, maternal income-to-needs ratio, and child negative emotionality. The results of this ANCOVA are found in Table 4. In this table, the sum of squares, the mean squares, and the F values for each of the between subjects variables and the covariates are displayed. Consistent with the regression analysis, a main effect of the aggregate maternal anxiety variable was found for childhood behavioral problems at 48 months $F(1, 3251) = 26.83, p < .001$. After controlling for the covariates, no main

effect of child gender was found. The interaction term was also not significant indicating that child gender does not moderate the relationship between maternal anxiety and childhood behavioral problems. Figure 2 displays the means of each variable for each condition including the standard errors of each group.

Hypothesis #3b: The relationship between maternal anxiety, harsh parenting, and childhood behavioral problems will be moderated by presence of the child's biological father.

A 2 x 2 between subjects ANCOVA was also performed on total childhood behavioral problems at 48 months with the aggregate maternal anxiety variable (anxious and not anxious) and father presence (father present and father absent) as the independent variables. The same covariates were included with this ANCOVA as with the initial model and the results are displayed in Table 5. There was a significant main effect of maternal anxiety $F(1, 3251) = 8.99$, $p < .01$. After controlling for the covariates there was no significant main effect of father presence or the interaction term. These results indicate that father presence does not moderate the relationship between maternal anxiety and childhood behavioral problems. Figure 3 displays the means of each variable between the different groups, along with the standard errors of each group.

Hypothesis #3c: The relationship between maternal anxiety, harsh parenting, and childhood behavioral problems will be moderated by family mental health history.

A 2 x 2 factorial between subjects ANCOVA was performed on total childhood behavioral problems at 48 months with the aggregate maternal anxiety (anxious and not anxious) variable and maternal family mental health history (risk factor present and no risk factor present) as the independent variables. As with the first two multiple group analyses the same covariates

were included in this ANCOVA to be considered. The results for this analysis are displayed in Table 6. There was still a significant main effect of maternal anxiety $F(1, 3251) = 8.56, p < .01$ and a significant main effect of maternal family mental health family history $F(1, 3251) = 12.29, p < .001$. The interaction term for the independent variables was not significant indicating that a positive mental health history does not moderate the relationship between maternal anxiety and childhood behavioral problems. Figure 4 displays the means of each variable between the different groups along with the standard errors of each group.

Discussion

The purpose of this research was to examine how maternal anxiety impacts children's behavior problems and the intervening processes that impact the association. The results of this study yielded several noteworthy findings. Consistent with previous research (e.g. McClure et al., 2001), maternal anxiety was found to predict a subsequent increase in childhood behavioral problems. The results of this study also indicated that harsh parenting functions as a partial mediator for the relationship between maternal anxiety and childhood behavioral problems; that is, harsh parenting can be considered a possible pathway through which maternal anxiety leads to more childhood behavioral problems. The results failed to support any of the moderating hypotheses, suggesting a degree of uniformity in the effects of anxiety on child behavior problems. Child gender, father presence, and maternal family mental health history were not found to significantly alter the relationship between maternal anxiety and childhood behavioral problems.

Strengths of Study

There were a number of important strengths to this study. In particular, the large and diverse sample lends support to the notion that the found associations exist across a wide array of family contexts, particularly family contexts represented by increased risk for children's behavior problems. The sample focused heavily on non-married parents with low socioeconomic status. These kinds of families are often underrepresented in research (Coley, 2001) and identifying that such processes occur in these family contexts extends our understanding of the impact of maternal mental health on children's outcomes across contexts.

It would, of course, be unethical and quite impossible to perform a true experiment in which maternal anxiety level was manipulated to examine its effects on child outcomes. Therefore, as with any correlational research, the found associations may simply be

epiphenomenal to other operating process variables. That is, some other, unmeasured variable may be driving variations in both the maternal anxiety and child behavior variables. However, this study did include several theoretically and empirically relevant variables as controls in the analyses, such as maternal education and family income (Lee, 2009; Arditti et al., 2010), thereby decreasing the likelihood for omitted-variables bias.

The longitudinal nature of the data can provide additional support for proposed theoretical models. In this study, families were followed from the time of the focal child's birth and assessed at regular periods during early childhood. A great deal of past research into the relationship between maternal anxiety and childhood behavioral problems has focused on data obtained concomitantly (e.g. McClure et al., 2001). While data collected at one time period can provide an initial description of the potential relations between variables of interest, data collected over a longer period of time can provide a clearer picture of the developmental process underlying the manifestation of disorder. It is possible that the found associations are child-driven (e.g., Scarr and McCartney, 1983) rather than parent-driven, such that children with more behavior problems produce more anxiety in their mothers. Longitudinal data can help to disentangle the directional nature of the found relations by measuring the variables of interest at different times. With maternal anxiety, harsh parenting, and childhood behavioral problems being temporally sequenced so that the variations in maternal anxiety precede subsequent harsh parenting, and more childhood behavioral problems at a still later assessment, greater confidence can be placed in the sequencing of the proposed relationship than if all the variables were assessed concomitantly. The inclusion of longitudinal data in this study therefore expands on past research in this area by providing stronger evidence for the possible direction of the relationship between maternal anxiety and childhood behavioral problems.

The inclusion of an initial temperament variable as a control further increases the likelihood that the found relations are describing a maternal effect. Given that Feldman et al. (1997) found that the temperament in young children can often predict the behaviors of the parents, it was important to consider that child temperament may play a role in maternal anxiety and/or childhood behavioral problems. To limit this possibility, the children's temperament was controlled by controlling for initial negative emotionality. As would be expected, child negative emotionality was a significant predictor of childhood behavioral problems. However, even with the inclusion of child negative emotionality in every analysis, maternal anxiety continued to be a unique predictor of childhood behavioral problems. This indicates that maternal anxiety is related to childhood behavioral problems beyond just a maternal reaction to a child's difficult temperament.

Another important strength of this study is that it examined a variable that is often unconsidered in research on the relationship between maternal anxiety and childhood behavioral problems. Few studies have previously examined maternal family history of psychopathology as a determinant of childhood behavior problems and none have examined it as a moderator of maternal anxiety. This is an important aspect to consider as biological risk factors for several childhood disorders can predict an increase in these disorders (Harvey, Friedman-Weieneth, Goldstein, & Sherman, 2007). Biological risk factors can also be an important facet when considering different parenting practices, both directly and via environmentally-mediated genetic effects. For instance, mothers with a history of mental health problems have been found to use more harsh and inconsistent parenting practices (Baydar et al., 2003). Although maternal family mental health history was not found to moderate the relationship between maternal anxiety and

childhood behavioral problems in this sample, a direct effect was indicated between a maternal mental health risk factor and behavioral dysfunction in children.

Parenting practices can play an important role in exacerbating or ameliorating risk for children's behavior problems (Rapee, 2009). In this work, harsh parenting was examined as a potential pathway through which maternal anxiety affects children's behavior. With past research demonstrating a relationship between maternal anxiety and harsh parenting (Webster-Stratton, 1990) as well as a relationship between harsh parenting and childhood behavioral problems (McKee et al., 2007) the next logical step was to examine the interrelationship between these three variables. Harsh parenting has often been examined for its contributions to more externalizing behaviors such as aggression in children (Xu et al., 2009). The theory being that if a child is exposed to more aggressive behaviors from their parents, then the child will become more aggressive, consistent with a social learning perspective (Bandura, 1977). However, past research into harsh parenting has also found it linked with many internalizing disorders in children (Loeber et al, 2009). This indicates that there is something else at work in the relationship between harsh parenting and childhood behavioral problems beyond social learning.

The direct relationship between harsh parenting and childhood behavioral problems can be an important consideration when attempting to better understand how maternal anxiety might lead to more childhood behavioral problems. Both exposure to an anxious mother and harsh parenting might represent significant stressors to a child and it could be the exposure to this stress that then leads to the development of behavioral problems. The maternal use of harsh parenting can be considered in a comparable way. Childhood behavioral problems may emerge as a way of dealing with the stress harsh parenting produces in a child, whereas harsh parenting may similarly be a maternal reaction to the stress an anxious mothers experiences.

Implications for the Stress Processing Perspective on Child Mental Health

The complex nature of how maternal anxiety, particularly the proximal processes within the child, might lead to childhood behavioral problems is far from being completely understood. Some evidence has been found for a genetic link for anxious behaviors (Ogliari et al., 2010) while other research has suggested environmental explanations such as social learning may be responsible (Askew & Field, 2008). There can be some agreement that neither genetic predisposition nor certain environmental exposures tell the whole story (Eley & Zavos, 2010). Rather it is more likely that an accurate explanation of this relationship will include a combination of genetic contributions and environmental experiences.

