Parent and Child Characteristics Associated with Comorbidity Differences in Children with Attention-Deficit/Hyperactivity Disorder

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PARENT AND CHILD CHARACTERISTICS ASSOCIATED WITH COMORBIDITY DIFFERENCES IN CHILDREN WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER

by

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A thesis submitted in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

in

Psychology

Approved:

UTAH STATE UNIVERSITY
Logan, Utah
2005
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Attention-deficit/hyperactivity disorder (ADHD) is a commonly diagnosed disorder that is associated with many negative outcomes. For many children, the disorder is comorbid with externalizing and/or internalizing problems. Understanding the correlates of comorbid problems in children with ADHD could be important for better treatment and/or prevention strategies. The purposes of this study were (a) to determine what parent-related and child-related characteristics are associated with externalizing or internalizing problems in children with ADHD, and (b) to determine if there are differences in these characteristics between a group of children with ADHD and externalizing problems, and a group of children with ADHD and externalizing and internalizing problems. Results indicated that parent anxiety, parent aggression, and child hostility were associated with internalizing problems. Child aggression was associated with externalizing problems. Results also indicated that children with ADHD
and externalizing and internalizing problems had significantly more hostility than children with ADHD and externalizing problems only.
ACKNOWLEDGMENTS

I would like to thank my committee members, Dr. Renee Galliher and Dr. Dennis Odell, for their thoughtful feedback and guidance. I would like to offer a special thank you to my committee chairperson, Dr. Gretchen Gimpel, for her time, encouragement, and expertise, which were invaluable in completing this research project. Dr. Gimpel embodies the characteristics of a true mentor, all of which shined through in working on this research project.

I would also like to thank my parents for their unfailing support and love, my sister for being an inspiration in my life, and my friends for their ability to make me laugh through the toughest of times. For my husband, Stephen, I offer a very special thank you. His unconditional love and support throughout this graduate school journey never ceases to amaze me and helps keep me moving forward everyday.

Julie A. Pelletier
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CHAPTER I
INTRODUCTION

Attention-deficit/hyperactivity disorder (ADHD) is currently the most commonly diagnosed childhood mental health disorder, with estimated prevalence rates falling between 3 - 5% of school-aged children (American Psychiatric Association [APA], 2000). In addition, ADHD is frequently comorbid with externalizing (or disruptive) problems, with at least 35% of children with ADHD also meeting diagnostic criteria for oppositional defiant disorder (ODD) and 30 - 50% of children with ADHD also meeting diagnostic criteria for conduct disorder (CD; Biederman, Newcorn, & Sprich, 1991). ADHD alone is associated with significant impairment in academic and social functioning. However, in conjunction with comorbid externalizing problems, children with ADHD are at an even greater risk for serious long-term outcomes such as antisocial and criminal behavior (Young, 2000). Therefore, research regarding factors that contribute to the development of comorbid externalizing problems in children with ADHD is necessary to provide better treatment planning for these children and to prevent negative outcomes.

In addition to frequently being comorbid with externalizing problems, the comorbidity rates of ADHD and internalizing problems (such as anxiety and mood disorders) are also high. A review of clinical and community samples of children and adolescents estimated that mood disorders co-occur in 15 - 75% of children with ADHD and anxiety was estimated to co-occur in 25 - 27.5% of children with ADHD (Biederman et al., 1991; Jensen, Shervette, Xenakis, & Richters, 1993). Furthermore, Jensen, Martin, and Cantwell (1997) reviewed studies of the comorbidity of ADHD and internalizing
disorders (without specifying mood and/or anxiety disorders) and found that the rates of comorbidity ranged from 13.0 - 50.8%. The presence of comorbid internalizing problems (particularly comorbid mood disorders) in children with ADHD is linked to additional negative long-term outcomes for these children such as a higher risk for suicide (Biederman et al.; Young, 2000). Recent research indicated that comorbid anxiety may play a particularly interesting role with regard to the treatment of children with ADHD. The Multimodal Treatment Study of Children with ADHD (MTA study) provided evidence that the presence of comorbid anxiety may indicate that behavioral treatment or combined behavioral treatment and medication management will be more effective treatments than medication management alone (Multimodal Treatment Study of Children with ADHD Cooperative Group, 1999). Further analysis of these results, however, indicated that this finding may only be true of parent-reported anxiety and may not represent “true” anxiety, but negative affectivity related to the presence of comorbid disruptive problems (March et al., 2000). Therefore, one hypothesis is that the presence of comorbid anxiety in children with ADHD, if known, can lead to more effective treatment planning. However, if undetected and untreated, these comorbid internalizing problems could lead to deleterious long-term outcomes.

Based on sheer percentages, a large number of children with ADHD likely suffer from both comorbid externalizing and internalizing problems. This has been supported by the research done in the MTA study in which 24% of the 579 children had both comorbid externalizing and internalizing problems in addition to ADHD (Jensen et al., 2001). Despite the large percentage of children with ADHD that have both comorbid
externalizing and internalizing problems, very few studies of ADHD include a sample of children with ADHD and both types of comorbid problems (Bird, Gould, & Staghezza-Jaramillo, 1994; Jensen et al.; Newcorn et al., 2004). Thus, little is known about the correlates of this combination of comorbid symptomatology in children with ADHD. Because both comorbid internalizing and externalizing problems in children with ADHD are predictive of poor long-term outcomes for these children (Biederman et al., 1991; Young, 2000), the combination of comorbid symptomatology is hypothesized to be a more serious risk factor for enduring problems (Ellison, 2002). Therefore, it is necessary to research the correlates of this combination of comorbid symptomatology to provide better treatment planning for children with ADHD. Understanding these correlates could lead to treatments that target both the comorbid symptoms as well as the ADHD symptoms.

