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Numerous studies have investigated the relationship between child AD/HD and maternal depression; however, findings have been largely mixed. Potentially contributing to the variability in findings, multiple methods of defining and assessing depression have been employed across studies. The purpose of the current study was to address these various methods within a single sample. Thirty-nine mothers of children with AD/HD and twenty-nine mothers of children without AD/HD completed measures of child and maternal psychopathology. Mothers of children with AD/HD were significantly more likely to report elevated depression at the time of the study and they were also more likely to have a history of chronic depression. Severity of depression was predicted by child diagnostic status, maternal anxiety, and maternal AD/HD. The results indicated that mothers of children with AD/HD are more likely to have a history of depression than other mothers and that the strength of the relationship between child AD/HD and maternal depression varies depending on the definition of depression. Additionally, when looking at lifetime depression status, measures that take into account chronic versus single-episode depression may be more sensitive to differences between mothers of children with and without AD/HD.

THE RELATIONSHIP BETWEEN MATERNAL DEPRESSION AND CHILD
ATTENTION-DEFICIT/HYPERACTIVITY DISORDER

by

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CHAPTER I

INTRODUCTION

Recent estimates place the prevalence of Attention-Deficit/Hyperactivity Disorder (AD/HD) among children between eight and nine percent (Froehlich et al., 2007; Pastor & Reuben, 2008). Although individual presentation of AD/HD is highly variable, primary symptoms include difficulties with sustained attention, hyperactivity, and impulsivity (APA, 2000). Childhood AD/HD is associated with impairment at home, at school, and in social settings (Frazier, Demaree, & Youngstrom, 2004; Hoza et al., 2005; Johnston & Mash, 2001). Impairment associated with childhood AD/HD is not limited, however, to that experienced by the child diagnosed with AD/HD. At home, families of children with AD/HD experience more conflict than do other families (for a review, see Johnston & Mash, 2001). In addition to this increased conflict, the impairment experienced by family members can exist outside the confines of their interactions with the child diagnosed with AD/HD, and research suggests that parents of children with AD/HD experience significantly more stress than do other parents (Anastopoulos, Guevremont, Shelton, & DuPaul, 1992).

There is also a large body of research that suggests a possible relationship between child AD/HD and parental depression¹ (e.g., Nigg & Hinshaw, 1998). One major limitation of this body of literature is the considerable variability in findings among different studies. More specifically, some studies suggest that the rate of depression is

higher among parents of children with AD/HD (Befera & Barkley, 1985; Biederman, Faraone, Keenan, & Tsuang, 1991; Faraone, Biederman, Keenan, & Tsuang, 1991); whereas, other studies suggest that there is a relationship between parental depression and child Oppositional Defiant Disorder (ODD) but not child AD/HD (Chronis et al., 2003). Variability in findings may be explained, in part, by variability in measurement and operational definition of depression across studies. Some studies have investigated the relationship between childhood AD/HD and parental depressed mood at the time of assessment using self-report rating scales (Befera & Barkley, 1985; Cunningham, Benness, & Siegel, 1988; Cunningham & Boyle, 2002). Others have used diagnostic interviews and looked at the extent to which parents of children with AD/HD are more likely to have a history of Major Depressive Disorder than parents of children without AD/HD (e.g., Chronis, et al., 2003; Faraone et al., 1995; Lahey, Piacentini, McBurnett, & Stone, 1988). Additionally, some researchers have investigated whether parenting a child with AD/HD is associated with more frequent Major Depressive Episodes (J. T. Nigg & Hinshaw, 1998).

To the extent that the strength of the relationship between childhood AD/HD and parental depression varies as a function of how parental depression is defined, those differences may shed light on the nature of the relationship between the two conditions. Comparisons among the findings of studies employing these different methods of defining depression provide information regarding the relationship between childhood AD/HD and parental depression. More specifically, such comparisons contribute to a better understanding of the extent to which childhood AD/HD is associated with presence

of parental depression among all parents or only a higher level of severity of depression among already depressed parents. Without comparing multiple methods of measurement within a single sample, however, it is unclear to what extent variability in findings is attributable to true variability in the relationship between childhood AD/HD and different aspects of depression versus sampling error.

Along with cross-study differences in defining parental depression, it is important to consider that there is also a high degree of variability in individual presentation of AD/HD. Given two distinct categories of symptoms (e.g., inattention and hyperactive/impulsive) and children need only exhibit six of nine symptoms from either category to meet diagnostic criteria, there is a multitude of different symptom combinations associated with an AD/HD diagnosis. It is possible that hyperactive/impulsive symptoms may be associated with parental depression while inattentive symptoms are not associated with parental depression, or vice versa.

The purpose of the current study was to take a more comprehensive approach to measuring this relationship in an effort to answer the following questions: Are mothers of children with AD/HD more likely to have a history of depression than mothers of children without AD/HD?² Is chronic depression (e.g., Major Depressive Disorder, Recurrent and Dysthymic Disorder), as opposed to single-episode depression (e.g., Major Depressive Disorder, Single Episode), more common among mothers of children with AD/HD than among mothers of children without AD/HD? To what extent do psychosocial characteristics of mothers and children (e.g., children's behavior, children's emotions, mothers' cognitions, etc.) play a role in maternal depression? In considering a

possible relationship between maternal depression and child AD/HD, however, it is first necessary to provide an overview of AD/HD in children and depression in adults.

Attention-Deficit/Hyperactivity Disorder

Features of AD/HD. By definition, AD/HD is associated with significant impairment in two or more domains of daily functioning including, but not limited to, the following: school, home, work, and social (APA, 2000). This dysfunction is believed to be attributable to the presence of significant symptoms of inattention, significant symptoms of hyperactivity/impulsivity, or both. There are, in total, nine symptoms of inattention and nine symptoms of hyperactivity/impulsivity. Examples of inattention symptoms include: “often has difficulty sustaining attention in tasks or play activities” and “often has difficulty organizing tasks and activities.” Examples of hyperactivity/impulsivity symptoms include: “often fidgets with hands or feet or squirms in seat” and “often interrupts or intrudes on others” (APA, 2000).

Of note, symptom counts alone are insufficient evidence to diagnose AD/HD. These symptoms must be associated with significant impairment across more than one domain of daily functioning and must not be better accounted for by some other condition. Furthermore, features of the disorder must be apparent before the age of seven. Although some controversy exists with regard to the age of onset criterion, early onset is listed as one of the defining features of this disorder primarily due to the overwhelming evidence for the biological bases of this disorder. In other words, because genes and neurological factors are strongly implicated in the etiology of this disorder, it is not expected that people develop AD/HD in adolescence or adulthood but that this is a

disorder with which people will struggle throughout life (Barkley, 2006; Barkley, Murphy, & Fischer, 2008).

Impairment and Comorbidity. As previously stated, children with AD/HD experience impairment in school, social, and home settings (APA, 2000). Furthermore, impairment associated with this disorder persists across the course of development. Turning first to impairment associated with AD/HD during childhood, symptoms of AD/HD contribute to higher rates of negative family interactions including parent-child and sibling interactions (Johnston & Mash, 2001; Mash & Johnston, 1982; Mikami & Pfiffner, 2008). At school, the disorder is linked to poorer performance on academic tests (Frazier, et al., 2004). It is believed that cognitive deficits and behavior problems, both features of AD/HD, contribute to academic impairment through disruption of the learning process (Frazier, et al., 2004; Tallmadge & Barkley, 1983). In the social domain, children with AD/HD tend to be less successful at maintaining desirable friendships and are generally less well-liked than other children (Hoza, et al., 2005).

Compared to other children, children with AD/HD are more likely to carry co-occurring diagnoses of a variety of comorbid conditions. Of note, there are multiple definitions of the term “comorbid”, some carrying implications with regard to etiology of the conditions. For the purposes of this paper, the use of the term “comorbidity” will be consistent with that of Lilienfeld (2003) and will refer to the tendency of two conditions to covary across individuals rather than within individual co-occurrence of multiple disorders. Furthermore, use of the term “comorbidity” is not intended to imply causal relationships between co-occurring conditions. With that clarification in mind, higher

rates of learning disorders are observed among children with AD/HD than among children without AD/HD (Semrud-Clikeman, Biederman, Sprich-Buckminster, & Lehman, 1992) as are higher rates of Oppositional Defiant Disorder (ODD) and Conduct Disorder (CD) (Jensen, Martin, & Cantwell, 1997). There is also evidence to suggest depression and other internalizing disorders are more commonly diagnosed among children with AD/HD than among other children (August, Realmuto, MacDonald, & Nugent, 1996; Jensen, et al., 1997). The association between child AD/HD and child depression is interesting in light of the focus of this paper and given that children of depressed mothers are more likely than other children to experience depression (Hammen & Brennan, 2003).

Of all other disorders, ODD and CD are the most common to co-occur with AD/HD; nearly half of children with AD/HD also meet diagnostic criteria for one of these two other externalizing disorders (APA, 2000). This is of particular concern considering the open acts of defiance and aggression associated with these disorders only contribute to further impairment. Although the presence of child AD/HD places children at greater risk for ODD and CD (APA, 2000), these disorders are believed to have separate etiologies. The etiology of AD/HD is primarily biological in nature (Barkley, 2006); in contrast, for many children with ODD and CD, the disorders are expected to evolve out of dysfunctional parenting (Eddy, Leve, & Fagot, 2001). According to Patterson (1982), child aggression and antisocial behavior develops, in part, out of maladaptive transactions with parents. During these transactions, parents and children use coercion and aggression to get the other to do as they want. These negative parent-child

transactions associated with these comorbid disorders likely make parenting a child with AD/HD even more difficult.

In summary, child AD/HD is associated with a wide range of impairment. Children with AD/HD have difficulties in peer, academic, and family settings. Furthermore, they are at increased risk for a variety of comorbid conditions, including other disruptive behavior disorders. Given such widespread impairment, children with AD/HD pose a special challenge for parents and parenting a child with AD/HD is associated with increased stress (Anastopoulos, et al., 1992). The additional stress associated with parenting a child with AD/HD is of particular relevance to the possible relationship between child AD/HD and maternal depression. As will be discussed in greater detail below, the association between child AD/HD and parenting stress is one of several potential mechanisms through which child AD/HD may be related to maternal depression.

Etiology. Existing research suggests that genetic factors play a large role in the etiology of AD/HD. In a meta-analysis of twin and sibling studies, Burt (2009) found the median concordance rate for AD/HD among monozygotic twins to be .66, while the rate for dizygotic twins was significantly lower (.20). Additionally, the concordance rate for nonrelated siblings (e.g., step-siblings and adoptive siblings) was low (.09). The finding that concordance rates increase with genetic similarity indicates a strong genetic component. Furthermore, the relatively small concordance rate among siblings with no biological relationship suggests that environment plays a lesser role in the etiology of AD/HD. More specifically, genetic factors have been estimated to explain approximately

70 percent of the variability in AD/HD (Burt, 2009). A number of candidate genes have been implicated in AD/HD, including DAT1, DRD4, DRD5, 5HTT, HTR1B, and SNAP25 (Gizer, Ficks, & Waldman, 2009). The possible relationship between 5HTT and AD/HD is particularly notable given 5HTT is also implicated in depression.

Although genes play a large role in the etiology of AD/HD, they are not the only determinant of whether an individual has the disorder or not, and there is evidence of a gene-by-environment interaction in the etiology of AD/HD (J. Nigg, Nikolas, & Burt, 2010). Low-birth weight, level of lead in blood, and psychosocial adversity in particular have been shown to be associated with AD/HD (Counts, Nigg, Stawicki, Rappley, & Von Eye, 2005; Mick, Biederman, Prince, Fischer, & Faraone, 2002; J. T. Nigg et al., 2008). Although the role of environmental factors in the etiology of AD/HD is relatively small in comparison to that of genetic factors, it is important to mention given the association between maternal depression and difficulties within the parent-child relationship (Johnston, Murray, Hinshaw, Pelham, & Hoza, 2002). The impact of maternal depression on the parent-child relationship will be discussed in greater detail below.

Major Depressive Disorder and Dysthymic Disorder

Features of Depression. Depressed mood is a feature of multiple mood disorders including MDD, Dysthymic Disorder, Bipolar I, and Bipolar II, and depressed mood varies considerably across individuals with regard to course, severity, and onset. MDD is by far the most common of the mood disorders with 10% to 25% of women and between 5% and 20% of men experiencing the disorder at some point in their lives (APA, 2000). MDD is characterized by the presence of one or more Major Depressive Episodes

(MDEs). According to DSM-IV-TR criteria, MDEs consist of a period of at least two weeks during which a person experiences a change in typical functioning associated with depressed mood, loss of interest or pleasure, or both as well as at least four other symptoms of depression (e.g., change in weight or appetite, sleep disturbance, psychomotor disturbance, fatigue, feelings of worthlessness or excessive guilt, poor concentration, and recurrent thoughts of death or suicide). Additionally, these symptoms must be associated with a significant amount of distress and must not be better explained by bereavement or some other condition. MDD is also episodic in nature. Some may experience a single episode and never relapse. Others may experience frequent MDEs interspersed with periods of relatively normal functioning. Furthermore, some individuals with MDD have a more chronic presentation, with few to no periods without significant mood disturbance.

Depressed mood is also a feature of Dysthymic Disorder. Approximately 6% of people experience this disorder at some point in their lives. Individuals with Dysthymic Disorder present with chronic mood disturbance of lower severity than individuals with MDD. DSM-IV-TR criteria for Dysthymic Disorder for adults require the presence of depressed mood for most of the day on more days than not for a period of at least two years. Depressed mood must be accompanied by two or more symptoms of depression similar to those listed in the criteria for MDD. Additionally, there may not have been an MDE within the first two years of illness (APA, 2000).

Bipolar I and Bipolar II also include MDEs in their diagnostic criteria. Individuals with these diagnoses experience episodes of depressed mood interspersed with episodes

of mania or hypomania. Depressive episodes associated with a bipolar disorder appear to be similar to those associated with unipolar depression given both appear to be associated with significant life stress (Alloy et al., 2005). There are also notable differences between bipolar and unipolar depressive episodes. Those associated with a bipolar disorder are more likely to involve psychosis, diurnal mood variation, and hypersomnia (Forty et al., 2008). Depressive episodes associated with a bipolar disorder also tend to be shorter and more frequent than those associated with unipolar (Forty, et al., 2008). Furthermore, the presence of manic or hypomanic episodes also distinguishes individuals with bipolar depression from those with unipolar depression. Given these notable differences associated with bipolar depression, it was outside the scope of this study to fully address a possible relationship between child AD/HD and maternal depression associated with a bipolar disorder. From this point forward, discussion will focus on Major Depressive Disorder and Dysthymic Disorder.