The stress-processing model proposed by Grant et al. (2003) provides a compelling theory on how childhood behavioral problems might develop. The main concept is that exposure to a chronic stressor would leave a child more vulnerable to development of behavioral problems if confronted by additional stressors via changes in the child's regulatory capabilities. The model is flexible in its consideration of the possible stressors, allowing them to be internal or external factors. This present study examined the relationship between maternal anxiety, harsh parenting and childhood behavioral problems using a stress-processing framework. For a child, being exposed to an anxious mother would act as a chronic stressor, particularly given the stability of maternal anxiety symptoms (Nes, Roysamb, Reichborn-Kjennerud, Harris, & Tambs, 2007). When the child is faced with additional stressors, such as harsh parenting, the child's stress will manifest in disordered ways such as childhood behavioral problems. The addition of other stressors, such as being a single parent (child's father absent from the home) or having a family history of psychological dysfunction would then lead to the use of greater instances of harsh parenting by the anxious mothers as a disordered way of dealing with their stress.

The original prediction on the moderating role of child gender did not specify in what way child gender would affect the relationship between maternal anxiety, harsh parenting and childhood behavioral problems. Differences were expected based on past research that had identified gender differences between harsh parenting and childhood behavioral problems (Smith et al., 2007). In view of the fact that harsh parenting was not included in the moderating analysis that was used for this study, finding no differential effect of child gender on the relationship was not entirely unanticipated. It appears that the overall behavioral outcome of children due to maternal anxiety demonstrates a similarity in the nature of its influence on children's outcomes. Past research into the impacts of stress have yielded no significant gender differences in how children biologically react to stress (Kudielka, Buske-Kirschbaum, Hellhammer, & Kirschbaum, 2004). Conversely, differences have been found in how children of different genders cope with stress, with girls seeking social support and problem solving, while boys utilize more avoidant coping strategies (Eschenbeck, Kohlmann, & Lohaus, 2007). The results of this study suggest that children of both genders are impacted equally in terms of their behavioral problems by maternal anxiety. However, future research in this area could investigate how differences in coping strategies across genders might lead to similar behavioral outcomes in order to better understand the process of developing childhood behavioral problems.

The prediction was also made that father absence would act as a moderator for the relationship between maternal anxiety, harsh parenting, and childhood behavioral problems. This prediction was made considering the stress-processing model and expecting that the absence of the child's biological father in the home would provide an added strain to the mother and the child (Gee & Rhodes, 2003). The anxious mother would have the additional stress of being a single parent. It was also thought that in single-parent families, the psychological characteristics

of the mother would play a greater role in determining mental health outcomes, as the children would have limited means for developing additional modes of support within the family. This was not found to be the case. It is possible that the absence of the biological father in the child's home was not a significant enough stressor to impact the relationship between maternal anxiety and childhood behavioral problems. It is also possible that the effect of father absence had already been observed by directly affecting the initial levels of maternal anxiety, rather than subsequently affecting childhood behavioral problems (Jensen et al., 1989).

The final predicted moderator for the relationship between maternal anxiety, harsh parenting, and childhood behavioral problems was maternal family mental health history. Again, this moderating hypothesis was not supported, but maternal family mental health history was found to be a significant predictor of childhood behavioral problems on its own.

The lack of moderation by variables which have been shown to produce stress may have important implications for theoretical perspectives on the development of children's behavior problems. While null results are rarely directly informative on a particular theoretical stance, the lack of moderating effects of likely stressors, particularly father absence, may have some implications for the viability of the stress processing perspective for understanding children's behavior problems. Given the high degree of statistical power (stemming from the substantial sample size), the failure of increased stress to be associated with additional risk for behavior problems potentially suggests that the stress processing perspective may be need to be evaluated in light of these findings and that further research use additional models to evaluate the stress-processing perspective in tandem with other theoretical models.

Limitations

There are some limitations for this study. One important limitation is that all of the results are correlational so, of course, no true causal conclusions can be made regarding the relations. This is a difficulty encountered in much of the research examining the occurrence of mental health problems. As was previously mentioned, it is impossible to randomly assign psychological dysfunction to different groups of mothers in order to experimentally test the effects on their children's behavior. Several steps were taken to compensate for the correlational nature of the data. One important point to consider was that the data was longitudinal. As was mentioned earlier, while longitudinal data cannot demonstrate causality, it comes closer to providing stronger support for proposed causal relations.

Another limitation exists in the measurement of some of the variables. The measurement of the maternal anxiety variables, while reliable in predicting mothers who are clinically anxious, are scored dichotomously and therefore do not identify more subtle distinctions in maternal anxiety. For example, at 12 months the number of mothers marked as clinically anxious was $n=125$ while the number of mothers rated as not clinically anxious was $n=3656$. There is likely a wide-range of anxious symptoms within the latter group who did not meet all of the criteria to be counted as "clinically anxious" but nonetheless are counted as equal in their anxiousness with other participants who possibly have no anxious symptoms. While the dichotomous maternal anxiety variables do represent reliable predictions of being diagnosed with GAD, a more continuous variable of anxiety symptoms may be useful in future studies to identify how more subtle variations in anxiety affect children's behavior problems.

There is also the bias that all data used for each variable was collected from only one source (the mother), thereby resulting in the potential for shared method bias (Podsakoff,

Mackenzie, Lee, & Podsakoff, 2003). It may be that the differences present in childhood behavioral problems based on maternal anxiety are not be from the actual behavior of the child, but rather in how the mother's perceive and report the data. More anxious mothers perceive their children to be more disordered in their behavior than non-anxious mothers (Mulvaney & Mebert, 2007). Future research in this area would benefit from providing multiple sources of measurement of the constructs for greater confidence in the data's reliability.

Another possible limitation was in the maternal family mental health history variable. This variable represented the only possible moderating variable to have a significant main effect of childhood behavioral problems along with maternal anxiety. The measure has not been validated; it may be possible that mothers are unaware of their own mothers' mental health histories. This is an important variable to consider and future research in this area should attempt to develop assessments that can more accurately assess family history of psychopathology.

A final limitation lies with the inability to more thoroughly examine the relationship between maternal anxiety, harsh parenting, and childhood behavioral problems for the moderating analyses. Due to the extremely positive skew of the data when the groups were separated, it was not possible to perform the moderating analyses using SEM. Although this represents a limitation in examining the full process model, completing separate ANCOVAs for each of the moderating variables still made it possible to test each moderating variable for their role in the relationship between maternal anxiety and childhood behavioral problems. Utilizing measurements that did not have such distributional problems and that could be subject to multiple group analyses would help substantially in understanding more complex relations between the variables.

Intervention Implications

The results of this study bring several important factors to light about the relationship between maternal anxiety and childhood behavioral problems. One such important factor is the young age at which maternal anxiety may lead to a number of externalizing and internalizing behavioral problems in children. At only 48 months children of anxious mothers were displaying behavioral problems, indicating the impact of maternal anxiety during the infancy and preschool period. Children of mothers who are anxious or who have a positive history for anxiety or depression in their family should therefore potentially be targeted for early intervention. Recognizing the risk factors of maternal anxiety, maternal family history of mental illness, and harsh parenting is a good place to start in considering what children should be evaluated and possibly treated with early behavioral interventions. Reducing behavioral problems before a child reaches school age will not only help to lessen the behavioral problems themselves, but the often unfortunate consequences of these behaviors such as academic difficulties and peer rejection (DuPaul & Kern, 2011).

Any possible intervention practices to help alleviate the child's behavioral problems should also include the anxious mother. If childhood behavioral problems develop as a disordered way of dealing with stress then it is important that the mother's own anxiety be abated as well. While, again these results cannot say for certain that maternal anxiety is the cause of childhood behavioral problems, if the treatment of the mother's anxiety leads to a decrease in the child's behavioral problems than an even stronger argument can be made for the relationship between these two variables. Evaluation of intervention efforts that work to reduce maternal anxiety would therefore be potentially useful for more clearly understanding the proposed causal relations.

Future Directions

GAD by definition represents a more generalized version of anxiety, but the differential effects of other maternal anxiety disorders on the behaviors of young children may be notable. Examining how several different anxiety disorders fit within a stress-processing model would add new insights to the development of different childhood disorders. Much of the research into obsessive-compulsive disorder (OCD) and parenting has focused on the stress of being a parent of a child with OCD (e.g. Storch et al., 2009). It would stand to reason that being a child of a parent with OCD could also cause considerable stress for a child and possibly lead to behavioral problems. Schneider et al. (2009) found that maternal panic disorder can significantly impact maternal parenting behaviors. Mothers with panic disorder were more openly-critical with their children, utilized more verbal control, and were less sensitive in their parent-child interactions when compared to mothers without panic disorder (Schneider et al., 2009). Based on this research it could be expected that the relationship between maternal panic disorder and harsh parenting might be considerable, and should be investigated for possible contributions to childhood behavioral problems in a manner comparable to GAD.