Many previous studies have investigated the correlation between parent characteristics and comorbid externalizing symptoms in children with ADHD. One of the most well studied parent characteristics, parent psychopathology, has been linked to the presence of comorbid externalizing symptomatology in children with ADHD (e.g., Johnston, 1996; Johnston, Murray, Hinshaw, Pelham, & Hoza, 2002; Nigg & Hinshaw, 1998; Pfiffner et al., 1999). In particular, the effects of parental depression on comorbid externalizing problems in children with ADHD have received considerable attention (Anastopoulos, Guevremont, Shelton, & DuPaul, 1992; Johnston; Johnston et al.; Nigg & Hinshaw). Parenting style has also been linked to externalizing problems in children with ADHD (Hinshaw, 2002; Jensen et al., 2001; Lindahl, 1998). In particular, lax and
overreactive parenting styles have been linked to comorbid externalizing problems in children with ADHD (Hinshaw; Lindahl). Lax parenting can be conceptualized as a permissive discipline style, while overreactive parenting can be conceptualized as an authoritarian discipline style.

Despite the vast amount of research focused on parent characteristics related to comorbid externalizing symptoms, few studies have investigated the association between the aforementioned parent characteristics and comorbid internalizing symptoms in children with ADHD (for exceptions, see Harvey, 2000; Hinshaw, 2002; Jensen et al., 2001; Pfiffner et al., 1999). Given the substantial comorbidity rates of ADHD and internalizing problems, this represents an area that warrants further research. In addition, only one known study (Jensen et al.) has investigated parent characteristics that may be associated with the presence of both externalizing and internalizing problems in children with ADHD. Despite including a sample of children with both types of comorbid problems, Jensen and colleagues found that maternal depression was only associated with comorbid internalizing problems in children with ADHD. It is noteworthy that maternal depression was the only parent psychopathology characteristic looked at in this study. Therefore, this population of children (those who have externalizing and internalizing problems in addition to ADHD) represents a population that has not fully been researched. This lack of research may result in poor treatment planning for these children. Additionally, identification of correlates of comorbid symptomatology might allow these correlates to be addressed at an early stage, which could prevent the development of comorbid symptomatology.
In addition to parent characteristics that may influence the development of comorbid symptomatology in children with ADHD, it is crucial to also consider child-related characteristics that may contribute to the development of comorbid symptomatology. Previous research suggested that children with ADHD who are also aggressive display higher levels of depressive symptomatology than children with ADHD who are not aggressive (Treuting & Hinshaw, 2001). In addition, there is research, not specific to children with ADHD, which suggested that childhood aggression and subsequent perceived peer rejection were predictive of depressive symptomatology (Panak & Garber, 1992). Other research suggested that elementary school children who were aggressive and rejected by their peers manifested externalizing symptoms in addition to internalizing symptoms, both of which persisted into adolescence (Coie, Terry, Lenox, Lochman, & Hyman, 1995). These findings suggested that targeting aggression in the treatment of ADHD may reduce the levels of comorbid internalizing and possibly externalizing symptomatology. However, additional research in this area would be beneficial to corroborate or challenge these findings.

Based upon the lack of previous research, it is unclear as to what parent-related characteristics may be associated with the presence of externalizing problems only versus the presence of both externalizing and internalizing problems in children with ADHD. In addition, further research is necessary to explore the role of child aggression in the expression of comorbid symptomatology in children with ADHD. Information about such parent and child-related characteristics is important in treatment planning for children with ADHD, which frequently overlooks comorbid internalizing problems in favor of
managing overt, externalizing behaviors. This lack of information may result in poor psychosocial treatment planning for many children with ADHD. In particular, comorbid internalizing problems may warrant different treatment than comorbid externalizing problems. It is clear that research investigating the differences that may exist between children with ADHD who have additional externalizing problems and children with ADHD who have both internalizing and externalizing problems, is necessary to better guide psychosocial treatment planning for many children with ADHD. Therefore, one purpose of this study was to investigate possible differences in the characteristics of parents of children with ADHD with additional externalizing problems and the characteristics of parents of children with ADHD with both externalizing and internalizing problems. A secondary purpose of the study was to investigate the role of aggressive behavior in the expression of comorbid internalizing and/or externalizing symptomatology in children with ADHD.

Specifically, this study investigated possible associations between parenting style, parent psychopathology, and the presence of comorbid symptomatology in children with ADHD. In addition, the study investigated possible associations between child aggression and the presence of comorbid symptomatology in children with ADHD. Two groups of children with ADHD were utilized, those having only comorbid externalizing problems and those having both externalizing and internalizing problems. These groups were designated by children obtaining scores at, or above, the borderline clinical cutoffs (t-scores of 60 or above) on the externalizing and/or internalizing scales of the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001). The parents of these children
completed measures of parenting style and parent psychopathology. Additionally, parents completed behavior rating scales about their children, and a measure rating the presence and severity of aggression in their children.
What Is ADHD?