Age of onset is another source of variability with regard to the presentation of depression. The median age of onset for mood disorders has been estimated between 25 and 32 years (Kessler et al., 2005); however, there appears to be substantial variability in individuals' age of onset of depression. More specifically, the 25th percentile on the age-of-onset distribution for mood disorders has been estimated at 18 years whereas the 75th percentile has been estimated at 43 years (Kessler, et al., 2005). In other words, individuals develop mood disorders at a wide variety of ages. Given significant variability in age of onset and course of illness, depression (whether associated with MDD or Dysthymic Disorder) is highly variable in presentation. As will be discussed in

later sections, this high degree of variability poses significant challenges for research involving the relationship between maternal depression and child AD/HD.

Impairment and Comorbidity. Depression is associated with impairment across multiple domains of functioning. In general, adults with depression report less overall satisfaction with life (Strine et al., 2009). Data from the National Comorbidity Survey Replication indicates that Major Depressive Disorder is associated with approximately 27 lost workdays per worker with MDD per year (Kessler, Akiskal et al., 2006). Depression is also associated with poorer performance in the workplace (Adler et al., 2006). Of particular relevance to the focus of the current study, family functioning is lower among families of individuals with depression, especially during depressive episodes (Friedmann et al., 1997; Weinstock, Keitner, Ryan, Solomon, & Miller, 2006).

Depression may also affect parenting practices. Depressed mothers appear to engage in more negative parenting behaviors (e.g., laxness and over-reactivity) than other mothers (Gerdes et al., 2007; Lovejoy, Graczyk, O'Hare, & Neuman, 2000; O'Leary, Smith Slep, & Reid, 1999). Among mothers of children with ODD or CD, mothers with more severe symptoms of depression make more critical comments towards their children (Green, Stanley, & Peters, 2007). In addition to engaging in more negative parenting behaviors, depressed mothers may also have difficulty structuring learning activities for their children. During structured interactions with an unfamiliar child, mothers with high scores on the Beck Depression Inventory (BDI) were less sensitive to the child's level of understanding, used fewer teaching strategies, and engaged in less frequent shared decision-making with the child than did mothers with lower BDI-measured depression

(Goldsmith & Rogoff, 1995). There is also evidence that maternal depression is associated with parenting behaviors among mothers of children with AD/HD. Johnston and colleagues found that mothers who reported more severe depression were less responsive during interactions with their sons with AD/HD (Johnston, et al., 2002). With regard to timing of maternal depression, both past and present depression appear to negatively impact parenting; however, the relationship between parenting and current depression is stronger (Feng, Shaw, Skuban, & Lane, 2007; Lovejoy, et al., 2000).

Taken together, these findings illustrate that past and present maternal depression is associated with poorer parenting practices. Due to the use of correlational design, inferences cannot be made regarding the extent to which there may be a causal relationship between maternal depression and poor parenting practices. Furthermore, Lovejoy and colleagues (2000) have suggested that the relationship between maternal depression and parenting may not be specific to depression but that maladaptive parenting might be related to general parental distress. There is also some evidence suggesting that the relationship between maternal depression and poor parenting practices is an artifact of the relationships between child behavior and both depression and parenting (Kashdan et al., 2004). Although child behavior has been shown to elicit poor parenting practices in laboratory settings (Goldsmith & Rogoff, 1995), child behavior is likely not the only determinant of parenting behavior. Given the wealth of research indicating the impact of maternal depression on parenting behavior, a more valid conclusion would be that both child behavior and maternal depression play a role in parenting behavior.

Rates of comorbid disorders are high among adults with depression which likely contributes to impairment among this population. Most individuals who meet criteria for MDD also meet criteria for another psychological disorder (e.g., Generalized Anxiety Disorder, Post-Traumatic Stress Disorder, Alcohol Abuse, etc.) at some point in their lives, whether prior to the onset of depression or after the onset of depression (Kessler, Zhao, Blazer, & Swartz, 1997). The presence of any one of a number of psychological disorders, including anxiety disorders and alcohol dependence has been shown to predict the onset of an MDE (Kessler, et al., 1997). Of particular relevance to the current study, adults with AD/HD are at increased risk for depression (Kessler, Adler et al., 2006). As will be discussed later, given adult AD/HD is associated with depression and higher risk for having a child with AD/HD, a relationship between maternal depression and child AD/HD may be an artifact of the relationship between parental AD/HD and child AD/HD.

Etiology. There are multiple theories addressing the etiology of depression. Some theories, such as cognitive theory of depression (Beck & Alford, 2009) follow a diathesis stress model in which the interaction between stressful life events and individual vulnerability to stress leads to depression. More specifically, cognitive theory posits that the root of depression lies in maladaptive thought patterns triggered by the experience of stressful events (Beck & Alford, 2009). Alternatively, interpersonal theory attributes depression to malfunctions in the social roles of depressed persons (Klerman & Weissman, 1986). Behavioral activation models of depression suggest that depression develops as a result of experiencing insufficient levels of positive reinforcement (Manos,

Kanter, & Busch, 2010). Neuropsychological theories provide evidence of the role of brain dysfunction in depression (Shenal, Harrison, & Demaree, 2003).

One common thread among many of these theories is the theory that depression is associated with the experience of negative life events or stress. There is a significant body of research suggesting a link between stress and depression. In his review, Kessler (1997) noted that stressful events such as the death of a spouse, loss of a job, and divorce are associated with an increase in depressive episodes. Kessler (1997) also noted that chronic role-related stresses (e.g., marital conflict, job-related stress) are associated with depression. Life stress is not the only determinant of depression. There is evidence that biological factors also play a role. More specifically, the presence of certain genes (e.g., 5-HTTLPR) may serve to moderate the relationship between stressful life events and depression (Karg, Burmeister, Shedden, & Sen, 2011). Although stress is not the only factor contributing to the onset of depression, it plays a large role. The relationship between chronic stress and depression is particularly relevant to the current study. Parenting a child with AD/HD has been shown to be more stressful than parenting a child without AD/HD (Anastopoulos, et al., 1992). Therefore, the stress associated with parenting a child with AD/HD may contribute to maternal depression. Prior to a discussion of the mechanisms through which parenting a child with AD/HD may be associated with maternal depression, existing literature addressing the relationship between the two will be reviewed.

Child AD/HD and Maternal Depression

Evidence for a Relationship. Some studies indicate a relationship between child AD/HD and maternal depression. In general, risk of MDD is higher among the first-degree relatives of children with AD/HD (Biederman, et al., 1991; Faraone, et al., 1991). Nigg and Hinshaw (1998) found that the past-year prevalence of MDEs was much higher for mothers of children with AD/HD than for mothers of children without AD/HD; however, there was no difference in lifetime prevalence of MDD between groups nor was there any difference in lifetime or past year rates of depression among fathers. This finding held true despite the presence of either comorbid ODD or CD among children. For example, when compared to mothers of control children, mothers of children with AD/HD report greater severity of depression (Befera & Barkley, 1985; Cunningham, et al., 1988). When participants were grouped based on risk for AD/HD or ODD, mothers of preschoolers at risk for AD/HD or both AD/HD and ODD had higher BDI-measured depression than did mothers of “normal” children, but mothers of children at risk for ODD but not AD/HD did not differ in BDI-measured depression from mothers of “normal” children (Cunningham & Boyle, 2002).

Although much of the research supporting a relationship between child AD/HD and maternal depression is correlational in nature, there is also some supporting data from experimental research. Pelham, et al (1997) found that mothers assigned to interact with confederate children behaving like children with AD/HD and ODD reported more severe depressed mood following the interaction that did mothers interacting with a confederate child behaving in a normal manner. Unfortunately, because all confederate children

behaved as though they had comorbid AD/HD and ODD or CD, it is impossible to decipher which behaviors (AD/HD vs. ODD/CD) were responsible for maternal depressed mood. Along the same lines, Forehand, Wells, and Greist (1980) found that mothers of children with AD/HD experienced a decrease in BDI-measured depression after completing a parent training course that led to simultaneous improvements in child compliance and parenting behavior.

Other research suggests maternal depression is related to the presence of child ODD and CD, but not to child AD/HD. Chronis and colleagues (2003) found that child AD/HD did not significantly increase risk for a lifetime diagnosis of MDD among mothers of young children. Rather, this study found that comorbid child AD/HD and ODD or CD, but not AD/HD alone, increased maternal risk of MDD as well as risk for several other diagnoses. Similarly, Lahey and colleagues (1988) found that increased rates of maternal MDD and Dysthymic Disorder were associated with the presence of CD but not with the presence of AD/HD, paternal MDD was not associated with either child AD/HD or CD. Barkley and colleagues (1991) also question the extent to which maternal depression is associated with AD/HD. In their study, mothers of children with both AD/HD and ODD or CD reported more severe depression than mothers of children without either disorder; however, mothers of children with AD/HD without comorbid diagnoses were no different from control mothers with regard to depression severity (Barkley, et al., 1991).

Elgar and colleagues (2003) examined the increased risk of future maternal depression associated with the presence of severe child adjustment problems (e.g., 90th

percentile and above on child rating scales). The results of these analyses indicated the presence of severe hyperactivity did not significantly increase risk of future maternal depression; however, the presence of either severe aggression or severe emotional problems did. Although this study did not involve formal AD/HD diagnoses, it does bring into question the extent to which child AD/HD might play a causal role in maternal depression. Looking at the day-to-day relationships between child behavior and maternal functioning in a small sample of children attending a summer treatment program, this same research group found that, among mothers of children with AD/HD, child inattention, impulsivity, and over-activity on one day did not predict symptoms of maternal depression on the following day, but these child behaviors did predict maternal fatigue and anger (Elgar, Waschbusch, McGrath, Stewart, & Curtis, 2004).

As a whole, existing research addressing the relationship between maternal depression and child AD/HD yields mixed results. Although there appears to be a trend in findings suggesting that maternal depression is associated with the presence of comorbid AD/HD and ODD or CD rather than AD/HD alone, there is still disagreement in the literature (e.g., Nigg & Hinshaw, 1998 and Chronis, 2003). As previously mentioned, some of the variability in findings may be attributable to variability in research design (see Table 1). Some studies defined depression as the presence of major depressive disorder based on a structured diagnostic interview (e.g., (Biederman, et al., 1991; Chronis, et al., 2003; Faraone, et al., 1991), while others defined depression as scores on self-report rating scales such as the BDI (e.g., Barkley, et al., 1991; Cunningham, et al., 1988; Cunningham & Boyle, 2002). Although not all studies relied on self-report rating

scales, some of the discrepancies among these findings may be, in part, attributable to the use of these rating scales. It is important to keep in mind that, when interpreting findings from studies in which depression was measured only in this way, these scales do not necessarily measure symptoms of MDD and Dysthymic Disorder. Rating scales measure symptoms of depressed mood which are also a feature of Bipolar Disorder I and Bipolar Disorder II. Furthermore, some have questioned the extent to which BDI scores in a community sample may correspond to general cognitive and emotional distress rather than severity of MDD (Coyne & Gotlib, 1983).

An additional weakness associated with the current body of literature regarding child AD/HD and maternal depression, is the manner in which the role of AD/HD subtype and comorbid psychopathology has been addressed. Symptom presentation can vary considerably across the three subtypes of AD/HD. The impact on the parent-child relationship of a purely inattentive child versus that of a purely hyperactive/impulsive or combined type child may be quite different. With regard to comorbid child conditions, there have been numerous studies looking at the potential role of child ODD and CD in relation to the possible link between child AD/HD and maternal depression. In general, these studies suggest that maternal depression is related to child ODD and CD rather than to child AD/HD (Chronis, et al., 2003; Lahey, et al., 1988); however, this theme in existing literature may be partially attributable to research design issues. More specifically, by dividing participants into an AD/HD group, an AD/HD and ODD or CD group, and a control group as many studies have done, the effect of ODD or CD may be exaggerated if the presence of ODD and CD covaries with severity or subtype of AD/HD.

With regard to comorbid maternal psychopathology, very little attention has been paid to the potential role of maternal AD/HD. Parents of children with AD/HD (Barkley, 2006) are more likely to meet criteria for AD/HD than are other parents. Considering that adult AD/HD is associated with increased risk for depression (Kessler, Adler, et al., 2006), it is important to control for maternal AD/HD when measuring the relationship between child AD/HD and maternal depression.

Nature of the Relationship. While results are mixed, especially with regard to the role of comorbid child ODD and CD, there appears to be evidence in support of a relationship between child AD/HD and maternal depression. There are multiple possible explanations for the nature of the relationship. Child AD/HD might cause or contribute to severity and maintenance of maternal depression. Maternal depression might or contribute to the severity and maintenance of child AD/HD. Some third factor may cause or contribute to the severity and maintenance of both disorders. Furthermore, some combination of these three explanations is also possible. As will be evident in the proceeding sections, some possibilities are more probable and have more empirical support than others.

Child AD/HD and Environmental Risk for Maternal Depression. As previously discussed, the etiology of depression is attributed to a combination of genetic risk and psychosocial stress. With regard to the hypothesis that child AD/HD plays a causal role in the development of maternal depression, there is some evidence that parenting a child with AD/HD may contribute to psychosocial stress and environmental risk for depression. Most of the findings in support of this hypothesis are limited in that

they are based on correlational research. In a rare experimental study, Pelham, et al (1997) found that mothers assigned to interact with confederate children behaving like children with AD/HD and ODD reported more severe depressed mood following the interaction than did mothers interacting with a confederate child behaving in a normal manner. Unfortunately, because all confederate children behaved as though they had comorbid AD/HD and ODD or CD, it is impossible to decipher which behaviors (AD/HD vs. ODD/CD) were responsible for maternal depressed mood. Of course, just because child behavior can increase maternal depression in a research setting does not also entail that child behavior causes prolonged maternal depression in naturalistic settings; however, these results are consistent with the hypothesis that child AD/HD plays a causal role in maternal depression. Along the same lines, Forehand, Wells, and Greist (1980) found that mothers of children with AD/HD experienced a decrease in BDI-measured depression after completing a parent training course that led to simultaneous improvements in child compliance and parenting behavior.