Another angle that may be useful in understanding the mediating role that harsh parenting plays in the link between maternal anxiety and childhood behavioral problems may be in exploring how children perceive their parents' discipline. Past research has highlighted the mediating role that children's perceptions of caretaker-rejection can have on the relationship between harsh parenting in discipline and a child's psychological maladjustment (Rohner, Bourque, & Elordi, 1996). If a child's perception as to why they are being disciplined can make a significant impact on how they handle harsh discipline this might play an interesting role in whether or not harsh parenting will always mediate the relationship between maternal anxiety

and childhood behavioral problems. It is likely this mediating relationship may be reduced if the children of mothers with clinical symptoms feel their mother's harsh parenting is not representative of an emotional rejection.

Subsequent research in this area could be improved by developing and utilizing assessments that can measure these constructs more thoroughly. As was stated earlier, the maternal anxiety variable for this study was useful in separating the clinically anxious mothers from the non-clinically anxious mothers, but its strict dichotomous nature did not allow for differences to be observed within the non-clinically anxious group. It is likely that there is important variation within sub-clinical samples that has implications for parenting and children's behavior problems. In future work, an assessment that allows for a continuum of anxiety symptoms would be very useful in better understanding the relationship between maternal anxiety, discipline and childhood behavioral problems. A similar concern exists regarding the maternal family mental health history variable. It provided an interesting look into a possible biological risk factor for childhood behavioral problems, but again existed as a "risk present" or "no risk present" dichotomous variable. As with anxiety, biological risk may better represented along a continuum and future research in this area would be enhanced considering this possibility.

References

- Achenbach, T. M. (1991). *Manual for the Child Behavior Checklist/4-18 and 1991 Profile*. Burlington, VT: University of Vermont, Department of Psychiatry.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders (Revised 4th ed.)*. Washington, DC: American Psychiatric Publishing, Inc.
- Andrews, G., & Peters, L. (1998). The psychometric properties of the Composite International Diagnostic Interview. *Social Psychiatry and Psychiatric Epidemiology*, 33, 80-88. doi: 10.1007/s001270050026
- Arditti, J., Burton, L., & Neeves-Bothelho, S. (2010). Maternal distress and parenting in the context of cumulative disadvantage. *Family Process*, 49, 142-164. doi:10.1111/j.1545-5300.2010.01315.x
- Askew, C., & Field, A. P. (2008). The vicarious learning pathway to fear 40 years on. *Clinical Psychology Review*, 28, 1249-1265. doi:10.1016/j.cpr.2008.05.003
- Bailey, J. A., Hill, K. G., Oesterle, S., & Hawkins, J. (2009). Parenting practices and problem behavior across three generations: Monitoring, harsh discipline, and drug use in the intergenerational transmission of externalizing behavior. *Developmental Psychology*, 45, 1214-1226. doi:10.1037/a0016129
- Bandura, A. (1977). *Social learning theory*. Oxford England: Prentice-Hall.
- Barlow, J. J. (2002). Antenatal anxiety, parenting and behavioural/emotional problems in children. *British Journal of Psychiatry*, 181, 440-441. doi:10.1192/bjp.181.5.440-a
- Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173-1182. doi:10.1037/0022-3514.51.6.1173

- Baydar, N., Reid, M., & Webster-Stratton, C. (2003). The role of mental health factors and program engagement in the effectiveness of a preventive parenting program for head start mothers. *Child Development, 74*, 1433-1453. doi:10.1111/1467-8624.00616
- Becker, K. D., Ginsburg, G. S., Domingues, J., & Tein, J. (2010). Maternal control behavior and locus of control: Examining mechanisms in the relation between maternal anxiety disorders and anxiety symptomatology in children. *Journal of Abnormal Child Psychology, 38*, 533-543. doi:10.1007/s10802-010-9388-z
- Bender, H. L., Allen, J. P., McElhaney, K., Antonishak, J., Moore, C. M., Kelly, H., & Davis, S. M. (2007). Use of harsh physical discipline and developmental outcomes in adolescence. *Development and Psychopathology, 19*, 227-242. doi:10.1017/S0954579407070125
- Benheim-Thoman Center for Research on Child Wellbeing and Princeton University. (2009). Fragile Families and Child Wellbeing Study. Retrieved from <http://www.fragilefamilies.princeton.edu/index.asp>
- Bernstein, A., Leen-Feldner, E. W., Kotov, R., Schmidt, N. B., & Zvolensky, M. J. (2006). Test of a Panic-Relevant Diathesis-Stress Model Using a Taxonic Index of Anxiety Sensitivity. In A. J. Sanfelippo, A. J. Sanfelippo (Eds.), *Panic disorders: New research* (pp. 15-40). Hauppauge, NY US: Nova Biomedical Books. Retrieved from EBSCOhost.
- Brozina, K., & Abela, J. Z. (2006). Behavioural inhibition, anxious symptoms, and depressive symptoms: A short-term prospective examination of a diathesis-stress model. *Behaviour Research and Therapy, 44*, 1337-1346. doi:10.1016/j.brat.2005.09.010
- Buss, A.H., & Plomin, R. (1984). *Temperament: Early developing personality traits*. Hillsdale, NJ: Lawrence Erlbaum.
- Campbell, S. B., Shaw, D. S., & Gilliom, M. (2000). Early externalizing behavior problems:

Toddlers and preschoolers at risk for later maladjustment. *Development and Psychopathology*, 12, 467-488. doi:10.1017/S0954579400003114

Clément, M., & Chamberland, C. (2009). The role of parental stress, mother's childhood abuse and perceived consequences of violence in predicting attitudes and attribution in favor of corporal punishment. *Journal of Child and Family Studies*, 18, 163-171.
doi:10.1007/s10826-008-9216-z

Coley, R. (2001). (In)visible men: Emerging research on low-income, unmarried, and minority fathers. *American Psychologist*, 56, 743-753. doi:10.1037/0003-066X.56.9.743

Crijnen, A. M., Achenbach, T. M., & Verhulst, F. C. (1997). Comparisons of problems reported by parents of children in 12 cultures: Total problems, externalizing, and internalizing. *Journal of the American Academy of Child & Adolescent Psychiatry*, 36, 1269-1277.
doi:10.1097/00004583-199709000-00020

Cmic, K. A., Gaze, C., & Hoffman, C. (2005). Cumulative parenting stress across the preschool period: Relations to maternal parenting and child behaviour at age 5. *Infant and Child Development*, 14, 117-132. doi:10.1002/icd.384

Dedrick, R. F., Greenbaum, P. E., Friedman, R. M., & Wetherington, C. M. (1997). Testing the structure of the Child Behavior Checklist/4-18 using confirmatory factor analysis. *Educational and Psychological Measurement*, 57, 306-313.
doi:10.1177/0013164497057002009

DuPaul, G. J. & Kern, L. (2011). *Young children with ADHD: Early identification and intervention*. Washington, DC US: American Psychological Association.

Eley, T. C., Napolitano, M., Lau, J. F., & Gregory, A. M. (2010). Does childhood anxiety evoke maternal control? A genetically informed study. *Journal of Child Psychology and*

Psychiatry, 51, 772-779. doi:10.1111/j.1469-7610.2010.02227.x

Eley, T. C., & Zavos, H. S. (2010). Genetics. In J. A. Hadwin, A. P. Field, J. A. Hadwin, A. P. Field (Eds.), *Information processing biases and anxiety: A developmental perspective* (pp. 209-232). Wiley-Blackwell. Retrieved from EBSCOhost

Elwood, L. S., Mott, J., Williams, N. L., Lohr, J. M., & Schroeder, D. A. (2009). Attributional style and anxiety sensitivity as maintenance factors of posttraumatic stress symptoms: prospective examination of a diathesis–stress model. *Journal of Behavior Therapy and Experimental Psychiatry*, 40, 544-557. doi:10.1016/j.jbtep.2009.07.005

Erath, S. A., El-Sheikh, M., & Cummings, E. (2009). Harsh parenting and child externalizing behavior: Skin conductance level reactivity as a moderator. *Child Development*, 80, 578-592. doi:10.1111/j.1467-8624.2009.01280.x

Eschenbeck, H., Kohlmann, C., & Lohaus, A. (2007). Gender differences in coping strategies in children and adolescents. *Journal of Individual Differences*, 28, 18-26. doi:10.1027/1614-0001.28.1.18

Fanti, K. A., & Henrich, C. C. (2010). Trajectories of pure and co-occurring internalizing and externalizing problems from age 2 to age 12: Findings from the National Institute of Child Health and Human Development Study of Early Child Care. *Developmental Psychology*, 46, 1159-1175. doi:10.1037/a0020659

Feldman, R., Greenbaum, C. W., Mayes, L. C., & Erlich, S. H. (1997). Change in mother–infant interactive behavior: Relations to change in the mother, the infant, and the social context. *Infant Behavior & Development*, 20, 151-163. doi:10.1016/S0163-6383(97)90018-7

First, M. B., & Tasman, A. (2004). *DSM-IV-TR mental disorders: Diagnosis, etiology, & treatment*. West Sussex, England: John Wiley and Sons, Ltd.