According to the American Psychiatric Association (APA, 2000), ADHD currently affects between 3 - 5% of school-aged children and is the most commonly diagnosed childhood psychological disorder. ADHD is a chronic psychological disorder that is distinguished by difficulties with hyperactivity, impulsivity, and/or inattention. According to the Diagnostic and Statistical Manual (4th ed., Text Revision; DSM-IV-TR; APA) diagnostic criteria, a child may be diagnosed with one of three subtypes of ADHD depending on the child’s symptoms: primarily inattentive subtype, primarily hyperactive/impulsive subtype, or combined subtype. A child exhibiting symptoms of the inattentive subtype would likely have trouble sustaining attention, be easily distracted, and have difficulty organizing tasks and activities. Hallmark symptoms of the hyperactive/impulsive subtype of ADHD are fidgeting, having excessive energy, and acting before thinking. A child diagnosed with the combined subtype of ADHD would likely exhibit both symptoms of inattention and symptoms of hyperactivity and impulsivity. Other crucial diagnostic features of ADHD are that symptoms are first present before the age of 7 and that the symptoms cause significant impairment across several settings of the child’s life (e.g., in the home and school settings, APA).
In addition to the core symptoms of ADHD, children with ADHD often experience related problems in family and social functioning, and academic performance. Specifically, common ancillary problems associated with ADHD include aggression, noncompliance, difficulty with peer relations, and academic underachievement (Barkley, 1998). The related problems, in addition to the core symptoms of ADHD, are associated with negative short-term and possibly long-term outcomes.

**Negative Outcomes Associated with ADHD**

Barkley (1998) presented extensive evidence that the core symptoms of ADHD, as well as problems associated with ADHD, typically persist into adolescence for a significant portion of children with ADHD. In addition, numerous research studies indicated that the presence of ADHD and associated problems led to negative outcomes for these children (for a review see Barkley). Examples of such negative outcomes are: an increased risk for substance use, poor adolescent driving records, and an increased risk for serious academic consequences (e.g., dropping out of high school and not pursuing a college education; Barkley).

Hinshaw (2000) also discussed the negative outcomes associated with ADHD. In particular, he highlighted the negative impact that having a child with ADHD can have on the parent-child interaction, such as an increased level of parenting stress. However, it is difficult to determine the direction of this effect and is therefore imprecise to state that parenting a child with ADHD causes increased parenting stress. Hinshaw also emphasized the negative peer relations that often affect many children with ADHD. Specifically, children with ADHD often suffer from peer rejection, which has been linked
in numerous research studies to deleterious outcomes such as delinquency, school problems, and the presence of mental health problems as an adult.

Although less researched than childhood and adolescent outcomes, recent evidence suggested that symptoms of ADHD and related problems may persist into adulthood for a portion of affected individuals (Barkley, 1998). Specifically, a review by Goldstein (2002) suggested that approximately 60% of children with ADHD will continue to exhibit symptoms of ADHD in adulthood, in addition to mild to moderate difficulties in social, academic, and emotional realms. Furthermore, Goldstein suggested that an additional 10 - 30% of children with ADHD will continue to have difficulty due to ADHD and will also go on to develop comorbid problems, such as antisocial characteristics. An empirical review by Young (2000) supported Goldstein’s position and indicated that a significant portion of children with ADHD do continue to experience impairment from various core symptoms of ADHD in adulthood. In addition to struggling with a continuation of core symptoms, adults with ADHD have higher rates of alcohol abuse, poorer work performances, lower job statuses than expected, and possibly higher than average rates of divorce and separation (Young).

Two crucial studies discussed in Young (2000) warrant further elaboration. In particular, longitudinal, controlled studies in Montreal (see Weiss & Hechtman, 1993 for a detailed description) and New York (see Mannuzza & Klein, 1999 for a detailed description) provided key insights into the adult outcomes of children with ADHD. In the Montreal study, adults identified as hyperactive between the ages of 6 and 12, were followed-up with at the 10-year and 15-year marks (Weiss & Hechtman). At the 15-year
follow-up, 66% of the adults who had been diagnosed as hyperactive as a child (mean age of 25.1 years) still reported at least one enduring ADHD-like symptom, compared with only 7% of the control group individuals (mean age of 25.2 years). In addition, the adults who had been hyperactive as children also reported a significantly worse history of psychiatric problems, including more interpersonal and neurotic problems, more acts of physical aggression, and more suicide attempts than individuals in the control group. The only distinguishing psychiatric diagnosis between the group who had been hyperactive and the control group was antisocial personality disorder (APD). Based on modified symptom criteria on the Schedule for Affective Disorders and Schizophrenia (SADS; modified to omit a question asking whether the individual had a close relationship with another person), 23% of the individuals who had been diagnosed as hyperactive as children met diagnostic criteria for APD versus only 2.4% of the control group individuals. However, according to Ellison (2002), adults with ADHD have higher overall rates of comorbid psychological disorders than adults without ADHD. Additionally, Ellison suggested that "these disorders interact with ADHD to produce a more impaired and persistent form of ADHD" (p. 16).

The New York study provided a 9-year and 16-year follow-up of individuals who had been diagnosed as having hyperkinetic reaction of childhood (a previous term used to describe what is now ADHD; Mannuzza & Klein, 1999). This study provided further evidence that a significant portion of children with ADHD go on to have continued difficulties due to ADHD and other mental health problems. In particular, half of the adults diagnosed with hyperkinetic reaction of childhood met criteria for a psychological
disorder, primarily ADHD, antisocial disorders, and nonalcohol substance use disorder. This was compared to only one fifth of the control group individuals meeting criteria for an ongoing psychological disorder. The New York study also showed that significantly more of the adults formerly diagnosed as hyperkinetic had problems with the law (e.g., arrests, convictions, and incarcerations) when compared with the control group individuals. However, as noted by Mannuzza and Klein, the increased rate of criminal activity seemed to be completely mediated by the presence of APD or CD.

Biederman (2004) suggested that in addition to the deleterious effects that ADHD and comorbid disorders have on adult individuals with ADHD, the societal impact of adult ADHD could also be quite negative. Though economic information is not available, Biederman suggested that adults with ADHD likely have higher health care use and costs than adults without the disorder. Biederman indicated that more research is needed to determine the occupational and societal costs of adult ADHD.