With few exceptions, research examining parent-child interactions in families of children with AD/HD suggests that parent-child interactions are more negative when the child has AD/HD. This negativity is evident in both mother and child behavior. In an early study of parent-child interactions, hyperactive children were less compliant and engaged in less independent activity than non-hyperactive children (Mash & Johnston, 1982). Possibly in response to their children's behavior, mothers of hyperactive children used more directives, were more negative, and were less approving of appropriate child behavior than mothers of non-hyperactive children (Mash & Johnston, 1982). Other

studies have echoed Mash and Johnston's (1982) findings that child AD/HD is associated with increased child noncompliance and mothers' use of directives in parent-child interactions (Cunningham & Barkley, 1979; DuPaul, McGoey, Eckert, & VanBrakle, 2001; Tallmadge & Barkley, 1983). Buhrmester and colleagues (1992) found that hyperactive boys behaved more negatively towards their mothers than did non-hyperactive boys and that mothers of hyperactive boys engaged in more coercive behavior when interacting with their sons than did other mothers. Providing evidence that parent-child negativity is unique to children with AD/HD and not to parents of children with AD/HD, parents of multiple children have been found to have more conflict in their relationship with their child with AD/HD than in their relationship with their child without AD/HD (Smith, Brown, Bunke, Blount, & Christophersen, 2002). The negativity in these interactions appears to persist across time as parent-adolescent interactions have been found to be more negative in families in which the adolescent was diagnosed with hyperactivity in childhood (Barkley, et al., 1991).

Of note, the negative impact of AD/HD on the parent-child relationship may be attributable to the presence of comorbid ODD or CD rather than behaviors and impairment specifically associated with AD/HD; however, findings are variable. Based on maternal report of the parent-adolescent relationship, comorbid ODD or CD exacerbate the negative effect of AD/HD on this relationship (Barkley, Anastopoulos, Guevremont, & Fletcher, 1992). In contrast, observational data from parent-adolescent interactions indicated greater negativity in the comorbid AD/HD and ODD group but found the AD/HD group to be no different from the non-AD/HD group (Barkley, et al.,

1992). In a similar study, mothers of children with AD/HD and either high or low levels of ODD behaviors reported more conflict in relationships with their children than did mothers of children without AD/HD; however, there were few differences among the groups with regard to observed mother and child behavior (Johnston, 1996). Thus, it may be that mothers of children with AD/HD only perceive their relationships as more negative than other mothers and that only mothers of adolescents with both ADHD and ODD actually engage in more negative interactions with their adolescents than other mothers. Alternatively, observational methods may not be sufficiently sensitive to detect differences in interactions between dyads of children with AD/HD and their mothers and dyads of children without AD/HD and their mothers.

Also consistent with the hypothesis that parenting a child with AD/HD might contribute to depression through increased psychosocial stress, the literature indicates that mothers of children with AD/HD experience higher levels of stress than do other mothers (Baker & McCal, 1995; Breen & Barkley, 1988; DuPaul, et al., 2001; Mash & Johnston, 1983; Podolski & Nigg, 2001). Furthermore, among mothers of children with AD/HD, parenting stress appears to be associated with the severity of child AD/HD (Anastopoulos, et al., 1992; Harrison & Sofronoff, 2002). As with the relationships between AD/HD and previously discussed constructs, the relationship between AD/HD and parenting stress may be better explained by comorbid symptoms of ODD and CD than by AD/HD alone. Although Podolski and Nigg (2001) found higher maternal distress among mothers of children with AD/HD, this difference was no longer significant after accounting for symptoms of ODD and CD.

Taken together, these findings suggest that mothers' interactions with their AD/HD children are associated with more conflict, stress and negativity. There is some evidence that difficulties in the parent-child relationship may be attributable to behaviors associated with ODD and CD rather than AD/HD. Regardless of whether difficulties in the parent-child relationship are attributable specifically to AD/HD behaviors or ODD and CD behaviors, mothers' interactions with their children with AD/HD are less positive than those of mothers of children without AD/HD. These interactions appear to contribute to stress, which may lead to maternal depression.

Maternal Depression and Environmental Risk for Child AD/HD. As previously discussed, genetic factors play a much more prominent role in the etiology of AD/HD than do environmental factors. Therefore, it is no surprise that there is significantly less research suggesting maternal depression contributes to environmental risk for AD/HD than there is to support the reverse relationship. There is evidence that maternal depression is associated with increased child disruptive behavior over time; however, these findings are not specific to AD/HD and generally refer to behaviors associated with ODD and CD (Kim-Cohen, Moffitt, Taylor, Caspi, & Pawlby, 2005; Warner, Weissman, Mufson, & Wickramaratne, 1999). Although maternal depression has an effect on the parent-child relationship and may contribute the development or exacerbation of disruptive behavior, there is no evidence that maternal depression increases environmental risk for the onset of AD/HD.

Shared Risk for Maternal Depression and Child AD/HD. A third explanation for a relationship between child AD/HD and maternal depression is that a third factor,

namely genetic similarity, increases risk for both conditions. There is some evidence of shared genetic risk between AD/HD and depression. More specifically, AD/HD and mood disorders have been found to co-occur within families (Biederman, Faraone, Keenan, & Benjamin, 1992). It is also important to consider that adults with AD/HD are at increased risk of depression (Kessler, Akiskal, et al., 2006). Given the high heritability of AD/HD, adults with AD/HD are also at greater risk of having children with AD/HD. Therefore, a relationship between child AD/HD and maternal depression could potentially be attributable to the relationship between child AD/HD and maternal depression.

Summary

Although findings are mixed, existing research points to a possible link between child AD/HD and maternal depression. In addition to adverse outcomes experienced by adults with depression, (e.g., poorer life satisfaction and poorer work productivity), there are also potential negative outcomes for children of adults with depression, especially those with AD/HD (e.g., increased risk of comorbid child psychopathology) (Chronis et al., 2007; Kessler, Akiskal, et al., 2006; Strine, et al., 2009). Given the pervasive impairment associated with maternal depression, it is of utmost importance to identify to what extent parenting a child with AD/HD contributes to environmental risk for maternal depression.

There are many different potential mechanisms through which child AD/HD may be related to maternal depression. Most plausible of these is the hypothesis that parenting a child with AD/HD contributes to mothers' overall level of stress, which then increases

risk for depression. More specifically, parenting a child with AD/HD is associated with significant stress (Anastopoulos, et al., 1992). Figure 1 illustrates a potential model through which the stress associated with parenting a child with AD/HD could lead to maternal depression. This model is built upon existing research linking stress to the development and maintenance of depression (Beck & Alford, 2009; Kessler, 1997) as well as research linking child AD/HD to impairment in the parent-child relationship (Johnston & Mash, 2001). Additionally, the model follows transactional theory (Sameroff, 2009) and assumes that effects within the parent-child system are bidirectional and may evolve over time.

In this model, child AD/HD contributes to maternal depression indirectly through its negative impact on the mother-child relationship. Although a causal relationship from child AD/HD to maternal depression is theoretically plausible, findings have been highly variable among studies that have examined the relationship between child AD/HD and maternal depression. Some studies suggest a relationship exists, while others suggest maternal depression is associated with child ODD and CD but not with child AD/HD. Findings differ to the extent that is unclear whether mothers of children with AD/HD are more likely than other mothers to experience depression and this variability may be attributable to variability in operational definitions of maternal depression. Some studies have looked at the frequency of Major Depressive Disorder among mothers of children with AD/HD, while others have looked at the frequency of Major Depressive Episodes with the past year. Others, still, have used scores on self-report rating scales such as the BDI as indices of depression. These different methods of measuring depression,

correspond to different questions about the nature of the relationship between child AD/HD and depression. For example, it is possible that parenting a child with AD/HD increases risk for mothers to develop depression. In which case, it would be expected that more mothers of children with AD/HD would carry depression diagnoses than would other mothers. Alternatively, parenting a child with AD/HD may be associated with increased frequency or severity of depressed mood among mothers who already experience depression. In this case, it would be expected that the overall rate of depression diagnoses would not differ among mothers of children with and without AD/HD. Mothers of children with AD/HD who had a history of depression prior to the onset of their children's behavioral difficulties, however, would be expected to experience longer, more severe, or more frequent episodes of depression than mothers who had a history of depression but did not have children with AD/HD. This increase in duration, severity, and frequency of symptoms among depressed mothers of children with AD/HD would be expected given the added stress associated with parenting a child with AD/HD. Furthermore, regardless of whether child AD/HD is associated with the presence or severity of a diagnosed mood disorder among mothers, child AD/HD may be related to maternal distress and depressed mood as measured by self-report rating scales.

Given the significant variability in findings related to the possibility of a relationship between child AD/HD and maternal depression, a thorough test of the model presented in Figure 1 through research addressing potential mechanisms through which child AD/HD and maternal depression may be related is premature. *The primary purpose of the proposed study, therefore, was to clarify current understanding of the nature of the*

relationship between child AD/HD and maternal depression in the context of a design that addresses many of the methodological shortcomings in prior research. As such, multiple methods of measuring depression (e.g., self-report rating scales and structured diagnostic interview) and multiple methods of defining depression (e.g., current status, lifetime status, severity of depression, etc.) were employed within a single data set.

A primary assumption of this model is that maternal depression is more likely to occur in families of children with AD/HD and that maternal depression may be maintained or exacerbated through mothers' interactions with their child with AD/HD. It is assumed from a diathesis stress model, there may be some mothers who are predisposed to depression but who had not experienced depression prior to parenting. For those mothers, parenting a child with AD/HD may serve as the stressor that leads to the onset of depression. For other mothers who had experienced depression prior to becoming parents, the stress associated with parenting a child with AD/HD might contribute to more severe or more chronic depression. Therefore, consistent with the model, the following hypotheses were made:

- It was hypothesized that mothers of children with AD/HD would be more likely than mothers of children without AD/HD to have a history of depression across the following definitions of depression: higher scores on the BDI as well as lifetime diagnosis according to structured interview, current diagnosis according to structured interview, and past-year diagnosis according to structured interview.
- It was also hypothesized that parenting a child with AD/HD would be

associated with more severe depression among mothers such that chronic depression (i.e., the presence of 2 or more Major Depressive Episodes or Dysthymic Disorder) rather than single-episode depression would be more common among mothers of children with AD/HD than among other mothers.

A secondary assumption of the model is that maternal AD/HD is a factor of both child and maternal characteristics. Thus, a secondary purpose of the proposed study was to identify additional characteristics of the mother-child system that may explain variability in depression among mothers. To address gaps in existing research, the role of maternal symptoms of AD/HD in the relationship between child AD/HD and maternal depression were investigated.

- It was hypothesized that mothers with greater severity of AD/HD symptoms would also experience greater severity of depression.

Additionally, the extent to which child inattention, child hyperactivity/impulsivity, child aggression, and child conduct problems differentially predict maternal depression was investigated on an exploratory basis.

CHAPTER II

METHOD

Participants

Biological mothers of children with and without AD/HD were recruited through a university-based outpatient clinic specializing in AD/HD and other community sites, including outlets (e.g., physicians' and psychologists offices, schools, and other organizations in the Southeastern United States). Additionally, participants were recruited through online classified advertisements in major metropolitan areas across the United States. Approximately half of AD/HD group participants were recruited through AD/HD specialty clinic. Additional AD/HD group participants and the majority of Comparison group participants were primarily recruited through online advertisements and the majority were from the following states: North Carolina, Missouri, New York, Georgia, Pennsylvania, and Illinois.

Thirty-nine biological mothers with at least one child between the ages of 6 and 12 years (23 males, mean age = 8.97 years, $SD = 1.74$) who had been diagnosed with AD/HD were included in the AD/HD group. Twenty-nine biological mothers of at least one child between the ages of 6 and 12 (16 males, mean age = 8.90 years, $SD = 2.14$) who had never been diagnosed with AD/HD participated in the Comparison group. Mothers were excluded from participation in the Comparison group if there had been a child with AD/HD living in their home within the 12 months prior to entrance into the

study. Three mothers in the ADHD group indicated that more than one of their children was between the ages of 6 and 12 years and had been diagnosed with AD/HD. Similarly, 9 Comparison group mothers reported that more than one of their biological children was between the ages of 6 and 12 years. For mothers in the AD/HD group, the child with AD/HD who had been in their care the longest was identified as the target child. For mothers in the Comparison group, the child who had been in their care the longest was also identified as the target child.

AD/HD diagnostic status was established according to maternal report that the target child had been diagnosed with AD/HD by a psychologist, psychiatrist, pediatrician, or other health care provider. All AD/HD diagnoses were confirmed by elevated symptom counts on mother-completed ADHD-RS (e.g., 6+ hyperactive/impulsive and/or 6+ inattentive symptom) and symptom severity on mother-completed BASC-2 (e.g., *t*-score of 65 or greater for either Hyperactivity or Inattention subscales). The absence of child AD/HD was established through mother ratings of symptom count (e.g., 5 or fewer hyperactive/impulsive and 5 or fewer inattentive symptoms). Additionally, teacher ratings of AD/HD symptoms were available for a subset of the participants. Efforts were made to collect teacher ratings for all AD/HD group participants; however, because much of the data were collected during the summer, parents were often unable to obtain teacher ratings. For the 18 AD/HD group target children for whom teacher ratings were available, teacher ratings confirmed mother ratings indicating group eligibility for 11 children. Seven children had sub-threshold ratings by teachers; however, these children were also taking medication for AD/HD during the school day.