- Gao, W., Paterson, J., Abbott, M., Carter, S., & Iusitini, L. (2007). Maternal mental health and child behaviour problems at 2 years: Findings from the Pacific Islands Families Study. *Australian and New Zealand Journal of Psychiatry, 41*, 885-895.
doi:10.1080/00048670701634929
- Gaylord, N. K., Kitzmann, K. M., & Lockwood, R. L. (2003). Child characteristics as moderators of the association between family stress and children's internalizing, externalizing, and peer rejection. *Journal of Child & Family Studies, 12*, 201.
- Gee, C. B., & Rhodes, J. E. (2003). Adolescent mothers' relationship with their children's biological fathers: Social support, social strain and relationship continuity. *Journal of Family Psychological, 17*, 370-383. doi:10.1037/0893-3200.17.3.370
- Goldsmith, H., Buss, A. H., Plomin, R., & Rothbart, M. K. (1987). What is temperament? Four approaches. *Child Development, 58*, 505-529. doi:10.2307/1130527
- Grant, K. E., Compas, B. E., Stuhlmacher, A. F., Thurm, A. E., McMahon, S. D., & Halpert, J. A. (2003). Stressors and child and adolescent psychopathology: Moving from markers to mechanisms of risk. *Psychological Bulletin, 129*, 447-466. doi:10.1037/0033-2909.129.3.447
- Grant, B. F., Hasin, D. S., Stinson, F. S., Dawson, D. A., Ruan, W., Goldstein, R. B., & ... Huang, B. (2005). Prevalence, correlates, co-morbidity, and comparative disability of DSM-IV generalized anxiety disorder in the USA: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Psychological Medicine: A Journal of Research in Psychiatry and the Allied Sciences, 35*, 1747-1759.
doi:10.1017/S0033291705006069
- Grimbos, T., & Granic, I. (2009). Changes in maternal depression are associated with MST

outcomes for adolescents with co-occurring externalizing and internalizing problems.

Journal of Adolescence, 32, 1415-1423. doi:10.1016/j.adolescence.2009.05.004

Grüner, K., Muris, P., & Merckelbach, H. (1999). The relationship between anxious rearing behaviours and anxiety disorders symptomatology in normal children. *Journal of Behavior Therapy and Experimental Psychiatry*, 30, 27-35. doi:10.1016/S0005-7916(99)00004-X

Harvey, E. A., Friedman-Weieneth, J. L., Goldstein, L. H., & Sherman, A. H. (2007). Examining subtypes of behavior problems among 3-year-old children, part I: Investigating validity of subtypes and biological risk-factors. *Journal of Abnormal Child Psychology: An official publication of the International Society for Research in Child and Adolescent Psychopathology*, 35, 97-110. doi:10.1007/s10802-006-9087-y

Jensen, P. S., Grogan, D., Xenakis, S. N., & Bain, M. W. (1989). Father absence: Effects on child and maternal psychopathology. *Journal of the American Academy of Child & Adolescent Psychiatry*, 28, 171-175. doi:10.1097/00004583-198903000-00004

Kagan, J., & Snidman, N. (1999). Early childhood predictors of adult anxiety disorders. *Biological Psychiatry*, 46, 1536-1541. doi:10.1016/S0006-3223(99)00137-7

Kenny, D. A. (2010). Measuring model fit. Retrieved from <http://www.davidakenny.net/cm/fit.htm>

Kessler, R.C., Andrews, G., Mroczek, D., Ustun, T.B., & Wittchen, H.U. (1998). The World Health Organization Composite International Diagnostic Interview Short-Form (CIDI-SF). *International Journal of Methods in Psychiatric Research*, 7, 171-185.

Kovacs, M., & Devlin, B. (1998). Internalizing disorders in childhood. *Journal of Child*

Psychology and Psychiatry, 39, 47-63. doi:10.1017/S0021963097001765

Kudielka, B. M., Buske-Kirschbaum, A. A., Hellhammer, D. H., & Kirschbaum, C. C. (2004).

HPA axis responses to laboratory psychosocial stress in healthy elderly adults, younger adults, and children: Impact of age and gender. *Psychoneuroendocrinology*, 29, 83-98.

doi:10.1016/S0306-4530(02)00146-4

Lee, Y. (2009). Early motherhood and harsh parenting: The role of human, social, and cultural capital. *Child Abuse & Neglect*, 33, 625-637. doi:10.1016/j.chiabu.2009.02.007

Lee, J. K., Orsillo, S. M., Roemer, L., & Allen, L. B. (2010). Distress and avoidance in generalized anxiety disorder: Exploring the relationships with intolerance of uncertainty and worry. *Cognitive Behaviour Therapy*, 39, 126-136.

doi:10.1080/16506070902966918

Liu, J. (2004). Childhood Externalizing Behavior: Theory and Implications. *Journal of Child and Adolescent Psychiatric Nursing*, 17, 93-103. doi:10.1111/j.1744-6171.2004.tb00003.x

Loeber, R., Hipwell, A., Battista, D., Sembower, M., & Stouthamer-Loeber, M. (2009).

Intergenerational transmission of multiple problem behaviors: Prospective relationships between mothers and daughters. *Journal of Abnormal Child Psychology: An official publication of the International Society for Research in Child and Adolescent*

Psychopathology, 37, 1035-1048. doi:10.1007/s10802-009-9337-x

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: An official publication of the International Society for Research in Child and Adolescent*

Psychopathology, 29, 1-10. doi:10.1023/A:1005260311313

- McKee, L., Roland, E., Coffelt, N., Olson, A. L., Forehand, R., Massari, C., Jones, D., Gaffney, C. A., & Zens, M. S. (2007). Harsh discipline and child problem behaviors: The roles of positive parenting and gender. *Journal of Family Violence, 22*, 187-196. doi:10.1007/s10896-007-9070-6
- Miner, J. L., & Clarke-Stewart, K. (2008). Trajectories of externalizing behavior from age 2 to age 9: Relations with gender, temperament, ethnicity, parenting, and rater. *Developmental Psychology, 44*, 771-786. doi:10.1037/0012-1649.44.3.771
- Mistry, R., Stevens, G. D., Sareen, H., De Vogli, R., & Halfon, N. (2007). Parenting-related stressors and self-reported mental health of mothers with young children. *American Journal of Public Health, 97*, 1261-1268. doi:10.2105/AJPH.2006.088161
- Mulvaney, M. K., & Mebert, C. J. (2007). Parental corporal punishment predicts behavior problems in early childhood. *Journal of Family Psychology, 21*, 389-397. doi:10.1037/0893-3200.21.3.389
- Nes, R. B., Røysamb, E., Reichborn-Kjennerud, T., Harris, J. R., & Tambs, K. (2007). Symptoms of anxiety and depression in young adults: Genetic and environmental influences on stability and change. *Twin Research and Human Genetics, 10*, 450-461. doi:10.1375/twin.10.3.450
- Ogliari, A., Spatola, C. A., Pesenti-Gritti, P., Medda, E., Penna, L., Stazi, M., & ... Fagnani, C. (2010). The role of genes and environment in shaping co-occurrence of DSM-IV defined anxiety dimensions among Italian twins aged 8–17. *Journal of Anxiety Disorders, 24*, 433-439. doi:10.1016/j.janxdis.2010.02.008
- Pesenti-Gritti, P., Spatola, C. M., Fagnani, C., Ogliari, A., Patriarca, V., Stazi, M., & Battaglia,

- M. (2008). The co-occurrence between internalizing and externalizing behaviors: A general population twin study. *European Child & Adolescent Psychiatry, 17*, 82-92. doi:10.1007/s00787-007-0639-7
- Podsakoff, P. M., Mackenzie, S. B., Lee, J., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*, 879-903. doi:10.1037/0021-9010.88.5.879
- Rapee, R. M. (2009). Early adolescents' perceptions of their mother's anxious parenting as a predictor of anxiety symptoms 12 months later. *Journal of Abnormal Child Psychology: An official publication of the International Society for Research in Child and Adolescent Psychopathology, 37*, 1103-1112. doi:10.1007/s10802-009-9340-2
- Reichman, N. E., Teitler, J. O., Garfinkel, I., & McLanahan, S. S. (2001). Fragile families: Sample and design. *Children and Youth Services Review, 23*, 303-326. doi:10.1016/S0190-7409(01)00141-4
- Reitman, D., & Asseff, J. (2010). Parenting practices and their relation to anxiety in young adulthood. *Journal of Anxiety Disorders, 24*, 565-572. doi:10.1016/j.janxdis.2010.03.016
- Repetti, R. L., Taylor, S. E., & Seeman, T. E. (2002). Risky families: Family social environments and the mental and physical health of offspring. *Psychological Bulletin, 128*, 330-366. doi:10.1037/0033-2909.128.2.330
- Rohner, R. P., Bourque, S. L., & Elordi, C. A. (1996). Children's perceptions of corporal punishment, caretaker acceptance, and psychological adjustment in a poor, biracial southern community. *Journal of Marriage and the Family, 58*, 842-852.