ADHD and Comorbidity

In addition to ADHD being associated with negative long-term outcomes, ADHD is also commonly associated with additional externalizing and/or internalizing problems. 

Comorbidity with Externalizing Problems

Externalizing problems, which are also commonly referred to as disruptive problems, include symptoms such as aggression, noncompliance, and other related conduct problems. ADHD, typically considered an externalizing problem, is frequently comorbid with other externalizing disorders, in particular with ODD and
A review by Jensen et al. (1997) focused on comorbidity rates of ADHD and CD/ODD in various studies of community-based samples. The studies examined included a number of longitudinal community-based samples and included samples from the United States and several other countries (e.g., Puerto Rico, Canada, and New Zealand). In their review, Jensen and colleagues combined CD and ODD into one category and found that the rates of comorbidity between ADHD and CD/ODD ranged between 42.7 - 93.0%.

Biederman et al. (1991) conducted an extensive review of available studies involving community-based and clinic-based samples to determine the comorbidity rates of ADHD and various disorders, including externalizing disorders. A review of 29 articles revealed that 30 - 50% of children with ADHD also meet diagnostic criteria for CD. As supported by Jensen and colleagues' review (1997), in which the CD and ODD diagnostic categories were combined, Biederman et al. had difficulty finding studies that separated out CD and ODD. However, drawing upon the few studies available yielded a comorbidity rate of at least 35% between ADHD and ODD.

While it is useful to know the comorbidity rates of ADHD with other narrow-band disruptive disorders (i.e., ODD and CD), it is also useful to know the comorbidity of ADHD with broadband externalizing problems (as measured by the CBCL; Achenbach & Rescorla, 2001). This is particularly useful because broadband measurements of externalizing problems are often administered to parents and teachers in the assessment of children with ADHD and in research studies of children with ADHD. A study by
Jensen et al. (1993), which focused on assessing factors related to comorbidity in children with ADHD, found that in a sample of 46 children with ADHD, 63% were rated by mothers as scoring above the clinical cutoff (t-scores of 64 or above) on the CBCL externalizing scale. In addition, the mean externalizing scale score was significantly higher than that of the community comparison group and a psychiatric clinic comparison group. This suggests that for a large percentage of children with ADHD there are accompanying externalizing problems at the broadband level. It is noteworthy that the CBCL does not include attention problems in the externalizing scale. Therefore, the presence of ADHD in children will not inherently inflate the externalizing scale of the CBCL.

Comorbidity with Internalizing Problems

In addition to often co-occurring with externalizing disorders, ADHD also frequently co-occurs with internalizing disorders or problems (Biederman et al., 1991; Jensen et al., 1993, 1997). Internalizing disorders encompass affective disorders such as dysthymia, unipolar depression, and bipolar disorder, as well as anxiety disorders. At the symptom level, examples of internalizing symptoms are feeling down or depressed, chronic worrying, somatic complaints, and sleep problems (APA, 2000). Also, as indicated in the DSM-IV-TR (APA, 2000), children who are depressed may exhibit an irritable mood.

A seminal review of 19 studies utilizing clinical and community samples of children estimated that mood disorders co-occur in 15 - 75% of children with ADHD (Biederman et al., 1991). In addition, Biederman and colleagues provided further
evidence of the comorbidity of ADHD and mood disorders based on family studies of children with ADHD. These studies demonstrated significantly higher rates of mood disorders in the first degree relatives of children with ADHD when compared to rates of the first degree relatives of children without ADHD.

Biederman et al. (1991) also reviewed 11 studies to investigate the comorbidity of ADHD with anxiety disorders. In this review, a comorbidity rate of approximately 25% emerged between ADHD and anxiety disorders. Biederman and his colleagues again drew upon family studies to demonstrate that the risk for anxiety disorders was significantly higher among the relatives of children with ADHD as compared to the risk level in the relatives of children in a normal comparison group.

In their 1997 review of ADHD literature from the prior 15 years, Jensen and colleagues also examined the prevalence of comorbidity between ADHD and internalizing disorders in community samples of children, including several longitudinal samples. Based on the studies reviewed, comorbidity rates of ADHD and internalizing disorders ranged between 13.0 - 50.8%. However, as the authors noted, the large range in comorbidity rates was likely due to the fact that of the studies reviewed, some studies included general categories of internalizing disorders, while others focused on specific narrow-band disorders.

A 1993 study by Jensen and colleagues provided further data regarding the comorbidity of ADHD with anxiety and depression. This study utilized three groups of children, a group of 47 children diagnosed with attention deficit disorder with hyperactivity (as defined by Diagnostic and Statistical Manual, 3rd ed. [DSM-III; APA,
1980) diagnostic criteria), a matched group of 47 children from a community sample, and a matched group of 47 children seen in a psychiatric clinic (who did not meet DSM-III diagnostic criteria for attention deficit disorder with hyperactivity). Of the children with ADHD, 34.2% scored at or above the clinical cutoff (total score of 19 or higher) on the Child Depression Inventory, a child-reported measure of symptoms of depression. This was in comparison to 9.3% of children in the community comparison group and 26.8% children in the psychiatric clinic comparison group. When examining scores on the Revised Children’s Manifest Anxiety Scale, a child-report measure of symptoms of anxiety, 27.5% of children with ADHD scored above the clinical cutoff (90th percentile) on this measure. This was in comparison to 14.3% of children from the community comparison group and 31.7% of children from the psychiatric comparison group.