Efforts were made to recruit a Comparison sample that approximated the AD/HD sample with regard to age, gender, SES, ethnicity, and other demographic variables. Collapsing across groups, the average age of mothers was 37.60 ($SD = 6.66$). The entire sample was composed primarily of mothers who reported their race as White/Non-Hispanic ($N = 41$). The majority of mothers reported that they had completed a four-year college degree ($N = 41$). The majority of mothers reported that they were employed full-time ($N = 31$) or part-time ($N = 20$). Average gross annual income for the entire sample was \$66,519.43 ($SD = 70,722.78$); however, there was considerable variability across participants. The vast majority of mothers ($N = 55$) reported that they were in a relationship at the time of data collection. Eighteen mothers reported that they shared parenting responsibilities evenly with their partner and 39 mothers reported that they were responsible for more to many more of the parenting responsibilities than their partner. Most mothers ($N = 65$) reported that they had more than one child living in their home and the average number of children within the home was 2.31 ($SD = .95$).

The Comparison and AD/HD groups were generally consistent with each other in terms of maternal demographic characteristic. Mean age was 39.33 ($SD = 6.93$) for the AD/HD group and 35.28 years ($SD = 5.59$) for the Comparison group. Both samples were predominantly Caucasian (AD/HD group $n = 21$, Comparison group $n = 20$). Fifty-six percent of AD/HD group mothers and 65% of Comparison group mothers had completed a 4-year or graduate degree. Twenty-eight percent of the AD/HD group mothers and 68% of the Comparison group mothers reporting working full time and 38% of AD/HD group mothers and 17% of Comparison group mothers reported working part

time. The average income was \$66,519.43 ($SD = 70,722.78$) for the AD/HD group and \$77,166.67 ($SD = 41,231.76$) for the Comparison group. As with the entire sample, there was extensive variability regarding annual income within groups. Seventy-four percent of the AD/HD group and 89% of the Comparison group were in a relationship at the time of the study. Of those in a relationship at the time of the study, 33% of the AD/HD group and 29% of the Comparison group reported that they were responsible for more to many more of the parenting responsibilities than their partner. Twenty-three percent and 41% of the AD/HD and Comparison mothers in relationships, respectively, reported that they shared parenting responsibilities evenly with their partners. The average number of children in the homes of AD/HD participants was 2.38 ($SD = .96$) and the average for Comparison participants was 2.21 ($SD = .94$).

With regard to target children, across both samples, average age was 8.94 ($SD = 1.91$) years and 57% of the children in the sample were male. Sixty percent identified as Caucasian. As with maternal demographic characteristics, child demographic characteristics were comparable between groups. Average age was 8.97 years ($SD = 1.74$) in the AD/HD group and 8.90 years ($SD = 2.14$) in the Comparison group. Fifty-eight percent of the AD/HD group children and 55% of the Comparison group children were male. Fifty-one percent of AD/HD group children and 53% of Comparison group children identified as Caucasian.

Mother Assessment Measures

Structured Clinical Interview for DSM Disorders – Clinician Version (SCID-CV; First, et al., 1997). The SCID-CV is a commonly used, semi-structured diagnostic

interview that assesses Axis I disorders per DSM-IV criteria. For the purposes of the current study, the Mood Disorders and Anxiety Disorders modules were administered to all parents to assess the presence of past and present MDD and Dysthymic Disorder as well as other current mood and anxiety disorders. The Mood Disorders module has good inter-rater reliability and the Anxiety Disorders module has fair inter-rater reliability (Zanarini, et al., 2000). Results from the SCID-CV were used to classify mothers with regard to depression diagnoses. Mothers were classified as having met criteria for lifetime depression if they had ever met diagnostic criteria for Dysthymic Disorder or Major Depressive Disorder. Mothers were classified as having met criteria for past year depression if they had experienced a Major Depressive Episode or Dysthymic Disorder within the past year. Mothers were classified as currently depressed if, at the time of the interview, they met diagnostic criteria for Dysthymic Disorder, met criteria for a Major Depressive Episode, or had not fully remitted from a recent Major Depressive Episode. Mothers were classified as chronically depressed if they met diagnostic criteria for Dysthymic Disorder or had experienced 2 or more Major Depressive Episodes outside the context of post-partum depression.

Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, and Erbaugh, 1961; Beck, Rush, Shaw, & Emery, 1979). The BDI is a 21-item questionnaire used to assess symptoms of depression in adults. Each item offers four possible responses of increasing severity ranging in value from zero to three. For each item, participants identify the statement that most closely matches their feelings over the past two weeks. Item responses are summed to achieve an overall score. Higher scores

are representative of more severe depression. A score of 16 or higher is often considered to be evidence toward the presence, as opposed to the absence, of depression (Beck et al, 1961). The BDI is widely used in clinical practice and research and has very good reliability and validity (Beck, Steer, & Garbin, 1988). In this study, the BDI was administered as a measure of the severity of parents' current depressed mood. For non-dimensional analyses, BDI scores of 16 or greater were used to classify mothers as experiencing high versus low symptoms of depression.

Beck Anxiety Inventory (BAI; Beck, et al. 1988). The BAI is a 21-item self-report measure assessing the presence of anxiety-related symptoms. Each item describes a symptom (e.g., difficulty breathing, sweating, nervousness, etc.), and respondents rate the extent to which they have been bothered by each symptom over the past week on a 0 (not at all) to 3 (severely – I could barely stand it) scale. Responses for each item are summed, yielding a total score of 0 to 63. The BAI is commonly used in clinical assessment of anxiety. Psychometric research has shown this measure to have strong reliability with an alpha coefficient of .92. The BAI was used in the proposed study as a measure of parents' current anxiety (Beck, et al. 1988).

ADHD Rating Scale-IV Self-Report Version (ADHD-RS; DuPaul, Power, Anastopoulos, & Reid, 1998). This scale is an 18-item measure of the 9 inattentive and 9 hyperactive/impulsive symptoms listed in the DSM-IV AD/HD criteria (APA, 2000). On the self-report version of the ADHD-RS respondents rate the occurrence of each symptom on a scale from 0 (not at all) to 3 (very often), and they do so for two time periods: childhood (ages 5-12) and the past 6 months. The ADHD-RS yields symptom

counts and severity scores for both symptom categories as well as a total AD/HD severity score. Because the ADHD-RS has been shown to differentiate between those with AD/HD and those without, this measure was administered to screen for the presence of parental AD/HD symptoms.

Parenting Cognitions Scale (PCS; Shaffer, 2003). See Appendix C. The PCS is a 50-item self-report measure of the presence and severity of cognitive distortions related to parenting. On a 5-point Likert Scale, mothers rated the frequency at which they had experienced specific cognitive distortions over the past four weeks. Examples include: “Parenting shouldn’t be this hard” and “I should just know how to be a good parent.” The reliability of this measure is quite good with an overall test-retest correlation of .85. For the purposes of this study, the PCS was used to assess maternal cognitive distortions as they pertain to parenting the target child.

Life Stress Index (LSI; Abidin, 1986). The Life Stress Index is one subscale from the Parenting Stress Index (Abidin, 1986), a widely used measure of parents’ stress. The LSI is a 19-item measure of parents’ experiences of general life stressors over the past year. Each item is a potentially stressful event (e.g., divorce, pregnancy, debt, etc.) and parents are asked to identify which of the events occurred within their immediate family in the past year. This measure was administered as an indicator of the number of stressful events experienced by parents.

Parent Opinion Questionnaire Revised (POQR). The Parent Opinion Questionnaire (Hasket, et al., 2006) is an 80-item parent report measure of the developmental appropriateness of parents’ beliefs regarding expectations for children’s

behavior. The original measure included items related to expectations of very young children to adolescents. For the purposes of this study, a short form was developed. Thirty items were chosen from the original measure based on their applicability to the age range of the sample. Each item is a statement about the abilities of a child (e.g., “In most cases, a 6-year-old can get up, wash, dress, and go to school unassisted.”) and parents were asked to indicate whether they agreed or disagreed with the statement.

Child Assessment Measures

ADHD Rating Scale-IV (ADHD-RS; DuPaul, Power, Anastopoulos, & Reid, 1998). This scale is an 18-item measure of the 9 inattentive and 9 hyperactive/impulsive symptoms listed in the DSM-IV AD/HD criteria (APA, 2000). This measure is available in teacher-report and parent-report versions. On both versions of the ADHD-RS respondents rate the occurrence of each symptom on a scale from 0 (not at all) to 3 (very often), for the target child. The ADHD-RS yields symptom counts and severity scores for both symptom categories as well as a total AD/HD severity score. Because the ADHD-RS has been shown to differentiate between those with AD/HD and those without, the Hyperactivity/Impulsivity and Inattention symptoms counts as well as the Total Severity Score were used to confirm child AD/HD diagnoses.

Behavior Assessment System for Children, Second Edition (BASC-2; Reynolds & Kamphaus, 2004). The BASC-2 is a broadband measure of child behavior commonly used in the assessment of child AD/HD. There are three forms, one for each of the following age groups: preschool, child, adolescent. Depending on the specific form, this measure consists of 150-160 multiple choice items. Each item describes a behavior,

and mothers rate the frequency at which their children engage in each of the behaviors on a 4-point scale ranging from “never” to “almost always.” The BASC-2 is a psychometrically sound measure yielding 14 subscale scores and 4 composite scores with alpha coefficients ranging from .80 to .89 (Merenda, 1996). The BASC-2 was included as a measure of child behavior. Specifically, the aggression subscale and the internalizing and adaptability composites were used as measures of child externalizing, internalizing, and adaptive behavior (e.g., social skills, functional communication, etc.) respectively. This measure was administered to assess eligibility for participation. Furthermore, the BASC-2 was used in analyses as a measure of child psychopathology.

Procedure

For participants recruited through the AD/HD Clinic, following completion of the AD/HD evaluation, clinicians asked mothers who met inclusionary criteria if they would be interested in participating in the research project and if they would be willing to be contacted by the principal investigator by phone to describe the study and discuss participation requirements. For mothers who agreed to participate, the principal investigator arranged a research visit for mothers to complete the necessary measures. At the beginning of the visit, the principal investigator or another member of the research team explained the informed consent document to all participating parents and allowed parents to ask, and have answered, any questions. Mothers who agreed to participate and signed the informed consent document completed the ADHD-RS, IRS, and the BASC-2 with regard to the behavior of the target child. Mothers also completed the SCID-I mood disorder module, SCID-I anxiety disorders module, BAI, BDI, and ADHD-RS Self

Report Version with respect to their own mental health. If no more than six months had passed since their children's evaluations, mothers were given the option to complete forms to authorize the disclosure of the measures completed during their assessment at the AD/HD Clinic for use in the proposed study. Mothers who chose to do this did not repeat the BASC or the ADHD-RS and neither did they need to ask the target child's teacher to complete the ADHD-RS School Version.

Other mothers contacted the principal investigator in response to bulletins/flyers/online classified advertisements announcing the study. Mothers were invited to schedule a session to complete the necessary measures as indicated above. Mothers who lived too far from the AD/HD Clinic to participate in person were given the option of completing questionnaires by mail and completing the SCID-I over the phone.

Comparison group participants also contacted the principal investigator in response to bulletins/flyers/online advertisements announcing the study. Similar to the procedure for mothers of children in the AD/HD group, potential Comparison group mothers were given the option of participating in person or completing the study via mail and phone interview. Comparison group participants completed the same battery of measures as did the AD/HD group participants.

Participants were reimbursed at a rate of \$20 per family. Once a participant completed the study, all data were de-identified and coded with a participant number. Data were maintained locked in secure file cabinets in the clinic and entered into a secure password protected database.

CHAPTER III

RESULTS

Preliminary Inspection of the Data

Overall, an examination of the variables of interest across the sample, indicated that the data did not violate assumptions of normality. Inspection of the distribution of scores from the Parent Opinion Questionnaire indicated the presence of an outlier which was more than 6 standard deviations from the mean. Furthermore, the Skewness statistic (3.93) and the Kurtosis statistic (23.25) were outside acceptable limits. Thus, the outlying data point was removed. Once removed, the Skewness statistic (.70) and the Kurtosis statistic (-.08) for the Parent Opinion Questionnaire total score fall well within acceptable limits. Additionally, Skewness statistics for all continuous variables ranged from -.17 to 1.57. Kurtosis statistics for all continuous variables ranged from -.45 to 1.97. Visual inspection for each continuous variable indicated that distributions were uni-modal. Thus the data fulfilled the assumptions of the planned analyses.

Description of the Sample

A total of 68 mothers of children between the ages of 6 and 12 participated in the study, including 39 in the AD/HD group and 29 in the Comparison group. A summary of AD/HD and Comparison sample child characteristics appears in Table 2. Maternal characteristics are summarized in Table 3. In general, groups were similar with regard to

demographic variables. Child age in years was equivalent across Comparison ($M = 8.90$, $SD = 2.14$) and AD/HD groups ($M = 8.97$, $SD = 1.74$; $t_{(66)} = .17$, $p = .87$). Child gender was evenly distributed across samples according to Chi-square analysis ($\chi^2 = .10$, $p = .47$). Fifty-five percent ($N = 16$) of the Comparison group and 59% ($N = 23$) of the AD/HD group were male. Racial background was also consistent across groups ($\chi^2 = 3.21$, $p = .36$). Sixty-eight percent ($N = 20$) of the Comparison group and 54% ($N = 21$) of the AD/HD group reported Caucasian as their race.

With regard to demographic characteristics of mothers, there were significant differences with regard to maternal age at the time of the study ($t_{(66)} = 2.59$, $p < .01$). Age in years for mothers in the Comparison group ($M = 35.38$, $SD = 5.59$) was less than that of mothers in the AD/HD group ($M = 39.33$, $SD = 6.93$). There were also significant group differences with regard to maternal employment status ($\chi^2 = 11.15$, $p < .01$). Mothers in the AD/HD Group were more likely to endorse that they were employed part-time ($N=15$; 33.33%) or not employed ($N= 13$; 44.83%) than were mothers in the Comparison Group. Five mothers in the Comparison group (17%) reported that they were employed part-time and 14% ($N=4$) reported that they were non employed. Although employment status varied across groups, years of education and gross annual income were consistent across groups. Sixty-five percent ($N = 19$) of the Comparison group and 56% ($N = 22$) of the AD/HD group mothers reported that they had completed a four-year college degree. Mothers in the Comparison group reported an average gross annual income of \$77,166.67 and mothers in the AD/HD group reported an average gross annual income of \$66,519.43 ($T = .66$, $p = .51$). Consistent with racial and ethnic background for

target children, maternal race was consistent across groups ($\chi^2 = 2.84, p = .42$). Sixty-eight percent ($N = 20$) of Comparison group mothers and 54% ($N = 21$) of AD/HD group mothers reported being Caucasian.