Rothen, S., Vandeleur, C. L., Lustenberger, Y., Jeanprêtre, N., Ayer, E., Gamma, F., & ...

Preisig, M. (2009). Parent-child agreement and prevalence estimates of diagnoses in childhood: Direct interview versus family history method. *International Journal of Methods in Psychiatric Research, 18*, 96-109. doi:10.1002/mpr.281

Ruscio, A., Chiu, W., Roy-Byrne, P., Stang, P. E., Stein, D. J., Wittchen, H., & Kessler, R. C.

(2007). Broadening the definition of generalized anxiety disorder: Effects on prevalence and associations with other disorders in the National Comorbidity Survey Replication. *Journal of Anxiety Disorders, 21*, 662-676. doi:10.1016/j.janxdis.2006.10.004

Scarr, S., & McCartney, K. (1983). How people make their own environments: A theory of genotype → environment effects. *Child Development, 54*, 424-435.

Schneider, S., Houweling, J. G., Gommlich-Schneider, S., Klein, C., Nündel, B., & Wolke, D.

(2009). Effect of maternal panic disorder on mother-child interaction and relation to child anxiety and child self-efficacy. *Archives of Women's Mental Health, 12*, 251-259. doi:10.1007/s00737-009-0072-7

Schumacker, R. E., & Lomax, R. G. (2004). *A beginner's guide to structural equation modeling*.

Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.

Siu, A. (2008). A prevalence study on internalizing problems among primary school children in Hong Kong. *Journal of Child & Family Studies, 17*, 779-790. doi:10.1007/s10826-008-9189-y

Smith, B., Ray, G., Stefurak, T., & Zachar, P. (2007). College student evaluations of parent-child disciplinary situations. *Journal of Family Violence, 22*, 757-767.

doi:10.1007/s10896-007-9123-x

- Sobel, M. E. (1982). Asymptotic intervals for indirect effects in structural equations models. In S. Leinhardt (Ed.), *Sociological methodology 1982* (pp.290-312). San Francisco: Jossey-Bass.
- Soper, D. S. (2011). The free statistics calculators website. *Online Software*.
<http://www.danielsoper.com/statcalc>
- Storch, E. A., Lehmkuhl, H., Pence, S. r., Geffken, G. R., Ricketts, E., Storch, J. F., & Murphy, T. K. (2009). Parental experiences of having a child with obsessive-compulsive disorder: Associations with clinical characteristics and caregiver adjustment. *Journal of Child and Family Studies, 18*, 249-258. doi:10.1007/s10826-008-9225-y
- Straus, M.A. (1990). Measuring intrafamily conflict and violence: The conflict Tactics (CT) Scales. In M.A. Straus & R.J. Gelles (Eds.), *Physical violence in American families*, New Brunswick, NJ: Transaction.
- Straus, M. A., Hamby, S. L., Finkelhor, D., Moore, D. W., & Runyan, D. (1998). Identification of child maltreatment with the Parent–Child Conflict Tactics Scales: Development and psychometric data for a national sample of American parents. *Child Abuse & Neglect, 22*, 249-270. doi:10.1016/S0145-2134(97)00174-9
- Thirlwall, K., & Creswell, C. (2010). The impact of maternal control on children's anxious cognitions, behaviours and affect: An experimental study. *Behaviour Research and Therapy, 48*, 1041-1046. doi:10.1016/j.brat.2010.05.030
- 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.
doi:10.1016/S0005-7967(02)00028-1
- Van den Bergh, B. H., & Marcoen, A. (2004). High Antenatal Maternal Anxiety Is Related to

ADHD Symptoms, Externalizing Problems, and Anxiety in 8- and 9-Year-Olds. *Child Development*, 75, 1085-1097. doi:10.1111/j.1467-8624.2004.00727.x

Webster-Stratton, C. (1990). Stress: A potential disruptor of parent perceptions and family interactions. *Journal of Clinical Child Psychology*, 19, 302-312.
doi:10.1207/s15374424jccp1904_2

Whaley, S. E., Pinto, A., & Sigman, M. (1999). Characterizing interactions between anxious mothers and their children. *Journal of Consulting and Clinical Psychology*, 67, 826-836. doi:10.1037/0022-006X.67.6.826

Xu, Y., Farver, J. M., & Zhang, Z. (2009). Temperament, harsh and indulgent parenting, and Chinese children's proactive and reactive aggression. *Child Development*, 80, 244-258. doi:10.1111/j.1467-8624.2008.01257.x

Yoo, J. P., Brown, P. J., & Luthar, S. S. (2009). Children with co-occurring anxiety and externalizing disorders: Family risks and implications for competence. *American Journal of Orthopsychiatry*, 79, 532-540. doi:10.1037/a0017848

Young, A. S., Klap, R., Shoai, R., & Wells, K. B. (2008). Persistent depression and anxiety in the united states: Prevalence and quality of care. *Psychiatric Services*, 59, 1391-1398. doi:10.1176/appi.ps.59.12.13

Table 1

Descriptive Statistics (Mean and Standard Deviation) for Variables predicting the Relationship Between Maternal Anxiety, Harsh Parenting, and Childhood Behavioral Problems

Variable	Birth	12 months	30 months	48 months	Average
Maternal Anxiety	--	.03(.18)	.05(.21)	--	.04(.16)
Harsh Parenting	--	--	4.02(3.51)	3.86(3.34)	3.9(3.1)
Child Internalizing Problems	--	--	--	.23(.21)	--
Child Externalizing Problems	--	--	--	.45(.30)	--
Child Behavioral Problems	--	--	--	.34(.22)	--
Maternal Family Mental Health History	--	.36(.48)	--	--	--
Presence/Absence of Father	--	--	--	--	.51(.50)
Child Negative Emotionality	--	2.81(1.06)	--	--	--
Poverty Ratio	2.29(2.44)	1.88(2.16)	1.96(2.56)	1.94(2.22)	2.03(2.07)
Mother's Education	4.13(1.15)	--	--	--	--
Child's gender	1.48(.50)	--	--	--	--
Maternal Age	25(6.05)	--	--	--	--
Marital Status	--	--	--	.31(.46)	--

Note. The means of all variables are represented first followed by their standard deviations in parentheses. Presence/Absence of father is constructed from whether father was always present or never present (over all four times). The Maternal Anxiety "average" represents whether mothers were found to be clinically anxious at either 12 months or 30 months.

Table 2

Correlation Matrix for Variables Involved in the Relationship between Maternal Anxiety, Harsh Parenting, and Childhood Behavioral Problems

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Maternal Anxiety, 12 months	--	.29**	.71**	.04*	.03	.05**	.09**	.10**	.10**	.01	-.06**	.14**	-.04*	-.04*	.05*	.00	-.04*
2. Maternal Anxiety, 30 months		--	.83**	.10**	.05**	.09**	.09**	.10**	.11**	-.01	-.09**	.17**	-.06**	-.06**	.08**	-.02	-.07**
3. Maternal Anxiety (Aggregate)			--	.11**	.05*	.10**	.10**	.11**	.12**	.01	-.09**	.20**	-.06**	-.06**	.08**	-.02	-.07**
4. Harsh Parenting, 30 months				--	.54**	.91**	.10**	.22**	.21**	-.08**	-.14**	.12**	-.04	-.06**	.12**	-.15**	-.10**
5. Harsh Parenting, 48 months					--	.90**	.17**	.40**	.36**	-.08**	-.13**	.11**	-.03	-.07**	.09**	-.14**	-.09**
6. Harsh Parenting (Average)						--	.15**	.33**	.31**	-.08**	-.15**	.13**	-.03	-.07**	.12**	-.15**	-.11**
7. Child Internalizing Behavioral Problems, 48 months							--	.47**	.79**	-.02	-.08**	.14**	-.13**	-.12**	.19**	-.06**	-.09**
8. Child Externalizing Behavioral Problems, 48 months								--	.91**	-.05**	-.15**	.15**	-.12**	-.11**	.24**	-.11**	-.13**
9. Childhood Behavioral Problems, 48 months									--	-.05**	-.15**	.17**	-.15**	-.14**	.26**	-.11**	-.13**
10. Child Gender										--	.03	-.02	-.02	-.01	-.02	.02	.01
11. Father Presence											--	.04	.35**	.44**	-.14**	.31	.77**
12. Maternal Mental Health Risk Factor												--	.01	.02	.09**	-.03*	.02
13. Maternal Education Level													--	.59**	-.15**	.39**	.35**
14. Maternal Poverty Ratio (Average)														--	-.13**	.34**	.44**
15. Child Negative Emotionality															--	-.09**	-.11**
16. Maternal Age																--	.32**
17. Marital Status, 48 months																	--

Note. Maternal anxiety (12 months and 30 months), child gender, presence/absence of father, and maternal mental health risk factor are dichotomous variables. For maternal anxiety, 1=Probability GAD caseness of 1 and 0=Probability GAD caseness of 0. For child gender, 1=Boy and 2=Girl. For presence/absence of father, 1=Father present and 0=Father absent. For maternal mental health risk factor, 1=Family history mental health risk factor and 0=no risk factor.