Jensen and colleagues (1993) also investigated internalizing problems at the broadband level, as determined by parents’ reports on the CBCL. Results showed that 21.7% of the children with ADHD (total n = 46) were rated above the clinical cutoff (t-scores of 64 or above) on the internalizing scale of the CBCL, based on mothers’ reports. Overall, Jensen and colleagues concluded that children in the ADHD group and children from the psychiatric clinic comparison group were indistinguishable with regard to the presence of internalizing symptoms. However, children with ADHD did score significantly higher on all child-reported and parent-reported measures of internalizing symptoms, when compared with the community comparison group of children.
Comorbidity with Both Externalizing and Internalizing Problems

Numerous studies and reviews have focused on the comorbidity of ADHD with externalizing problems and the comorbidity of ADHD with internalizing problems. However, far fewer studies have focused on the comorbidity of ADHD with both externalizing and internalizing problems. To date, only two known studies have specifically examined a separate group of children with ADHD who also have both externalizing and internalizing problems to determine the prevalence rates of having ADHD and both externalizing and internalizing problems (Bird et al., 1994; Jensen et al., 2001).

Bird et al. (1994) conducted a large epidemiological study in Puerto Rico to determine the comorbidity of ADHD with other disorders. Results from this study confirmed that ADHD frequently co-occurs with CD and/or ODD (comorbidity rate of 17.1%) and that ADHD also co-occurs with internalizing disorders, although at a lower rate than with CD/ODD (comorbidity rate of 9.2%). However, the most striking result from this study was that 68.5% of the children with ADHD met diagnostic criteria for CD/ODD and an internalizing disorder. Therefore, only 5.2% of children in the sample had ADHD without co-occurring CD, ODD, and/or internalizing problems. In particular, the authors noted that two thirds of the children with ADHD also specifically met diagnostic criteria for ODD and an anxiety disorder.

The National Institute of Mental Health (NIMH) Collaborative Multisite MTA study also provided crucial information about the comorbidity of ADHD with both externalizing and internalizing problems (Jensen et al., 2001). In this study of 579
children aged 7-9.9 years, a significant percentage (24.7%, \( n = 143 \)) were diagnosed as having ODD/CD and an anxiety disorder, in addition to ADHD. Children with ADHD and ODD/CD constituted 29.5% (\( n = 171 \)) of the total sample and children with ADHD and an anxiety disorder constituted an additional 14.0% (\( n = 81 \)) of the total sample of children with ADHD. In addition, the authors noted that 22 children also had a mood disorder. In 20 of these 22 cases the mood disorder was comorbid with an anxiety disorder, thus the authors included these 20 children (as well as the two children without a comorbid anxiety disorder) in the comorbid anxiety group. The remaining percentage of children (31.8%, \( n = 184 \)) were diagnosed as having only ADHD. This study therefore provided crucial corroborating evidence that both externalizing and internalizing problems are present for a significant portion of children with ADHD.

**Negative Outcomes Associated with Comorbid Problems**

While research has consistently demonstrated that ADHD alone is a significant risk factor for negative outcomes, there is substantial evidence that the presence of comorbid problems provides additional risk of negative outcomes (Pliszka, Carlson, & Swanson, 1999). Many studies have shown that the presence of CD plays a powerful role in the development of negative outcomes in children with ADHD. A review by Pliszka et al. provided evidence that the presence of CD in children with ADHD may lead to negative outcomes such as increased rates of criminal activity and arrests, substance abuse, higher family stress, increased rate of learning disabilities, and overall greater
impairment. In sum, the presence of CD seems to heighten the severity of ADHD when present and seems to lead to even more negative consequences.

With regard to comorbidity with ODD, Drabick, Gadow, Carlson, and Bromet (2004) found that children with ADHD and symptoms of ODD had more internalizing problems, peer problems, and academic difficulties than children with ADHD alone or ODD alone. These authors noted that the effects appeared to be synergistic in that the amount and severity of problems appeared to be more than would be expected by simply adding the impairment experienced from ADHD with the impairment experienced from ODD. However, Drabick and her colleagues noted that the differences between groups only resulted in small effect sizes; thus, some caution should be exercised when drawing conclusions from this research study.

While there is less conclusive evidence regarding negative outcomes associated with the additional presence of internalizing problems in children with ADHD, reviews by Young (2000) and Biederman et al. (1991) both cited evidence that comorbid mood disorders (particularly bipolar disorder) may increase the risk of suicide in individuals with ADHD. In each case, Young and Biederman et al. cited research suggesting that adolescents who completed suicide had higher rates of bipolar disorder and ADHD than those attempting suicide. Despite this tentative evidence, further research seems warranted regarding the outcomes of children with both ADHD and a mood disorder. Additional research by Connor and colleagues (2003) suggested that the presence of internalizing problems in children with ADHD is associated with an increased risk of antisocial behaviors in these children. Given the extensive research on the negative
outcomes associated with antisocial behaviors, it appears that it would be important to identify correlates of these behaviors in children with ADHD.

Research regarding outcomes associated with the presence of anxiety disorders in addition to ADHD is also lacking. Pliszka et al. (1999) described several research studies in which the presence of anxiety in addition to ADHD actually seemed to lessen the display of impulsive and disruptive behaviors when compared to children with ADHD only (although they did display more of these behaviors than normal children in the control group). However, Pliszka et al. also presented evidence that the additional presence of anxiety in children with ADHD may be detrimental to the working memories of these children. This was found in tasks requiring additions of series of numbers presented in an auditory fashion.

Only two known studies examined the negative effects of children having ADHD and both an externalizing and internalizing disorder (James, Lai, & Dahl, 2004; Newcorn et al., 2004). James et al. reviewed over 30 years of articles on ADHD and suicide and found that there seems to be an increased risk of suicide in males with ADHD. However, according to the authors, this risk appears to be mediated by the presence and severity of comorbid disorders. In particular, comorbid conduct disorder and depression appear to increase the risk of suicide for males with ADHD. These authors suggested that identifying and treating male patients with ADHD, depression, and CD could be beneficial to reducing the number of completed suicides.