Group differences were observed with regard to all measures of child internalizing and externalizing symptoms as well as adaptive functioning. Turning first to symptoms of AD/HD, target children in the AD/HD group displayed an average of 5.87 symptoms of hyperactivity/impulsivity ($SD = 3.03$) and 6.90 symptoms of inattention ($SD = 2.26$). These symptom counts exceed DSM-IV-TR criteria for AD/HD and are consistent with AD/HD group target children's pre-existing diagnoses. In contrast, target children in the Comparison group displayed an average of .41 symptoms of hyperactivity/impulsivity ($SD = .83$) and .31 symptoms of inattention ($SD = .60$). These symptoms counts are well below the number of symptoms required for a DSM-IV-TR diagnosis of AD/HD and are significantly lower than those of children in the AD/HD group (Inattention $T_{(66)} = 17.41, p < .001$; Hyperactivity/Impulsivity $T_{(66)} = 10.74, p < .001$). Other behavior problems were also significantly more severe among children in the AD/HD group. BASC-2 Aggression was rated as more severe in the AD/HD group ($M = 59.18, SD = 13.06$) than in the Comparison group ($M = 46.59, SD = 7.37; T_{(65)} = 5.00, p < .001$). Furthermore, children in the AD/HD group had more severe conduct problems as measured by the BASC-2 ($M = 61.82, SD = 14.14$) than did Comparison Group children ($M = 45.93, SD = 8.11; T_{(65)} = 5.79, p < .001$). Children in the AD/HD group also had more severe BASC-2 Internalizing scores ($M = 58.13, SD = 13.88$) than Comparison group children ($M = 46.03, SD = 10.53; T_{(65)} = 4.06, p < .001$). Consistent with pervasive

impairment associated with AD/HD, BASC-2 Adaptive Skills were weaker among AD/HD group children ($M = 36.16$, $SD = 8.89$) than among Comparison group children ($M = 52.17$, $SD = 9.15$; $T_{(65)} = -7.22$, $p < .001$).

Group differences were also observed with regard to maternal ratings of AD/HD, anxiety, and depression. Mothers in the AD/HD group endorsed significantly more current symptoms of inattention ($M = 1.69$; $SD = 2.15$) than mothers in the Comparison group ($M = .43$, $SD = .79$; $T = 2.96$, $p < .05$). AD/HD group mothers also reported significantly greater symptoms of inattention during childhood ($M = 2.25$, $SD = 2.72$) than Comparison group mothers ($M = .93$, $SD = 1.68$; $T_{(62)} = 2.26$, $p < .05$). Childhood symptoms of hyperactivity/impulsivity were comparable among AD/HD group mothers ($M = 1.92$, $SD = 2.63$) and among Comparison mothers ($M = .93$, $SD = 1.39$; $T_{(62)} = 1.93$, $p = .07$). There were also no significant differences between groups with regard to current hyperactive/impulsive symptoms between AD/HD group mothers ($M = 1.61$, $SD = 2.07$) and Comparison group mothers ($M = .93$, $SD = 1.56$; $T_{(62)} = 1.45$, $p = .14$). Additionally, mothers in the Comparison group endorsed fewer symptoms of anxiety ($M = 3.76$, $SD = 5.67$) than the AD/HD group mothers ($M = 12.65$, $SD = 11.59$; $T_{(64)} = 3.79$, $p < .001$).

Correlations Among Variables Across Samples

Bi-variate correlations among variables collapsed across AD/HD and Comparison samples are presented in Table 4. Significant relationships existed among child variables. Children with higher overall AD/HD severity were also rated as having more severe behavior problems with regard to aggression ($r = .58$, $p < .001$) and conduct problems (r

= .68, $p < .001$). Additionally, children with more severe symptoms of AD/HD were rated as having poorer adaptive skills ($r = -.68, p < .001$).

Relationships were also observed among maternal variables. Mothers who endorsed more symptoms of anxiety also endorsed more current symptoms of depression ($r = .71, p < .001$), more current symptoms of AD/HD ($r = .51, p < .001$), and retrospectively reported more symptoms of AD/HD during their childhood ($r = .36, p < .01$). More severe maternal anxiety was also associated with greater frequency of negative cognitions about parenting ($r = .44, p < .001$) as well as report of more stressful life events during the past year ($r = .35, p < .01$). Similarly, maternal depression was associated with other measures of maternal psychopathology and distress. Mothers who endorsed more severe symptoms of depression also endorsed more severe past ($r = .50, p < .001$) and present ($r = .66, p < .001$) symptoms of AD/HD as well as more frequent negative cognitions about parenting ($r = .51, p < .001$) and greater occurrence of stressful life events within the past year ($r = .35, p < .01$).

Maternal variables were also related to child variables. Most notably, more severe symptoms of depression were associated with greater severity of all measures of child psychopathology: hyperactivity ($r = .34, p < .05$), inattention ($r = .38, p < .01$), aggression ($r = .47, p < .001$), and conduct problems ($r = .30, p < .05$). Additionally, mothers of children with poorer adaptive skills also reported more severe depression ($r = -.31, p < .05$). Further relationships among maternal and child psychopathology, greater severity of maternal AD/HD over the past 6 months was associated with more severe symptoms of child AD/HD ($r = .32, p < .01$) and aggression ($r = .35, p < .01$), as well as

poorer adaptive skills ($r = -.30, p < .05$). Mothers who reported more severe symptoms of AD/HD during their childhood also had children with more severe symptoms of AD/HD ($r = .25, p < .05$). Severity of child AD/HD ($r = .59, p < .001$), child aggression ($r = .62, p < .001$), child conduct problems ($r = .47, p < .001$), and child adaptability ($r = -.51, p < .001$) were also significantly correlated with mothers' negative thoughts about parenting.

Depression Status and Group Membership

Group differences with regard to depression status are outlined in Table 7. One mother in the AD/HD group and one mother in the Comparison group endorsed symptoms consistent with a diagnosis of Bipolar disorder during the structured diagnostic interview. As previously discussed, this study was not designed to address a potential relationship between maternal Bipolar disorder and child AD/HD; therefore, data points for the two mothers meeting criteria for Bipolar disorder were removed from analyses related to diagnostic classification. Results of these analyses indicated that mothers in the AD/HD group were significantly more likely than Comparison group mothers to report a previous diagnosis of Major Depressive Disorder or Dysthymic disorder ($\chi^2 = 10.16, p < .01$; OR = 15.75). No significant differences were observed between groups with regard to lifetime history of ever meeting diagnostic criteria for Major Depressive Disorder or Dysthymic Disorder according to diagnostic interview ($\chi^2 = 2.17, p = .14$; OR = 2.40). AD/HD group mothers were, however, more likely to have met diagnostic criteria for MDD or Dysthymic Disorder in the past year than were Comparison group mothers ($\chi^2 = 4.18, p < .05$; OR = 7.20). Additionally, with regard to mothers' depression status at the

time of data collection, AD/HD group mothers were more likely to meet diagnostic criteria for Major Depressive Disorder or Dysthymic Disorder than were Comparison group mothers ($\chi^2 = 5.77, p < .05$). Group differences were also observed with regard to history of chronic depression (i.e., the presence of 2 or more Major Depressive Episodes or Dysthymic Disorder) such that AD/HD group mothers were more likely to have a history of chronic depression than Comparison group mothers ($\chi^2 = 3.98, p < .05$; OR = 4.64).

Predicting Depression

The purpose of the regression was to assess the relative role of child and maternal characteristics in maternal depression through a test of a simplified version of the previously discussed conceptual model of maternal depression. Because existing literature suggests a link between child AD/HD and maternal depression, group status (i.e., AD/HD versus comparison) was entered as a first step. Maternal age and employment status were also entered in the first step to control for significant between group differences with regard to these demographic variables. The goal of the second step of the regression was to identify which child and maternal characteristics explained variability in maternal depression over and above child AD/HD. In other words, holding child AD/HD constant, what child and maternal characteristics are associated with more severe depression? Child and maternal variables that have been previously associated with depression in the literature and that were found to be significantly correlated with depression in this sample (e.g., BASC-2 Externalizing Problems, BASC-2 Adaptive Skills, BAI Total Score, and Life Stress Index.) were entered as a second step. An

AD/HD and ODD behaviors interaction term was created by multiplying the ADHD-RS Total Score by the BASC-2 Aggression score. This interaction term was also included on the second step of the regression to account for findings from some studies suggesting that maternal depression is related to the combined effects of AD/HD and ODD, but not to AD/HD alone. Because the role of maternal AD/HD in predicting maternal depression has been previously unexamined, the goal of the third step of the regression was to test whether maternal AD/HD provided any additional explanatory power. Thus, maternal ADHD-RS Total Severity over the past 6 months was entered as a final step. As shown in Table 8, this stepwise regression yielded a final model that explained 68% of the variance in maternal depression. Group membership was the only significant predictor resulting from the first step (Cumulative Adjusted $R^2 = .19$, $F = 15.88$, $p < .001$). Maternal anxiety entered the model on the second step (Cumulative Adjusted $R^2 = .58$, $F = 42.43$, $p < .001$). Finally, maternal AD/HD severity over the past 6 months entered the model (Cumulative Adjusted $R^2 = .66$, $F = 40.60$, $p < .001$). Overall, this analysis indicates that, higher levels of maternal depression are associated with child AD/HD status, severity of maternal anxiety, and severity of maternal AD/HD.

CHAPTER IV

DISCUSSION

The purpose of the current study was to compare mothers of children with AD/HD and mothers of children without AD/HD using multiple methods of assessment and operational definitions of maternal depression to determine the nature of the relationship with child AD/HD. Because parenting a child with AD/HD may be associated with the course of depression (e.g., to what extent depression is chronic in nature) rather than presence or absence of depression, special attention was paid to assessing whether mothers had experienced chronic depression rather than a single episode of depression. Additionally, efforts were made to assess which maternal and child characteristics might be associated with the presence of maternal depression. In particular, given the high heritability rate of AD/HD (Burt, 2009) as well as the relationship between adult AD/HD and adult depression (Kessler, Adler, et al., 2006), the role of maternal AD/HD symptoms in the relationship between was also examined. It was hypothesized that mothers of children with AD/HD would be more likely to have experienced depression and that they would be more likely to have experienced chronic depression than would mothers of children without AD/HD. Additionally, it was hypothesized that mothers with greater severity of AD/HD symptoms would experience greater severity of depression.

Depression Among Mothers of Children with AD/HD

Turning first to the question of whether parenting a child with AD/HD is associated with maternal depression, the data generally supported the hypothesis that mothers of children with AD/HD are more likely to have experienced depression than mothers of children without AD/HD. Depression status was considered at the time of data collection, over the course of the year prior to data collection, and across the participant's lifetime. Depression was measured using a structured diagnostic interview, a self-report rating scale, and participants' report of previous diagnoses. As will be further discussed below, the strength of the effect varied depending on the particular measure of depression.

Depression status at the time of data collection was measured in two ways, both yielding significant differences. According to data from structured diagnostic interviews, mothers of children with AD/HD were more likely to be actively depressed at the time of data collection than mothers of children without AD/HD. More specifically, at the time of data collection 18% of AD/HD group mothers met diagnostic criteria for Dysthymic Disorder, were currently experiencing a Major Depressive Episode, or had not fully remitted from their most recent Major Depressive Episode; whereas, no mothers in the Comparison group met diagnostic criteria for depression at the time of data collection. Current depression status was also assessed through mothers' responses to the BDI. Mothers were classified as having either clinical or subclinical symptoms of depression according to their scores on this measure, which assesses symptoms of depression over the past two weeks. AD/HD group mothers were more than eleven times more likely than

Comparison group mothers to endorse clinically significant symptoms of depression on this measure. These results suggest that, when looking at a discrete point in time, not only are mothers of children with AD/HD far more likely than other mothers to report elevated symptoms of depression, they are also more likely to meet diagnostic criteria for depression.

It is important to place this finding within the context of previous research. The finding that BDI scores were higher among mother of children with AD/HD than among other mothers is consistent with the findings of other studies that employed similar methodology (e.g., Befera & Barkley, 1985; Cunningham & Boyle, 2002; Cunningham, et al., 1988). Chronis and colleagues (2003) also examined current diagnostic status among mothers and found a non-significant trend for maternal diagnostic status to be associated with child AD/HD. Of note, Chronis and colleagues further divided mothers of children with AD/HD into those whose children also met criteria for ODD or CD and those whose children did not meet criteria for these additional behavioral disorders. As previously discussed, dividing groups in this manner may limit power to find differences associated with AD/HD if severity of AD/HD behaviors co-varies with the presence of additional disruptive behavior disorders. Additionally, they included diagnoses of Bipolar I and Bipolar II disorder in their definition of depression.

Depression status over the course of the year prior to data collection was assessed using structured diagnostic interviews. Providing further support to the first hypothesis, AD/HD group mothers were seven times more likely to have met criteria for MDD or Dysthymic Disorder within the past year than Comparison group mothers. This finding is

consistent with research conducted by Nigg and Hinshaw (1998) which also indicated higher past-year rates of depression among mothers of children with AD/HD.

Lifetime depression status was assessed using structured diagnostic interview as well as participants' report of whether they had ever been diagnosed with MDD or Dysthymic Disorder. The most striking group difference was with regard to previous diagnoses. Mothers of children in the AD/HD group were fifteen times more likely than mothers in the Comparison group to report previous depression diagnoses. This historical measure of depression does not take into account the accuracy of previous diagnoses, nor does it account for mothers who may have experienced past depression but did not seek treatment. Therefore, this index of depression may artificially inflate group differences if mothers in the AD/HD group are more likely to seek treatment for mental health conditions than mothers in the Comparison group. Regardless, mothers of children with AD/HD in this study were much more likely to have been told by a health care professional that they meet diagnostic criteria for depression.

In contrast, data from structured diagnostic interview indicate no significant group differences with regard to lifetime diagnoses of MDD or Dysthymic Disorder. AD/HD group mothers were more than twice as likely as were Comparison group mothers to have ever met diagnostic criteria for depression; however, this difference was non-significant. This finding is consistent with the non-significant trend for higher rates of lifetime depression diagnoses among mothers of children with AD/HD found by Nigg and Hinshaw (1998); however, it is inconsistent with the findings of Chronis and her colleagues (2003) that indicated higher rates of lifetime depression diagnoses among

mothers of children with AD/HD. The variability among findings of this study and others, suggests that to the extent that there is a relationship between parenting a child with AD/HD and lifetime depression status, the strength of the relationship may be relatively weak.