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

Table 3

Summary of Hierarchical Regression Analysis of Variables Predicting Childhood Behavioral Problems

Variables	<i>B</i>	<i>SE</i>	β
Maternal Anxiety	.08	.02	.09***
<u>Control Variables</u>			
Maternal Education	-.01	.00	-.07**
Maternal Age	-.00	.00	-.04
Marital Status	-.03	.01	-.07**
Income-to-Needs	-.00	.00	-.03
Child Negative Emotionality	0.05	.00	.23***

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

Note. Adjusted R^2 for Model 1 = .10. Maternal anxiety represents mothers who have been scored clinically anxious at either 12 months or 30 months.

Table 4

*Analysis of Covariance for Maternal Anxiety and Child Gender
Predicting Childhood Behavioral Problems at 48*

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>
Maternal Anxiety	1.2	1	1.2	26.8***
Child Gender	.06	1	.06	1.3
Maternal Anxiety X Child Gender	.01	1	.01	.14
Error	141.45	3251	.04	--
<u>Control Variables</u>				
Maternal Education	.42	1	.42	9.56**
Maternal Age	.15	1	.15	3.51
Marital Status	.50	1	.50	11.46**
Income-to-Needs	.08	1	.08	1.74
Child Negative Emotionality	7.68	1	7.68	176.45***

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

Note. Maternal anxiety is representative of mothers who were marked as clinically anxious at either 12 months or 30 months.

Table 5

*Analysis of Covariance for Maternal Anxiety and Father Presence
Predicting Childhood Behavioral Problems at 48*

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>
Maternal Anxiety	.39	1	.39	8.99**
Father Presence	.09	1	.09	2.16
Maternal Anxiety X Father Presence	.07	1	.07	1.61
Error	81.17	1875	.04	--
<u>Control Variables</u>				
Maternal Education	.13	1	.13	3.03
Maternal Age	.04	1	.04	.88
Marital Status	.22	1	.22	5.03*
Income-to-Needs	.02	1	.02	.49
Child Negative Emotionality	4.64	1	4.64	107.14***

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

Note. Maternal anxiety is representative of mothers who were scored as clinically anxious at either 12 months or 30 months.

Table 6

Analysis of Covariance for Maternal Anxiety and Maternal Mental Health Risk Factor Predicting Childhood Behavioral Problems at 48

Source	SS	df	MS	F
Maternal Anxiety	.37	1	.37	8.56**
Maternal Risk Factor	.53	1	.53	12.29***
Maternal Anxiety X Maternal Risk Factor	.00	1	.00	.03
Error	135.00	3154	.04	--
<u>Control Variables</u>				
Maternal Education	.43	1	.43	10.04**
Maternal Age	.12	1	.12	2.83
Marital Status	.49	1	.49	11.52**
Income-to-Needs	.13	1	.13	2.91
Child Negative Emotionality	6.47	1	6.47	151.19***

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

Note. Maternal anxiety is representative of mothers who were marked as clinically anxious at either 12 months or 30 months.

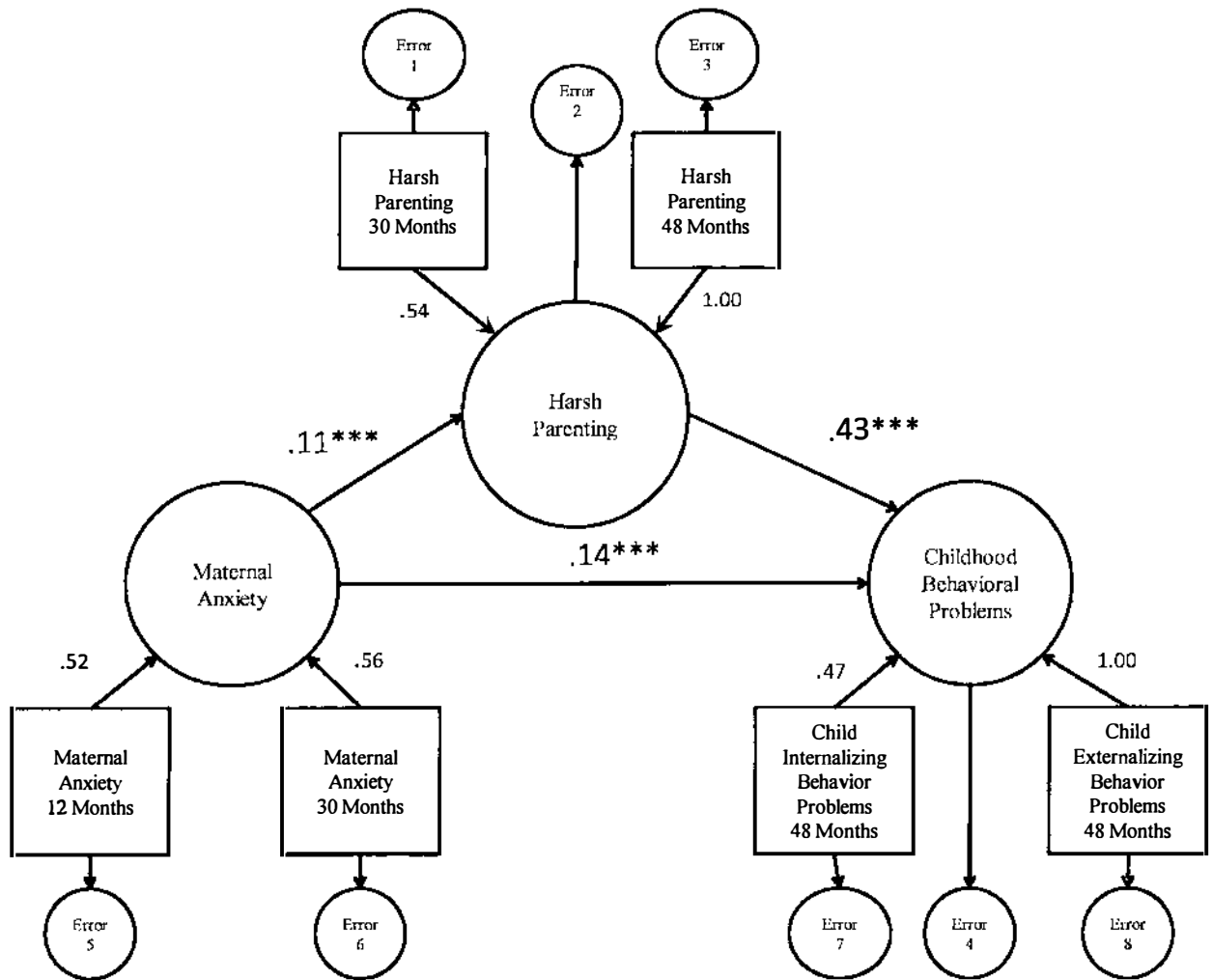


Figure 1. SEM model showing the direct relationship of maternal anxiety to childhood behavioral problems and the mediating role harsh parenting plays in this relationship. *** $p < .001$.