Newcorn and his colleagues (2004) also found that children with comorbid CD and internalizing problems were at increased risk for problems. However, these authors
specifically looked at children with ADHD, CD, and an anxiety disorder. They found that at the time of follow-up, when the sample of male children with ADHD ranged in age from 15 - 18 years old, children with comorbid CD and anxiety were rated as having the highest level of parent-reported symptoms, when compared with children with either CD or anxiety. Additionally, Newcorn et al. found that the presence of comorbid CD and an anxiety disorder in childhood best predicted social problems in adolescence for this sample of children with ADHD.

Parent Characteristics Associated with Comorbid Problems

*Rationale and Overview*

There is ample evidence that externalizing and internalizing problems frequently co-occur with ADHD and that the presence of these additional problems may lead to worse outcomes for affected children than ADHD alone. Therefore, studying the correlates of these comorbid problems is crucial in providing better treatment planning for children with ADHD who have comorbid problems. Treating all of the psychological symptoms children with ADHD may experience will enhance treatment. Therefore, it is important to know what factors may contribute to these problems so these factors can be targeted in treatment. In addition, identification of these factors would also be important to prevent the development of comorbid problems.

Parents often play an important role in the transmission of psychological problems to their children, due to genetic risk factors and environmental factors. Because of the important role parents play in this process, research has focused on investigating
the parent characteristics associated with the presence of comorbid externalizing and/or internalizing problems in children with ADHD. Overall, research studies on parent characteristics associated with the presence of comorbid problems in children with ADHD have focused primarily on the following three characteristics: parent psychopathology (Anastopoulos et al., 1992; Anderson, Hinshaw, & Simmel, 1994; Barkley, Anastopoulos, Guevremont, & Fletcher, 1992; Jensen et al., 2001; Johnston, 1996; Johnston et al., 2002; Nigg & Hinshaw, 1998; Pfiffner et al., 1999), factors of the parent-child interaction (e.g., parent hostility, negativity, and responsiveness; Anderson et al.; Barkley et al.; Jensen et al.; Johnston; Johnston et al.), and parenting style (e.g., the disciplinary techniques typically employed by parents; Harvey, 2000; Hinshaw, 2002; Jensen et al.; Johnston et al.; Lindahl, 1998). The research in these areas is summarized in the following sections.

**Parent Depression and Child Outcomes**

A considerable amount of research has looked at the effects that parental depression can have on children (see Beardslee, Versage, & Gladstone, 1998; Gotlib & Goodman, 1999 for reviews), thus warranting further elaboration. Beardslee and colleagues' review of the previous 10 years of literature regarding children of parents with affective illnesses overwhelmingly concluded that such children are at a higher risk for depression. In addition, Beardslee and colleagues provided substantial evidence that these children have higher risks of developing internalizing disorders as well as externalizing disorders. This review highlighted the need for clinical awareness of the
implications that having a parent with depression can have on children. In particular, being aware of the parent’s depression can warn clinicians of potential internalizing and externalizing problems that children may be exhibiting or at risk for developing. This certainly could have a significant impact on treatment planning for children who have parents that are depressed or have other affective illnesses.

A review by Gotlib and Goodman (1999) provided further evidence that having a depressed parent can have adverse effects on children of all developmental levels. According to Gotlib and Goodman, “Maternal depression has been associated with increased rates of behavior problems, social-emotional maladjustment, and deficits in cognitive-intellectual functioning in infancy through adolescence” (p. 422). However, Gotlib and Goodman also cautioned that these effects may not be specific to having a parent with depression. As the authors noted, few of the studies regarding parent depression utilized control groups who also have psychiatric diagnoses. Instead, most studies utilized “normal” control groups without any psychiatric diagnoses. Therefore, the results may be true of children of parents with any psychological disorder(s), and not necessarily just true of children of parents with depression.

Parent Psychopathology and Comorbidity in Children with ADHD

Parent psychopathology, particularly parent depression, has also been studied extensively in ADHD research. This stems from the fact that the presence of parent psychopathology may account for the direct genetic transmission of psychological disorders. In addition, the presence of parent psychopathology may play a mediating role
in the development of child psychopathology due to dysfunctional parenting techniques that result from parent psychopathology (e.g., modeling factors associated with psychopathology; Pfiffner et al., 1999).

Whether parent psychopathology plays a direct or mediating role in the development of child psychopathology is often difficult to ascertain, particularly in studies designed such that causal effects cannot be determined. Another complicating factor, as pointed out in Pfiffner et al. (1999), is that much of the early research regarding parent psychopathology and its relation to offspring with ADHD, failed to take into account possible comorbid disorders of the children. Based upon prior research, the association of parent psychopathology with ADHD in children changes dramatically when factoring in the presence of comorbid externalizing problems in the children. For example, Pfiffner et al. discussed prior research that found that many characteristics of parents of children with ADHD (e.g., history of depression, diagnosis of APD) are directly linked to the presence of CD in these children. Consequently, it seems that parent characteristics that were once thought to be associated with the presence of ADHD in children are better explained by the presence of other externalizing problems in children (particularly CD). Therefore, it is essential when studying parent psychopathology (and other parent characteristics), to examine this characteristic in relation to the comorbid symptomatology of the children.