Overall, four out of five indices suggest that mothers of children with AD/HD are more likely to experience depression. Mothers were more likely to meet diagnostic criteria for depression and were more likely to endorse elevated depression at the time of data collection, they were more likely to have experienced depression over the course of the past year, and they were much more likely to have been previously diagnosed with MDD or Dysthymic Disorder. Although significant differences were not observed with regard to lifetime diagnoses of depression according to structured diagnostic interviews, these data otherwise provide support for the first hypothesis. Mothers of children with AD/HD appear to be more likely to experience depression.

The second major purpose of the current study was to investigate the extent to which parenting a child with AD/HD might be associated with chronic depression. The data provide some support for the hypothesis that mothers of children with AD/HD would be more likely than mothers of children without AD/HD to have ever experienced chronic depression (i.e., meeting diagnostic criteria for Dysthymic Disorder or a history of two or more Major Depressive Episodes according to structured diagnostic interviewing). Significant differences were observed with regard to lifetime status of chronic depression. Looking at lifetime diagnostic status, mothers of children with AD/HD appear to be at greater risk than mothers of children without AD/HD. This is

particularly interesting when compared to the findings for lifetime status of depression in general (i.e., lifetime history of either Dysthymic Disorder or Major Depressive Disorder according to structured diagnostic interview). Mothers of children with AD/HD were more than four times more likely than Comparison group mothers to have a history of chronic depression; whereas, no significant differences were observed with regard to history of depression in general. To some extent, the non-significant finding for lifetime depression status may be attributable to reduced power due to small sample size.

Alternatively, the difference in the strengths of the relationships between parenting a child with AD/HD and lifetime history of chronic depression and lifetime history of depression in general may provide information regarding the nature of the relationship between child AD/HD and maternal depression. If there is a stronger relationship between child AD/HD and chronic maternal depression than there is between child AD/HD and maternal depression in general, that would suggest that mothers of children with AD/HD are not necessarily at greater risk for depression than other mothers but that depressed mothers of children with AD/HD may experience more chronic depression than depressed mothers of children without AD/HD. The extent to which parenting a child with AD/HD is associated with general risk for the presence of depression among all mothers or associated with more chronic depression among those who are already depressed, would have significant clinical and research implications. These and other implications will be discussed in greater detail below.

Predictors of Maternal Depression

A secondary purpose of the current study was to investigate which child and maternal characteristics are associated with severity of maternal depression, with particular attention paid to the role of maternal AD/HD symptoms. It was hypothesized that mothers with greater severity of AD/HD symptoms would also report greater severity of depression symptoms. Within the overall sample, mothers who endorsed more severe depression on the BDI also endorsed significantly more severe maternal anxiety, maternal AD/HD, and child behavior problems.

The data provided support for the hypothesized relationship between maternal AD/HD and depression. Regression analyses indicated that, after taking group status into account, maternal depression was predicted by two maternal characteristics: anxiety and severity of AD/HD symptoms. Furthermore, given the stepwise nature of the analysis, maternal AD/HD explained variance in maternal depression over and above that explained by group status and maternal anxiety. It was notable that no child variables were found to be significant predictors of maternal depression; however, this may be attributable to the presence of group membership in the model. Because there were significant differences in child externalizing and adaptive behaviors across groups, much of the relationship between these child variables and maternal depression may have been explained by group membership.

It was also notable that the AD/HD and ODD behaviors interaction term did not significantly predict maternal depression within the regression given previous research suggesting maternal AD/HD is related to the combined effects of these two disorders

rather than AD/HD alone (e.g., Chronis, et al., 2003). This difference in findings may be attributable to the continuous nature of the analyses employed in this study as opposed to the categorical nature of the analyses employed in other studies (e.g., grouping children according to diagnostic status).

The role of maternal AD/HD in the relationship between child AD/HD and depression has been largely ignored in previous studies. This is a significant oversight given parents of children with AD/HD are more likely to have AD/HD than other parents, and rates of depression are higher among adults with AD/HD (Burt, 2009; Kessler, Adler, et al., 2006). Thus, these links between child AD/HD and maternal AD/HD and between maternal AD/HD and maternal depression may play a significant role in the relationship between child AD/HD and maternal depression. Given the correlational and retrospective nature of this data set, it is not possible to speak to directional or causal relationships and these will be important to consider in future studies. The findings resulting from the current study do, however, highlight the importance of including parental depression in future research measuring the relationship between child AD/HD and maternal depression.

Theoretical, Empirical, and Clinical Implications

Mothers of children with and without AD/HD were compared on multiple measures of depression as efforts were made with this study to incorporate multiple methods of measuring and defining maternal depression. Overall, maternal depression appeared to be more common among mothers of children with AD/HD across almost all operational definitions of depression (e.g., past-year and current depression). Although

the format of this study did not allow for direct comparisons to be made regard relative utility of the various methods of measuring depression, some do appear to be more useful than others. The SCID-IV appears to be a particularly useful method as it captures current depression as well as past year and lifetime diagnoses. In contrast, simply asking mothers to report whether they have been previously diagnosed with depression may not be a particularly useful way of measuring maternal depression. Mothers' self-report of previous diagnoses is likely a less valid measure of depression as it does not take into account the accuracy of the previous diagnosis. The exceptionally high odds ratio associated with this method of assessing depression provides further evidence that this is not a particularly useful measure of maternal depression. Overall, the results of this study have significant implications for future research as well as clinical practice.

With regard to research implications, the findings of this study provide further clarification regarding the relationship between child AD/HD and maternal depression; however, these findings are limited by the correlational nature of the data and do not allow conclusions regarding the directionality of the relationship to be made. As illustrated in Figure 1, the relationship between child AD/HD and maternal depression is likely complex, involving characteristics of both mother and child. Furthermore, it is likely transactional in nature. Just as child AD/HD may contribute to maternal depression through a negative impact on the parent-child relationship, maternal depression may impact child behavior problems through its impact on parenting practices, and this relationship may evolve over time. In order to develop programs geared towards preventing depression among mothers of children with AD/HD who are not depressed

and treating depression among those who are depressed, it is first necessary to understand the mechanisms through which maternal depression develops and is maintained over time in families of children with AD/HD. This question of the mechanisms of the relationship would be best answered through longitudinal research that follows parents and their children over time, from the time children are very young, to assess the relative timing of changes in severity of maternal depression and child behavior problems while also taking into account the potential role of other sources of stress for parents (e.g., marital difficulties, co-occurring adult AD/HD, etc.). This type of research would also allow a better understanding of whether parenting a child with AD/HD is associated with new onset depression among all mothers versus greater severity and chronicity of depression among depressed mothers.

Longitudinal research would also allow an examination of how the relationship between child AD/HD may evolve over time. The findings of the current study are based on a sample of mothers of children ages 6 to 12 and may not generalize to mothers of children at different points in development. It may be that the relationship between child AD/HD and maternal depression changes over the course of development. For example, very young children typically do not have the same demands placed upon their behavior and attention as school aged children. Children in preschool and daycare typically do not need to sit still, listen to an adult speaking, or focus on tasks to the same degree as do children in elementary school. Because of this, difficulties associated with AD/HD may be less impairing for young children than for school-aged children. To the extent that younger children with AD/HD have fewer academic difficulties than older children,

parenting a younger child with AD/HD may be associated with less stress and therefore lower risk for depression. On the other hand, younger children with AD/HD may be less able to regulate their behaviors and emotions than older children with AD/HD, which could lead to elevated parenting stress and greater risk for depression.

There may also be differences in the relationship between child AD/HD and maternal depression when school-aged children with AD/HD are compared to adolescents with AD/HD. Mothers of adolescents with AD/HD have had more years of experience with dealing with difficult behaviors at home, impairment at school, and greater parent-child conflict. Because they have potentially experienced elevated parenting stress over a longer period of time than parents of elementary school aged children, they may be at greater risk for depression than parents of younger children. Conversely, some mothers may develop effective strategies over time for coping with the additional stress of parenting a child with AD/HD, in which case they may be at decreased risk for depression than mothers of younger children with AD/HD. At present, little is known about how the relationship between child AD/HD and maternal depression evolves over the course of child development. It will be important for future research to address this.

Additionally, efforts should be made to include fathers in research regarding child AD/HD and parental depression. As previously stated, much existing literature focuses on child AD/HD and maternal depression; however, fathers may also be at risk. There is some evidence that fathers of children with more severe externalizing and internalizing behaviors are more likely to experience depression (Kane & Garber, 2004); however, this

study was not specific to fathers of children with AD/HD. Much more research is needed to understand the impact of parenting a child with AD/HD on fathers' overall well-being.

It will also be important to develop a better understanding of the efficacy of behavioral parent training for mothers with depression. Research suggests that poorer treatment response for behavioral parent training for children with disruptive behavior is associated with maternal depression (Webster-Stratton, 1985). Although the relationship between maternal depression and treatment response has not been widely studied for children with AD/HD (Chronis, Chacko, Fabiano, Wymbs, & Pelham, 2004), children with AD/HD, who also have depressed mothers, may be less likely to benefit from an empirically supported intervention than children with AD/HD and healthy mothers. There are multiple possible explanations for why this type of intervention would be less effective for mothers with depression. Behavioral parenting interventions require a significant time commitment from parents, typically one to two hours a week in group or individual sessions for several weeks to several months. Additionally, parents who participate in these programs are often required to practice and implement the skills learned during sessions on a daily basis. Depressed mothers may struggle more with these tasks than do other mothers. For example, behavioral parent training often requires parents to spend more time providing praise and positive attention to their child. This could be very difficult for a parent in the midst of a depressive episode who struggles to recognize the positives. Token economies, another common component of behavioral parenting training, require significant organization and follow-through on the part of the parent. For a mother with depression, who feels tired, lacks motivation, and has difficulty

concentrating, the task of establishing and maintaining a token economy may prove overwhelming. Maternal characteristics, however, may not be the only reason behavioral parenting interventions are less effective for mothers with depression.

Child characteristics may also play a role in the diminished efficacy of the intervention. Children of depressed mothers may be less responsive to changes in parenting and therefore less responsive to a parenting intervention. Another possibility, mothers with depression may also be the mothers of children with the most severe behavior problems who, although they may experience improvements in symptoms, may be the least likely to experience a normalization of behavior. Also, it may be that mothers with depression are also mothers with AD/HD and symptoms of AD/HD interfere with their ability to implement the parenting strategies targeted during behavioral parent training. Some researchers have already begun to develop modified versions of traditional behavioral parent training to target mothers with depression (Chronis, Gamble, Roberts, & Pelham, 2006). Chronis and colleagues (2006) adapted a well-known cognitive-behavioral depression intervention, The Coping with Your Depression Course (Lewinsohn, Steinmetz, Antonuccio, & Teri, 1984) to focus on issues especially relevant to mothers of children with AD/HD. They found that this course resulted in improvements in maternal depression as well as other child and family characteristics. Further investigation is necessary to determine to what extent participation in such an intervention would be more beneficial for mothers with depression than would participation in a traditional parent training intervention. Additionally, it is important to assess whether participation in such a course prior to traditional behavioral parent

training might lead to greater treatment response to the behavioral parent training intervention.

In addition to significant implications for future research, the results of the current study also have implications for health care providers who work with children with AD/HD. Greater risk of depression among mothers of children with AD/HD has implications for the well-being of mothers and their children. Providers should consider screening mothers of children with AD/HD for depression and providing mothers experiencing elevated depression with recommendations for treatment when indicated. If maternal depression may be identified earlier and effectively treated, the potential negative effects of maternal depression on the parent-child relationship may be reduced. Thus, early identification and intervention for maternal depression could potentially reduce the risk among children with AD/HD for additional difficulties with disruptive behaviors, the development of which have been shown to be associated with the presence of maternal depression (Chronis, et al., 2007). In addition to identifying depression among mothers of children with AD/HD, health care providers should also be encouraged to inform healthy mothers of children with AD/HD of the elevated risks of depressed mood and to encourage mothers to find ways to effectively cope with the additional stress that may be associated with parenting a child with AD/HD.

An additional concern for health care providers, maternal depression may be a predictor of poorer response to common psychosocial interventions for children with AD/HD (Webster-Stratton, 1985) and providers should use caution when recommending this intervention. Although this has yet to be investigated, maternal depression may also

be associated with poorer medication compliance for children with AD/HD. Medication management for children with AD/HD requires a significant amount of coordination for parents. The medication must be administered on a regular basis, usually daily. Sometimes additional doses are required throughout the day, which may require coordination with school personnel. Furthermore, stimulant medications are a controlled substance and families must meet with their prescribing health care provider several times a year to obtain refill prescriptions. This degree of organization and coordination can be a challenge for parents without depression and may be exceptionally difficult for a parent who is struggling with depression and experiencing low motivation to complete necessary tasks. Medications are not likely to be as effective if not taken strictly according to the prescribing health care provider's directions and poor medication compliance among children with AD/HD is associated with negative outcomes (Pappadopulos et al., 2009). Thus, if mothers with depression struggle to adhere to medication schedules for their children with AD/HD, those children receive a sub-optimal dose and the medication will appear less effective. To the extent that children with AD/HD do not receive the optimal dose of an intervention, whether that be pharmacological or psychosocial, they will not likely function as well at school, at home, and in other settings. If prescribers are unaware of poorer adherence to medication regimen, they may increase the dose of medication for a child because the child does not appear to be improving on the prescribed dose. First and foremost, research is needed to address any possible relationship between maternal depression and adherence to child AD/HD medication regimens. In the meantime, health care providers should consider the

extent to which maternal depression may make it difficult for mothers to comply with AD/HD medication schedules for their children.