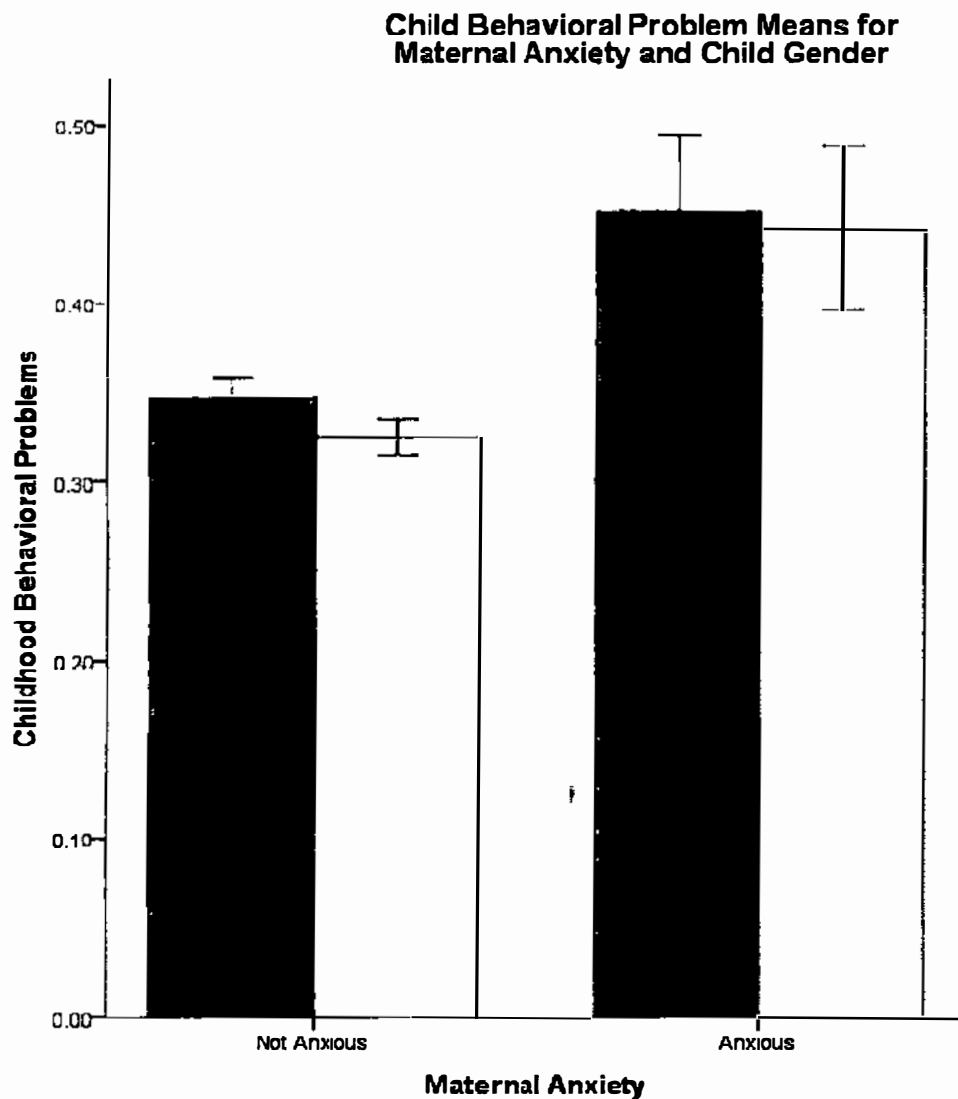


Figure 2. Representation of mean estimates (including standard error) for childhood behavioral problems at 48 months as predicted by child gender and maternal anxiety. The dark bars represent male children and the light bars represent female children.

Child Behavioral Problem Means for Maternal Anxiety and Presence of Father

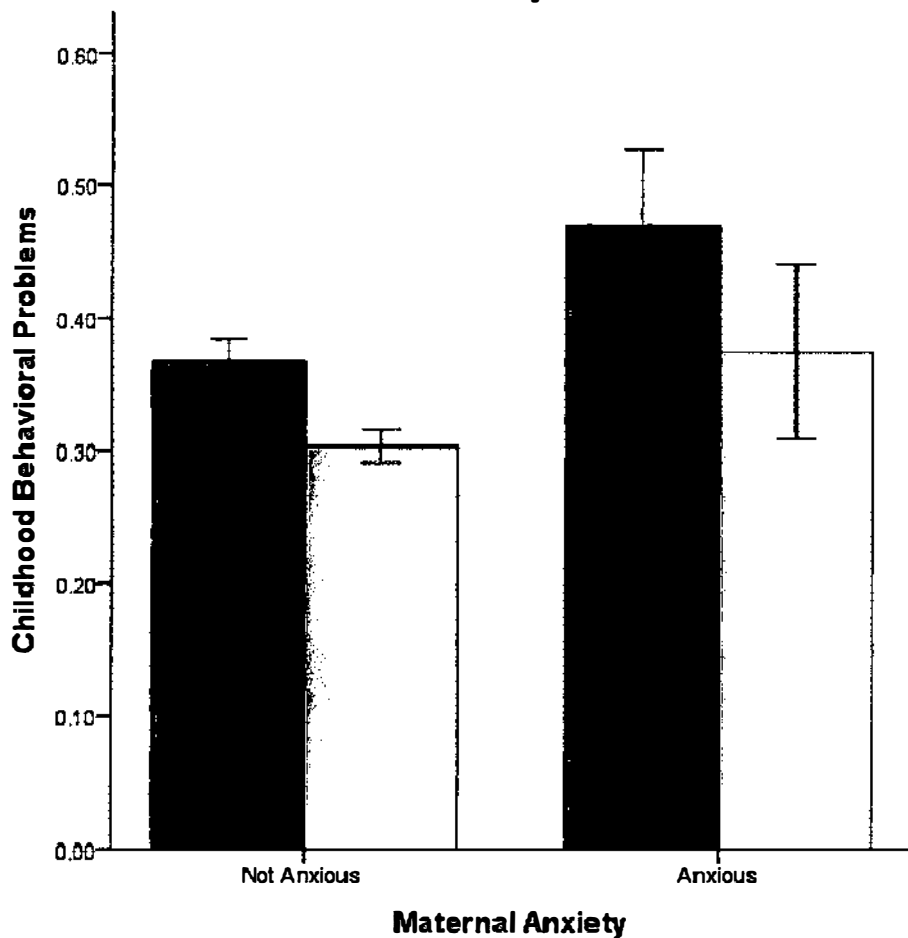


Figure 3. Representation of mean estimates (including standard error) for childhood behavioral problems at 48 months as predicted by father absence and maternal anxiety. The dark bars represent absent fathers and the light bars represent present fathers.

Child Behavioral Problem Means for Maternal Anxiety and Presence of Maternal Mental Health Risk Factor

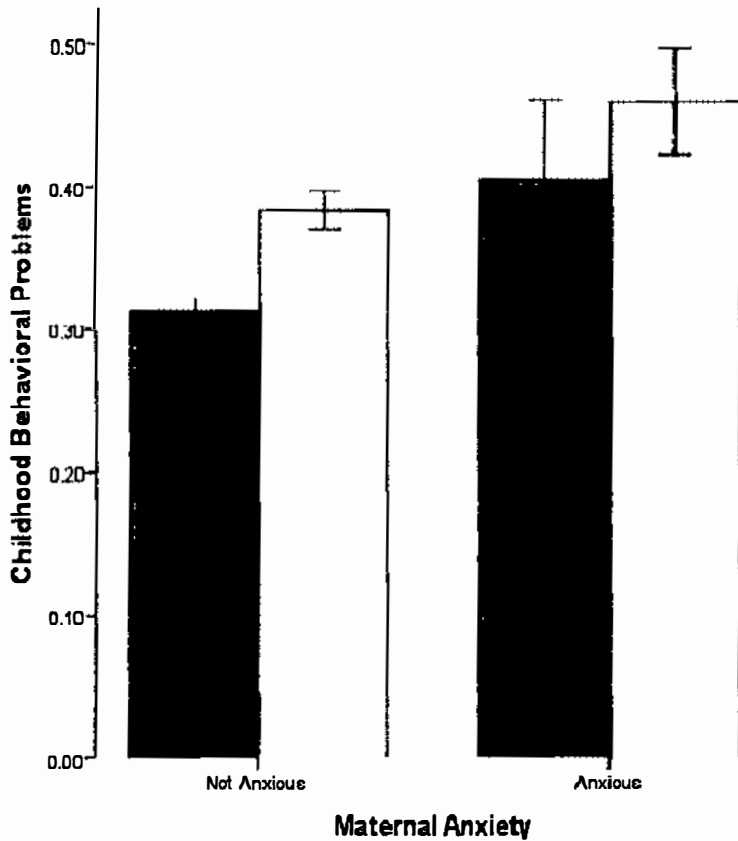


Figure 4. Representation of mean estimates (including standard error) for childhood behavioral problems at 48 months as predicted by maternal family mental health history risk factor and maternal anxiety. The dark bars represent no maternal risk factor and the light bars represent a maternal risk factor.