Several studies have investigated the association between parent psychopathology and comorbid externalizing problems in children with ADHD. The most consistent
finding across this heterogeneous body of research is that parent depression is associated with the presence of various externalizing problems in children with ADHD (Anastopoulos et al., 1992; Chronis et al., 2003; Johnston, 1996; Johnston et al., 2002; Nigg & Hinshaw, 1998). Maternal depression was the emphasis of most of these studies, with only a few including assessment of paternal depression (Johnston; Nigg & Hinshaw). Of these, one (Johnston) found that paternal depression was associated with the presence of externalizing problems in children with ADHD. Specifically, Johnston found that the fathers of children with ADHD who also had higher levels of oppositional-defiant behaviors (versus a group of children with ADHD and lower levels of oppositional-defiant behaviors) had statistically significantly higher ratings on the Depression and Obsessive-Compulsive scales of the Symptom Checklist 90-Revised (SCL 90-R) when compared with a group of children designated as the “nonproblem” comparison group. In addition, several studies consistently found that maternal depression was associated with conduct problems in children with ADHD (Anastopoulos et al.; Johnston et al.; Nigg & Hinshaw). However, some research has proposed that other factors such as parenting stress (Anastopoulos et al.) or maternal responsiveness (Johnston et al.) may mediate the association between maternal depression and comorbid conduct problems in children with ADHD through their impact on the mothers’ parenting techniques. Therefore, it is difficult to ascertain the causal mechanisms involved in the association of parent depression with comorbid externalizing problems (e.g., do the child’s behaviors “cause” the parent’s psychopathology, does the parent’s psychopathology “cause” the child’s
behaviors, or is there a third variable that may account for both child and parent problems or mediate such associations).

Several other studies investigated the association between parent psychopathology (other than depression) and the presence of externalizing problems in children with ADHD. One study in particular (Pfiffner et al., 1999) looked at comorbid problems at the broadband level and at the narrowband, diagnostic level. Overall, Pfiffner and colleagues found that paternal externalizing disorders (particular APD, as diagnosed by maternal reports) were associated with externalizing problems in a group of boys with ADHD. A study by Nigg and Hinshaw (1998) also suggested that externalizing problems in boys with ADHD are associated with paternal characteristics. However, in Nigg and Hinshaw’s study, the distinction was made between child covert (e.g., stealing) and overt (e.g., aggression and noncompliance) antisocial behaviors. The covert behaviors were best predicted by paternal cocaine abuse/dependence and openness to new experiences, one of the “Big Five” personality traits also investigated in this study. Overt antisocial behaviors in boys with ADHD were predicted by maternal depression and other maternal personality characteristics, such as a higher level of maternal neuroticism. It is noteworthy that the presence of anxiety in mothers actually acted as a protective factor for child antisocial behaviors, but this was not the case for anxiety in fathers. A history of generalized anxiety disorder (GAD) was significantly more prevalent in fathers of the group of boys with ADHD and ODD/CD than in fathers of the normal, comparison group of boys. While the percentage of fathers with a history of GAD was not significantly
higher (at the $p < .05$ level) in the group of boys with ADHD and ODD/CD versus the group of boys with ADHD only, the percentages were 11% and 4%, respectively.

Though maternal anxiety appeared to have a protective quality in the Nigg and Hinshaw study (1998), Kashdan and colleagues (2004) found contradictory evidence when examining a group of parents of children with ADHD and oppositional defiant behaviors. Kashdan et al. found lower levels of parental warmth and involvement in highly anxious versus less anxious mothers. They also found that parental anxiety was related to increased parental intrusiveness and negative involvement. Furthermore, the results indicated that ODD symptoms were negatively correlated with parental warmth and involvement, and were positively correlated with parental intrusiveness and negative involvement. Thus, anxiety may be mediated by the parent-child relationship in a negative manner, such that increased maternal anxiety is related to increased child oppositional behaviors as a result of less effective parenting practices; however, because the data were correlational in nature, the direction of the effect and any causal inferences are impossible to determine.

While less researched than comorbid externalizing problems in children with ADHD, a small number of studies have researched the association between parent psychopathology and comorbid internalizing problems in children with ADHD (Jensen et al., 2001; Pfiffner et al., 1999). Pfiffner et al. included information about the psychopathology of both mothers and fathers. They found that both maternal and paternal internalizing disorders (e.g., major depressive disorder [MDD], GAD, social phobia, panic disorder, or OCD) were associated with the presence of internalizing
disorders in children with ADHD (e.g., MDD, dysthymia, overanxious disorder [OAD], or separation anxiety disorder). Jensen et al., however, only investigated maternal depression. They investigated the association between maternal depression and comorbid problems in various groups of children with ADHD as part of the MTA study that included a group of children with ADHD and both comorbid externalizing and internalizing problems. They found that maternal depression was only associated with the presence of comorbid internalizing disorders in children with ADHD.

Overview of Findings Regarding Parent Psychopathology and Comorbid Problems

While there have been numerous studies that have investigated the association between parent psychopathology and the presence of comorbid externalizing and/or internalizing problems in children with ADHD, the results have been mixed. Studies typically have found that parent depression (particularly maternal depression) is associated with externalizing problems in children with ADHD (Anastopoulos et al., 1992; Johnston, 1996; Johnston et al., 2002; Nigg & Hinshaw, 1998), while there is also support that parent depression is associated with internalizing problems in children with ADHD (Jensen et al., 2001; Pfiffner et al., 1999). In addition, there is further inconsistency in the comorbid groups of children with ADHD that have been utilized to determine associations with parent psychopathology. Specifically some studies looked at ODD and CD groups separately, while others looked at them combined, and all of the studies concerned with internalizing problems lumped both mood and anxiety disorders into one category. Further muddling the results is the fact that many of the
aforementioned studies only utilized groups of boys with ADHD (Johnston et al., 2002; Nigg & Hinshaw, 1998; Pfiffner et al., 1999), therefore compromising the generalizability of the results. Overall, the investigation of the association between parent psychopathology and comorbid problems in children with ADHD has thus far included a heterogeneous group of research studies and has produced inconsistent results.