Limitations

The findings of this study must be considered within the context of the limitations of the data. The most significant limitation of this study was the small sample size, particularly of the comparison group. The sample size limited power and likely restricted the ability to detect group differences. On a related note, had the sample been larger, logistic regression may have been used to calculate the relationship between the dichotomous depression status and group variables; however, the more sensitive chi-square analysis was chosen to preserve power. Smaller sample size also limits the extent to which the findings can be generalized to other mothers. It is important to note that, despite restrictions imposed by the small sample size, significant group differences were detected with regard to several indices of depression. While sample size may have limited power to detect results, it may also have led to artificially inflated odds ratios.

It was outside the scope of the current project to include a clinic-referred, non-AD/HD comparison group. Without such a comparison group, it is not possible to determine conclusively from the existing data whether there is something unique about child AD/HD that might contribute to risk for maternal depression or whether risk of maternal depression is higher among mothers of clinic-referred children in general. While this may be the case, existing literature regarding impairment associated with child AD/HD provides support for the hypothesis that parenting a child with AD/HD could pose unique risk for maternal depression. Child AD/HD is associated with impairment

across multiple settings. As previously discussed, children with AD/HD struggle in academic settings, engage in more frequent problematic behavior, have poorer peer relationships, and their relationships with their family members are characterized by more conflict (Frazier, et al., 2004; Hoza, et al., 2005; Johnston & Mast, 2001; Mikami & Pfiffner, 2008). Although clinic-referred children with other presenting problems (e.g., depression or anxiety) may also experience impairment in some of these domains, because AD/HD is a chronic condition, children with AD/HD may experience chronic impairment. In contrast, conditions such as child depression and anxiety are more likely to be episodic in nature, situationally specific, or to remit and would not be expected to be associated with chronic impairment across settings and over the course of development. Thus, an argument can be made that children with AD/HD are a special case of clinic referred children and that their mothers may be a even greater risk for depression than mothers of other clinic-referred children.

The current study was also limited by the correlational and retrospective nature of the data. Mothers were asked to provide information regarding symptoms of depression across their lifetime and therefore the data are subject to errors in mothers' memories. Also, because data were collected at a single time point, no inferences can be made with regard to directional or causal relationships. It is unclear to what degree parenting a child with AD/HD may play a causal role in maternal depression or serve to maintain or exacerbate maternal depression over time. Additionally, the current data shed no light on the extent to which maternal depression contributes to dysfunctional parenting of children with AD/HD. Although determinations regarding directionality and causality are not

possible, the results of the current study provide a necessary first step upon which studies directly assessing such directional relationships may be built.

Another limitation, all data were provided by a single informant and there is some research suggesting that depressed mothers provide exaggerated ratings of their children's behaviors (Fergusson, Lynskey, & Horwood, 1993). Thus, the strength of the effects observed in this study may have been somewhat elevated. Of note, however, depression is also more common among mothers of children with behavioral problems so it is difficult to tease apart distorted perceptions associated with depression and actual differences in child behavior.

The distribution of participants who participated in the study in person versus responded to an online advertisement and participated via phone and mail was not equal across groups. Approximately half of the AD/HD group participated in person; whereas, all but one of the control sample participated via telephone and mail. Regardless of method of participation, the same measures were administered to all participants according to study protocol; however, this uneven distribution of participation type across groups may have created bias. Another limitation associated with the design of the study, the experimenter was not blind to the group status (AD/HD versus comparison) of participants. Although this may have contributed to bias, interviews were conducted according to the structured SCID-IV protocol to reduce potential bias.

Child medication status was measured, but was not included in analyses. The vast majority of AD/HD group target children (i.e., all but 7) were taking medication to control symptoms of AD/HD at the time of the study. None of the comparison group

children were taking prescription medication for emotional or behavioral difficulties. Because medication status was not a focus of the study, it was not included in the analyses. Because the majority of AD/HD group children were medicated, medication status likely did not have much of an effect on the findings of this study.

Also of note, this study focused entirely on the relationship between child AD/HD and maternal depression. Although efforts were made at the outset of the project to also measure paternal depression, recruitment of fathers proved to be exceptionally difficult and too few fathers enrolled in the project to allow analysis of their data. This is unfortunate given the vast majority of mothers who participated in the study reported that they shared parenting responsibilities with a partner and that partner may also be at increased risk for depression. The lack of data regarding fathers' experience of parenting a child with AD/HD is, unfortunately, not uncommon among studies of children with AD/HD and their families. It will be important for future research to find effective strategies to recruit and engage fathers in research to provide a more balanced picture of families of children with AD/HD.

Conclusion

Bearing these limitations in mind, the current findings nevertheless suggest that depression appears to be more common among mothers of children with AD/HD than among other mothers. The strength of this effect appears to vary depending on the specific manner in which depression is measured. Of particular importance, this study found that mothers of children with AD/HD were more likely to have a history of chronic depression than other mothers but overall rates of lifetime depression diagnoses were

comparable between mothers of children with and without AD/HD. Although much additional research is necessary, this finding suggests that parenting a child with AD/HD may be related more to the course of maternal depression than it is to the presence of maternal depression. Additionally, the results of this project provide initial support for the relationship between maternal AD/HD and maternal depression. Overall, these findings provide clarification to existing research and further support to the hypothesis that child AD/HD is associated with maternal depression as well as laying the groundwork for future research addressing the specific mechanisms at play in this relationship.

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APPENDIX A

FOOTNOTES

¹ Much of the research addressing relationship between child AD/HD and parental depression is based on research conducted with mothers and not fathers. For simplicity, the term "parental depression" will be used throughout this paper as a general term describing depression among both mothers and fathers. "Maternal depression" and "paternal depression" will be used when describing results of studies pertaining specifically to mothers or fathers, respectively.

² Of note, the current study focused specifically on maternal depression as it was outside the scope of the project to collect data from a sufficient number of fathers. Likely due to difficulties recruiting fathers into family research, much less is known about father-child relationships in families with AD/HD and this weakness of existing literature will be further discussed below.

APPENDIX B

TABLES

Table 1. Previous Research Addressing Child AD/HD and Maternal Depression

Reference	Sample	Comparison Groups	Measures of Depression	Definition of Depression	Findings
Biederman, et al., 1991	Relatives of Boys Ages 6 to 17	AD/HD Control	Structured Diagnostic Interview	Lifetime occurrence of MDD	Relatives of boys with AD/HD are more likely to have a history of MDD than relatives of controls.
Faraone, et al., 1991	Relatives of Girls Ages 6 to 17	AD/HD Control	Structured Diagnostic Interview	Lifetime occurrence of MDD	Relatives of girls with AD/HD are more likely to have a history of MDD than relatives of controls.
Nigg and Hinshaw, 1998	Biological Parents of Boys Ages 6 to 12	AD/HD AD/HD+CD/ODD Control	Structured Diagnostic Interview	MDD according to DSM-III criteria; current and past year	Past-year MDD higher among mothers in both AD/HD and AD/HD plus CD/ODD groups than in control. Non-significant trend for lifetime MDD to be higher in both AD/HD groups than control
Befera & Barkley, 1985	Mothers of Children Ages 6 to 11	AD/HD Control	BDI	BDI score	Mothers of hyperactive children had higher BDI scores than other mothers.

Cunningham, et al., 1988	Parents (Mean age of children = 119 months)	AD/HD Control	BDI	BDI score	Mothers of AD/HD children had higher BDI scores than CC
Cunningham & Boyle, 2002	Mothers of 4-year-old children	At risk for AD/HD At risk for AD/HD+ODD At risk for ODD Control	BDI	BDI score	Mothers of children in ADHD and ADHD/ODD risk groups had higher BDI scores than control mothers
Chronis, et al., 2003	Mothers of Children Ages 3 to 7	AD/HD AD/HD+ODD/CD Control	SCID	Current and Lifetime Diagnosis	Lifetime rates of MDD were more common among AD/HD moms and AD/DH+ODD/CD moms. Current MDD marginally higher among both AD/HD groups than among controls
Lahey (1988)	Parents of Children Ages 6 to 13	AD/HD AD/HD+CD CD Control	SADS	Current and past-year	Rates of depression higher among CD and CD+AD/HD groups than control. No significant difference in depression between ADHD and control groups.
Barkley et al (1991)	Parents of Adolescents	AD/HD Control	BDI	BDI scores	Mothers of AD/HD adolescents did not report more depression than mothers of control adolescents. Mothers of AD/HD+ODD reported more depression than controls.

(Elgar, et al., 2003)	Mothers of Children Ages 4 to 11 (4-year longitudinal data)	n/a	modified CES-D	modified CES-D scores	Child hyperactivity at one time-point did not predict maternal depression at a later time-point.
(Elgar, et al., 2004)	Mothers of Children Ages 7 to 12	n/a	Profile of Mood States	Daily POMS scores	No observed increases in maternal depression on days following instances of child AD/HD behaviors
Pelham, et al, 1997	Parents of Children without Disruptive Behavior Disorders	Children behaving as though they have AD/HD+ODD/CD Children behaving normally	Multiple Affect Adjective Checklist	MAACL score	Parents endorsed more depression after interacting with a child acting as though he had AD/HD +ODD/CD than parent who interacted with a child acting as if he did not have these diagnoses.
Forehand, Wells, & Greist, 1980	Mothers of Children (mean age = 58.4 mo)	n/a	BDI	BDI scores	BDI scores decreased following a parent training intervention

Table 2. Child Symptoms by Group

Child Characteristics	AD/HD Group (N = 39)				Comparison Sample (N = 29)			
	M	SD	Minimum	Maximum	M	SD	Minimum	Maximum
Age	8.97	1.74	6	12	8.90	2.14	6	12
ADHD-RS HI Symptom Count	5.87	3.03	0	9	.41	.83	0	3
ADHD-RS IA Symptom Count	6.90	2.26	1	9	.31	.60	0	2
BASC Hyperactivity	67.55	14.18	38	99	43.72	7.35	31	61
BASC Attention Problems	69.50	8.27	49	99	48.21	8.73	33	67
BASC Aggression	59.18	13.06	43	84	46.59	7.37	35	62
BASC Internalizing	58.13	13.88	32	100	46.03	10.53	29	73
BASC Adaptive Skills	36.16	8.89	12	55	52.17	9.15	24	68

Note. ADHD-RS = ADHD Rating Scale; HI = Hyperactivity/Impulsivity; IA = Inattention; BASC = Behavioral Assessment System for Children

Table 3. Mother Symptoms by Group

	AD/HD Group (N = 39)				Comparison Sample (N = 29)			
	M	SD	Minimum	Maximum	M	SD	Minimum	Maximum
Age	30.33	6.93	26	51	35.28	5.59	28	49
BDI Total Score	13.77	8.73	0	40	5.79	6.18	0	21
PCS Total Score	117.21	34.65	53	178	80.38	28.11	0	141
BAI Total Score	12.65	11.59	0	38	3.76	5.67	0	26
ADHD-RS Total Current	13.50	8.61	1	54	7.21	6.51	0	23

Note. BDI = Beck Depression Inventory; PCS = Parenting Cognitions Scale; BAI = Beck Anxiety Inventory; ADHD-RS = ADHD Rating Scale

Table 4. Correlations Among Variables Across Samples

Maternal Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1 BAI Total Score	-												
2 BDI Total Score	.71***	-											
3 POQ Total	-.00	.10	-										
ADHD-RS Total Score:													
4 Ages 5 to 12	.36**	.50***	.20	-									
ADHD-RS Total Score:													
5 Past 6 Months	.51***	.66***	-.04	.50***	-								
6 PCS Total Score	.44***	.51***	-.01	.22	.53***	-							
7 Life Stress Index	.35**	.35**	-.02	.31*	.34**	.09	-						
Child Variables													
8 ADHD-RS Total Score	.33**	.39**	.09	.25*	.32*	.59***	.20	-					

9	BASC Hyperactivity	.30*	.34**	-.06	.13	.30*	.56***	.22	.86***	-				
10	BASC Aggression	.45***	.47***	.01	.07	.35**	.62***	.15	.58***	.65***	-			
	BASC Conduct													
11	Problems	.30*	.30*	.13	.06	.11	.47***	.11	.68***	.72***	.69***	-		
	BASC Attention													
12	Problems	.38**	.38**	.07	.27*	.38**	.49***	.16	.81***	.81***	.55***	.60***	-	
									-	-		-		
13	BASC Adaptability	-.45**	-.31*	-.16	-.09	-.30*	-.51***	-.19	.69***	.70***	-.58***	.58***	-.82***	-

Note. N = 68. BAI = Beck Anxiety Inventory; BDI = Beck Depression Inventory; PSI = Parenting Stress Index ; POQ = Parent Opinion Questionnaire; ADHD-RS = ADHD Rating Scale; PCS = Parenting Cognitions Scale; BASC = Behavioral Assessment System for Children * p < .05. **p < .01 ***p<.001

Table 5. Percent of Participants Meeting Depression Criteria by Group

Measure of Depression	ADHD	Comparison	Odds Ratio	95% Confidence Intervals
	(n=38)	(n=28)		
Previous Depression Diagnosis - Self Report	37%	4%	15.75**	1.92 - 128.87
Previous Depression Diagnosis - SCID-IV	34%	18%	2.40	.74 – 7.76
Depression with Past Year – SCID-IV	29%	3%	7.20*	.84 – 61.38
Chronic Depression	26%	7%	4.64*	.93 - 23.21
Current Depression: SCID-IV	18%	0	-	-

Note. Odds ratio could not be calculated for Current Depression: SCID-IV due to a cell size of zero. Significance reflects significance of Chi-square statistics.

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

Table 6. Hierarchical Regression Examining Predictors of Maternal Depression

Predictor	β	R^2
Step 1		
Maternal Age		
Maternal Employment Status		
Group	0.46	0.20
Step 2		
BASC-2 Externalizing Problems		
BASC-2 Adaptive Skills		
Child ADHD-RS Total Score X BASC-2 Aggression		
Life Stress Index		
BAI	0.69	0.58
Step 3		
ADHD-RS Self Report Total Score (Past 6 months)	0.35	0.66

Note. N = 68. R^2 = Cumulative Adjusted R^2 . BASC-2 = Behavioral Assessment Schedule for Children - 2nd Edition. BAI = Beck Anxiety Inventory. ADHD-RS = ADHD Rating Scale. β and R^2 presented for significant predictors only.