Appendix A

Maternal Anxiety Scale Items

1. During the past 12 months, did you ever have a period lasting one month or longer when most of the time you felt worried, tense, or anxious? Yes; No.
2. People differ a lot in how much they worry about things. Did you have a time in the past 12 months when you worried a lot more than most people would in your situation? Yes; No.
3. Is that period of time still going on? Still going on; Ended.
4. How many months or years has it been going on?
5. How many months or years did it go on before it ended?
6. Did worry last six months or more? Yes; No.
7. During that/this period (was/is) your worry stronger than in other people? Yes; No.
8. (Did/Do) you worry most days? Yes; No.
9. (Did/Do) you worry about one particular thing, such as your job security or the failing health of a loved one or more than one thing? One thing; More than one thing
10. (Did/Do) you find it difficult to stop worrying? Yes; No.
11. (Did/Do) you have different worries on your mind at the same time? Yes; No.
12. How often (was/is) your worry so strong that you (couldn't/can't) put it out of your mind no matter how hard you (tried/try)? (Was/Is) this . . . Often; Sometimes; Rarely; Never.
13. How often (did/do) you find it difficult to control your worry? Often; Sometimes; Rarely; Never.
14. When you (were/are) worried or anxious, (were/are) you also restless? Yes; No.

15. When you (were/are) worried or anxious, (were/are) you also keyed up or on edge? Yes; No.
16. When you (were/are) worried or anxious, (were/are) you also easily tired? Yes; No.
17. When you (were/are) worried or anxious, (were/are) you also have difficulty keeping your mind on what you were doing? Yes; No.
18. When you (were/are) worried or anxious, (were/are) you also more irritable than usual? Yes; No.
19. When you (were/are) worried or anxious, (were/are) you also have tense, sore or aching muscles? Yes; No.
20. When you (were/are) worried or anxious, (were/are) you also have trouble falling asleep or staying asleep? Yes; No.

Appendix B

Childhood Behavioral Problems Scale Items

- *1. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) complains of loneliness?
- *2. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) fears that (he/she) might think or do something bad?
- *3. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) feels (he/she) has to be perfect?
- *4. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) feels or complains that no one loves (him/her)?
- *5. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) feels others are out to get (him/her)?
- *6. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) feels too guilty?
- *7. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) is self-conscious or easily embarrassed?
- *8. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) is suspicious?
- *9. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) worries?
- *10. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) cries a lot?

- *11. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) is nervous, high strung, or tense?
- *12. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) is too fearful or anxious?
- *13. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) feels worthless or inferior?
- **14. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) would rather be alone than with others?
- **15. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) refuses to talk?
- **16. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) is secretive, keeps things to self?
- **17. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) is shy or timid?
- **18. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) stares blankly?
- **19. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) sulks a lot?
- **20. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) is underactive, slow moving, or lacks energy?
- **21. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) is unhappy, sad, depressed?

- **22. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) is withdrawn; (he/she) doesn't get involved with others?
- ***23. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) argues a lot?
- ***24. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) brags or boasts?
- ***25. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) is cruel, bullies and shows meanness to others?
- ***26. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) destroys (his/her) own things?
- ***27. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) destroys things belonging to family or others?
- ***28. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) is disobedient at home?
- ***29. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) is disobedient at school or in childcare?
- ***30. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) is easily jealous?
- ***31. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) gets in many fights?
- ***32. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) physically attacks people?
- ***33. Is this not true (so far as you know), somewhat or sometimes true, very true or often true

for (CHILD)? (He/She) screams a lot?

***34. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) shows off or clowns around?

***35. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) talks too much?

***36. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) teases a lot?

***37. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) threatens people?

***38. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) is unusually loud?

***39. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) is stubborn, sullen, or irritable?

***40. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) has sudden changes in mood or feelings?

***41. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) has temper tantrums or a hot temper?

***42. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) wants a lot of attention?

****43. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) hangs around with others who get in trouble?

****44. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) lies or cheats?

****45. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) prefers being with older kids?

****46. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) runs away from home?

****47. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) sets fires?

****48. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) steals at home?

****49. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) steals outside the home?

****50. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) swears or uses obscene language?

****51. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) vandalizes?

****52. Is this not true (so far as you know), somewhat or sometimes true, very true or often true for (CHILD)? (He/She) doesn't seem to feel guilty after misbehaving?

*Anxious/Depressed Scale Items.

**Withdrawn Scale Items.

***Aggressive Scale Items.

****Delinquent Scale Items.

Appendix C

Harsh Parenting Scale Items

- *1. How many times in the past year did you...Shook (CHILD)? Was it once in the past year, twice, 3-5 times, 6-10 times, 11-20 times, more than 20 times in the past year, it happened but not in the past year, or this never happened?
- *2. How many times in the past year did you...Hit (him/her) on the bottom with something like a belt, hairbrush, a stick or some other hard object? Was it once in the past year, twice, 3-5 times, 6-10 times, 11-20 times, more than 20 times in the past year, it happened but not in the past year, or this never happened?
- **3. How many times in the past year did you...Shouted, yelled, or screamed at (CHILD)? Was it once in the past year, twice, 3-5 times, 6-10 times, 11-20 times, more than 20 times in the past year, it happened but not in the past year, or this never happened?
- *4. How many times in the past year did you...Spanked (him/her) on the bottom with your bare hand? Was it once in the past year, twice, 3-5 times, 6-10 times, 11-20 times, more than 20 times in the past year, it happened but not in the past year, or this never happened?
- **5. How many times in the past year did you...Swore or cursed at (him/her)? Was it once in the past year, twice, 3-5 times, 6-10 times, 11-20 times, more than 20 times in the past year, it happened but not in the past year, or this never happened?
- **6. How many times in the past year did you...Said you would send (him/her) away or would kick (him/her) out of the house? Was it once in the past year, twice, 3-5 times, 6-10 times, 11-20 times, more than 20 times in the past year, it happened but not in the past year, or this never happened?

- **7.** How many times in the past year did you...Threatened to spank or hit (him/her) but did not actually do it? Was it once in the past year, twice, 3-5 times, 6-10 times, 11-20 times, more than 20 times in the past year, it happened but not in the past year, or this never happened?
- *8.** How many times in the past year did you...Slapped (him/her) on the hand, arm, or Leg? Was it once in the past year, twice, 3-5 times, 6-10 times, 11-20 times, more than 20 times in the past year, it happened but not in the past year, or this never happened?
- *9.** How many times in the past year did you...Pinched (him/her)? Was it once in the past year, twice, 3-5 times, 6-10 times, 11-20 times, more than 20 times in the past year, it happened but not in the past year, or this never happened?
- **10.** How many times in the past year did you...Called (him/her) dumb or lazy or some other name like that? Was it once in the past year, twice, 3-5 times, 6-10 times, 11-20 times, more than 20 times in the past year, it happened but not in the past year, or this never happened?

***Physical Aggression Scale Items**

****Psychological Aggression Scale Items**

Appendix D

Maternal Family Mental Health History Scale Items

1. Did your biological father ever have periods lasting two weeks or more when he was depressed, down in the dumps, or blue most of the time? Yes; No; Don't Know.
2. Did he ever get professional treatment for depression? Yes; No; Don't Know.
3. Was he ever hospitalized for depression? Yes; No; Don't Know.
4. Did your biological father have periods of a month or more when he was constantly nervous, edgy, or anxious? Yes; No; Don't Know.
5. Did he ever get professional treatment for his nervousness? Yes; No; Don't Know.
6. Was he ever hospitalized for his nervousness? Yes; No; Don't Know.
7. Did your biological father ever attempt to commit suicide? Yes; No; Don't Know.
8. Did he die from the attempt? Yes; No.
9. Did your biological mother ever have periods lasting two weeks or more when she was depressed, blue, or down in the dumps most of the time? Yes; No; Don't Know.
10. Did she ever get professional treatment for depression? Yes; No; Don't Know.
11. Was she ever hospitalized for depression? Yes; No; Don't Know.
12. Did your biological mother have periods of a month or more when she was constantly nervous, edgy, or anxious? Yes; No; Don't Know.
13. Did she ever get professional treatment for her nervousness? Yes; No; Don't Know.
14. Was she ever hospitalized for her nervousness? Yes; No; Don't Know.
15. Did your biological mother ever attempt to commit suicide? Yes; No; Don't Know.
16. Did she die from the attempt? Yes; No

Appendix E

Child Negative Emotionality Scale Items

Using a scale from 1 to 5, where 1 means "not at all like your child," 5 means "very much like your child," and 2, 3, and 4 mean somewhere in between, tell me how well each statement describes (CHILD):

1. Which number would you use for this statement? (He/She) often fusses and cries.
2. Which number would you use for this statement? (He/She) gets upset easily
3. Which number would you use for this statement? (He/She) reacts strongly when upset.