APPENDIX D
CONSENT DOCUMENT

THE UNIVERSITY OF NORTH CAROLINA
GREENSBORO

CONSENT TO ACT AS A HUMAN PARTICIPANT:

Project Title: **Parental Depression and Child AD/HD**
Principal Investigator: **Dr. Arthur D. Anastopoulos**
Project Director: **Nicole K. Schatz**

Participant's Name: _____

What is the study about?

This is a research project. The purpose of this research project is to study the relationship between child AD/HD and parental depression. More specifically, this study will address whether depression is worse among mothers and fathers of children with AD/HD.

Why are you asking me?

Mothers and fathers of children between the ages of 6 and 12 are eligible to participate in this study. Mothers must be the biological parent of this child to participate. Fathers must have been a caregiver of this child for at least 1 year to be eligible to participate. You are eligible to participate either because your child is within this age group and has elevated symptoms of AD/HD or because your child is within this age group and does not have elevated symptoms of AD/HD.

What will you ask me to do if I agree to be in the study?

You will complete questionnaires and rating scales which ask questions about your thoughts, feelings, and behaviors. You will also complete a diagnostic interview about your symptoms of depression and anxiety. These questionnaires and the diagnostic interview should take about 45 to 60 minutes to complete. If you are this child's mother, you will also complete questionnaires about your child's feelings and behavior; these questionnaires should take an additional 20 to 30 minutes to complete. You will also be asked to have your child's teacher complete a short questionnaire about your child's symptoms of AD/HD; this questionnaire should take approximately 15 minutes to complete.

What are the dangers to me?

The risks involved in this study are minimal and are no greater than any other study involving the completions of questionnaires. Some questionnaires ask about personal information, including questions about past and present symptoms of depression and anxiety. You may ask questions at any time if you need to clarify anything. If at any time you feel uneasy about the information being asked, you may skip the questions that make you uncomfortable. You may also withdraw from the project at any time with no consequences. Should you like to discuss any issues or problems that may currently be causing you distress, a list of mental health care referrals will be provided.

Questions, concerns or complaints about this project or benefits or risks associated with being in this study can be answered by Nicole Schatz who may be contacted at (336)346-3196 x701 or Dr. Arthur D. Anastopoulos at (336)346-3196 x303. If you have any concerns about your rights, how you are being treated or if you have questions, want more information or have suggestions, please contact Eric Allen in the Office of Research Compliance at UNCG at (336) 256-1482.

UNCG IRB
Approved Consent Form

Valid 10/27/12 to 10/26/13

Version Date: 6.22.2011

Are there any benefits to me for taking part in this research study?

You will receive a written summary report of the information you provide about your symptoms of depression and anxiety.

Are there any benefits to society as a result of me taking part in this research?

The results of this study will aid researchers' understanding of the impact raising a child with AD/HD has on parents. This research will also help researchers develop effective treatments for parental depression.

Will I get paid for being in the study? Will it cost me anything?

Each family participating that completes this study will receive a \$20 gift certificate to a local business. Only one parent must complete the required measures in order for the family to receive the gift certificate. If parents complete some of the study, but not all, the family will receive a \$5 gift certificate to a local business. There are no costs to you for participating in this study.

How will you keep my information confidential?

The answers you and your child's teacher provide will be kept confidential. Questionnaires and interview information will be identified only by a number. The only people who will see information about you and your child are the researchers involved in this project. Your name will not be used in any reports from this study. The forms that you complete will be stored in locked cabinets. Passwords will protect information that has been entered on a computer. All information will be destroyed five years after the conclusion of this project. All paper documents will be shredded and electronic files will be deleted. All information obtained in this study is strictly confidential unless disclosure is required by law.

During or after your involvement in this project, you may become aware of other research studies being conducted in the AD/HD Clinic and in Dr. Kari Eddington's Depression Treatment and Research Program that may be of interest to you. Often these studies use many of the same behavioral data collection procedures. Should you decide to participate in any of these other projects, behavioral data collected from this project can be shared with the other research project in order to spare you the trouble of having to repeat the same data gathering procedures. Only the behavioral data common to each project will be shared, and data will only be shared with projects for which you have given written consent.

What if I want to leave the study?

You have the right to refuse to participate or to withdraw at any time, without penalty. If you do withdraw, it will not affect you in any way. If you choose to withdraw, you may request that any of your data which has been collected be destroyed unless it is in a de-identifiable state.

What about new information/changes in the study?

If significant new information relating to the study becomes available which may relate to your willingness to continue to participate, this information will be provided to you.

Voluntary Consent by Participant:

By signing this consent form you are agreeing that you read, or it has been read to you, and you fully understand the contents of this document and are openly willing consent to take part in this study. All of your questions concerning this study have been answered. By signing this form, you are agreeing that you are 18 years of age or older and are agreeing to participate, or have the individual specified above as a participant participate, in this study described to you by _____.

Signature: _____ Date: _____

UNCG IRB
Approved Consent Form

Valid 10/27/12 to 10/24/13

Version Date: 6.22.2011

APPENDIX E
RESEARCH FLYER

APPROVED IRB
MAR 24 2011

**PARENTS WITH CHILDREN
AGES 6 TO 12
NEEDED FOR A RESEARCH STUDY**



• **Who can participate?**

We are looking for mothers or mothers and fathers of children between the ages of 6 and 12 to participate in a research project looking at the relationship between child AD/HD and parental depression. *No diagnosis necessary.*

• **How much time will it take?**

60-90 minutes for mothers and 45-60 minutes for fathers to complete questionnaires and a diagnostic interview. Teachers will also be asked to complete brief questionnaires, which should take approximately 15-20 minutes of their time.

• **Where does the research take place?**

Parents will complete the questionnaires and the diagnostic interview at the AD/HD Clinic at UNCG or in a private room at a participating organization.

• **Is there compensation for participation?**

Parents will be given a summary report of their questionnaire and interview results. Families who complete the study will receive a \$20 gift card to a local business.

For more information....

If you are interested, please call the project director

Nicole Schatz, M.A. at: 336.346.3192, ext. 701

or e-mail to the following address: nkschatz@uncg.edu

Faculty Sponsor:

Arthur D. Anastopoulos, Ph.D.

AD/HD Clinic at UNCG

1100 W. Market St, 3rd Floor

APPENDIX F

PARENT OPINION QUESTIONNAIRE

INSTRUCTIONS: The following questionnaire includes a series of statements that have to do with parents and children. Read each of the statements and determine if you AGREE or DISAGREE with the statement. If you agree with a statement, circle A for agree. If you disagree with a statement, circle DA for disagree. Remember to read each statement; it is important not to skip any statement.

1. In most cases, a 6 year old can get up, wash, dress, and go to school unassisted A DA
2. Children (ages 4-5) are able to play outside alone even when there are no fences to keep them in A DA
3. In most cases, a 12 year old would not be able to stay at home alone for even a few hours without getting into trouble A DA
4. It's natural for a parent to be upset if a child breaks something expensive A DA
5. Most of the time a 4 year old can choose the right clothing for the weather and then get him or herself off to school A DA
6. It's fine to go shopping and leave the children with a babysitter to supervise A DA
7. An older daughter (12 years old) could reasonably be expected to discipline younger brothers and sisters A DA
8. A 7 year old is old enough to set his or her own curfew and meal times A DA
9. A 3 year old child usually knows when his mom or dad is upset and that he should stay out of the way at these times A DA
10. An 8 year old probably can get a 2 year old brother dressed and off to day care before going to school A DA
11. It's OK punish a child once in a while if he really misbehaves A DA
12. A 6 year old is probably old enough to be able to use a stove without parental supervision A DA
13. A 16 year old is not old enough to do his or her own laundry..... A DA
14. Generally 10:00 pm is not too late for a 7 year old to remain outside in the neighborhood A DA
15. A 13 year old is not old enough to go to the corner store and buy groceries A DA
16. Talking in front of children (5 to 7 years old) about problems in the family is OK because they can't understand A DA
17. A 5 year old can be expected to help by feeding, dressing and changing diapers for an infant A DA
18. If a parent had to work nights, older children (8 to 10) would take the responsibility and be left home alone ... A DA
19. Most 12 year olds are old enough to be able to listen to their mother's problems and give advice A DA
20. A 6 year old should be expected to keep his or her room clean and pick up toys after playing A DA

21. A 12 year old can take a bath without help A DA
22. A 12 year old can be expected to get up, pick out his or her clothes, and get to school A DA
23. Generally, it would be all right to leave kids alone for a few days if they are as old as 12 or 13..... A DA
24. A parent should not be upset if a child breaks something expensive, because it's normal for children to do things like that A DA
25. It's all right for a parent to leave a 6 year old alone for the day if taking time off from work would be very costly A DA
26. It's probably not too much to expect a 4 year old to behave in front of others so not to embarrass the parent A DA
27. A 7 year old is old enough to be expected to do the laundry for the family A DA
28. A 5 year old should be mature enough not be bothered when he or she doesn't get candy or praise from his/her parents A DA
29. In most cases a 10 year old can be expected to care for an elderly grandparent, which includes giving pills each day A DA
30. A 15 year old is not old enough to help with the cooking A DA

APPENDIX G

PARENTING COGNITIONS SCALE

DIRECTIONS: Listed below are *thoughts* that parents sometimes have when dealing with their child. Please read each item carefully and indicate how often YOU have had each of these thoughts OVER THE PAST FOUR WEEKS, by circling the appropriate number.

	1	2	3	4	5
	Not at All	Rarely	Sometimes	Often	All of the Time
1. Other parents would probably say I am a poor disciplinarian.	1	2	3	4	5
2. I feel like I always have to defend my child.	1	2	3	4	5
3. I should be able to handle my child better than I do.	1	2	3	4	5
4. My child never does what I ask.	1	2	3	4	5
5. When I don't follow through with my threats to discipline, my child probably thinks I'm a pushover.	1	2	3	4	5
6. I always have trouble parenting my child.	1	2	3	4	5
7. I should never have become a parent.	1	2	3	4	5
8. I've let my child down.	1	2	3	4	5
9. My child should do what I ask more often.	1	2	3	4	5
10. My child is always in trouble at school.	1	2	3	4	5
11. When my child disobeys me in front of relatives, they probably think I'm not a very good parent.	1	2	3	4	5
12. I'm so disappointed in myself as a parent.	1	2	3	4	5
13. My child hates me.	1	2	3	4	5
14. I should be more consistent in parenting than I am.	1	2	3	4	5
15. When my child repeatedly disobeys me in a restaurant, I think to myself –I've tried everything and nothing works.	1	2	3	4	5
16. My child doesn't do what I ask when we're visiting with friends of the family and I think my child should know better.	1	2	3	4	5
17. My child always misbehaves in public.	1	2	3	4	5
18. My child's teacher probably thinks that I don't manage my child's behavior well.	1	2	3	4	5
19. I feel like I'm up against the world when I try to advocate for my child.	1	2	3	4	5
20. I should be less negative with my child.	1	2	3	4	5

	1	2	3	4	5
	Not at All	Rarely	Sometimes	Often	All of the Time
21. When my child misbehaves in front of company/ extended family at home, my guests probably think that I don't know what's best for my child.				1	2 3 4 5
22. No one ever invites my child over to play.				1	2 3 4 5
23. I wish I were a better parent.				1	2 3 4 5
24. There must be something wrong with me as a parent.				1	2 3 4 5
25. I should compliment my child more than I do.				1	2 3 4 5
26. Parenting is not going the way I want it to.				1	2 3 4 5
27. When my child disobeys me in front of guests, they probably think I need to discipline my child more.				1	2 3 4 5
28. I should be a better parent.				1	2 3 4 5
29. When my child acts up in public, other people probably think I'm a bad parent.				1	2 3 4 5
30. My friends are much better parents than I am.				1	2 3 4 5
31. I feel so helpless when my child does not listen to me.				1	2 3 4 5
32. When my child misbehaves at a family gathering, other family members probably think I'm a bad parent.				1	2 3 4 5
33. I shouldn't have yelled at my child.				1	2 3 4 5
34. When my child doesn't listen to me in front of relatives at home, they probably think I'm a failure as a parent.				1	2 3 4 5
35. My friends/relatives think I'm a lousy parent.				1	2 3 4 5
36. When my child misbehaves when playing at a friend's house, the other parent probably thinks I'm a lousy parent.				1	2 3 4 5
37. I can't get it together when caring for my children.				1	2 3 4 5
38. When my child is rude to his/her teacher, I think – I must be an awful parent.				1	2 3 4 5
39. I should just know how to be a good parent.				1	2 3 4 5
40. When my child throws a temper tantrum at the grocery store, I think to myself – Everyone is staring at me.				1	2 3 4 5
41. My child doesn't listen to me.				1	2 3 4 5
42. When my child misbehaves in a fancy restaurant, I think to myself – I'm so embarrassed.				1	2 3 4 5
43. I should never lose my temper when parenting my child.				1	2 3 4 5
44. Parenting shouldn't be this hard.				1	2 3 4 5
45. When my child acts up at the grocery store, other people probably think my child is very poorly behaved.				1	2 3 4 5
46. My child thinks I'm mad at him/her.				1	2 3 4 5
47. When we have company for dinner and my child throws a temper tantrum, I think – I'm so embarrassed.				1	2 3 4 5
48. I shouldn't have yelled at my child in public.				1	2 3 4 5

	1	2	3	4	5			
	Not at All	Rarely	Sometimes	Often	All of the Time			
49. No one ever invites my child to stay overnight.				1	2	3	4	5
50. When my child is disrespectful toward the teacher,– I think to myself I'm a terrible parent.				1	2	3	4	5

APPENDIX H
LIFE STRESS INDEX

Instructions: During the past 12 months, have any of the following events occurred in your immediate family? Please check all that apply.

1. _____ Divorce
2. _____ Marital Reconciliation
3. _____ Marriage
4. _____ Separation
5. _____ Pregnancy
6. _____ Other Relative Moved into Household
7. _____ Income Increased Substantially (20% or More)
8. _____ Went Deeply into Debt
9. _____ Moved to a New Location
10. _____ Promotion at Work
11. _____ Income Decreased Substantially
12. _____ Alcohol or Drug Problem
13. _____ Death of Close Family Friend
14. _____ Began a New Job
15. _____ Entered New School
16. _____ Trouble with Superiors at Work
17. _____ Trouble with Teachers at School
18. _____ Legal Problems
19. _____ Death of Immediate Family Member