**Parenting Style and Comorbidity in Children with ADHD**

_Historical overview of conceptualization of parenting style._ Diana Baumrind’s work (1966, 1971) studying different types of parental authority laid the foundation for current conceptualizations of parenting style. Baumrind initially classified parental control in three categories: permissive, authoritarian, and authoritative (1966). According to Baumrind, permissive parents make few demands on their children, act in nonpunitive ways towards their children, and do not exercise overt control over their children’s behaviors. In addition, permissive parents affirm their children’s behaviors. Authoritarian parents, however, were described quite differently. Baumrind indicated these parents attempt to actively control and influence their child’s behavior based on a rigid value system of right and wrong. Furthermore, Baumrind described authoritarian parents as not engaging in verbal debates with their children and instead believing that children should not question their parents’ authority. Compared with permissive parents, authoritarian parents are less affirming of their children’s behaviors. Lastly, Baumrind described authoritative parents as occupying the middle ground between permissive and
authoritarian parents. She depicted authoritative parents as attempting to shape their children’s behaviors but also allowing their children to voice an opinion and debate issues. According to Baumrind, authoritative parents achieve a balance between firm control and affirmation and acceptance of their children.

Baumrind (1966, 1971) not only described the various categories of parental authority, she also studied the effects of each type of authority on children’s behaviors. Baumrind’s early work (1971) suggested that authoritative parents evoked the best outcomes in their children’s behaviors. The results implied that compared with authoritarian and permissive parents, the children of authoritative parents generally developed responsible, autonomous behaviors. According to Baumrind, children of authoritative parents were the most “self-reliant, self-controlled, explorative, and content” (1971, p. 1) when compared with children of authoritarian and permissive parents. In contrast, children of authoritarian parents seemed to be detached and withdrawn. Baumrind (1967) also hypothesized that children of parents who utilized aggressive authoritarian control may be more likely to react with counteraggression. Finally, Baumrind (1971) described the children of permissive parents as the least self-controlled and autonomous. Likely, these children would be considered impulsive by today’s standards.

Modern conceptualizations of parenting style. More recent research in the area of parenting style typically focuses on parent discipline style. This stems from research findings (e.g., Arnold, O’Leary, Wolff, & Acker, 1993; Dishion & Patterson, 1997; Irvine, Biglan, Smolkowski, & Ary, 1999; O’Leary, Slep, & Reid, 1999) that particular
patterns of parent discipline are linked with child behavior problems. One such pattern that has received considerable research attention is coercive parenting (e.g., Patterson, Reid, & Dishion, 1992; Vuchinich, Bank, & Patterson, 1992). As described by Patterson and colleagues, a coercive pattern of parent-child interaction involves trying to force the child into compliance, sometimes through aggressive means. This results in the child reacting with problem behaviors, typically involving aggression. According to Patterson et al., this often leads to the parent giving in to the child and thus negatively reinforces the child’s problem behaviors through removal of the aversive parent behaviors and positively reinforces the child via gains that might be obtained (e.g., the child gets to do what he/she wants to do). In addition, this process negatively reinforces the parent’s giving in. As is emphasized by the findings of Vuchinich et al., this coercive process may be a reciprocal process in which antisocial behaviors by the child affect the parenting style and parenting style affects the child’s antisocial behaviors.

In addition to coercive parenting, there is support that harsh, overreactive disciplinary strategies employed by parents are associated with externalizing behaviors in their children (Dishion & Patterson, 1997; O’Leary et al., 1999). Although less emphasized, Irvine et al. (1999) also found that parental overreactivity was significantly correlated with the internalizing scale of the CBCL (Achenbach, 1991). Overreactive parents utilize punitive disciplinary methods which may include physical punishment, threats, and/or insults. Arnold et al. (1993) hypothesized that such disciplinary strategies may model aggression for children and may contribute to the presence of externalizing behaviors in children. Although not addressed by Arnold et al., overreactive discipline, in
particular insults and physical punishment, could be hypothesized to lead to low self-esteem, depression, and/or anxiety, thus accounting for the correlation with internalizing problems found by Irvine and colleagues. Lastly, tying together previous and current conceptualizations of parenting style, Arnold et al. asserted that an overreactive disciplinary style is akin to Baumrind’s (1967, 1971) conceptualization of authoritarian parents.

In addition to an overreactive disciplinary style, lax or permissive discipline strategies have also been linked to child behavior problems (e.g., Arnold et al., 1993; Irvine et al., 1999). Lax parenting has been described by Arnold and colleagues as a modern interpretation of Baumrind’s (1967, 1971) permissive parenting style. An example of a lax discipline strategy is giving in to children when they misbehave (Arnold et al.). Arnold et al. pointed out that by giving in to misbehaviors, parents may inadvertently be providing positive reinforcement to their children and increasing the likelihood that such behaviors will occur in the future. Studies that have measured child behavior problems via the CBCL (Achenbach, 1991) have found that lax parental discipline is positively correlated with externalizing behaviors (Arnold et al.; Irvine et al.; O’Leary et al., 1999) and internalizing behaviors (Irvine et al.). However, of the three studies, Irvine and colleagues were the only researchers to include an analysis of the internalizing scale of the CBCL.

The aforementioned discipline strategies (overreactivity and laxness) have been linked to the presence of externalizing and internalizing behaviors in community samples of normal and at-risk children (Arnold et al., 1993; Irvine et al., 1999; O’Leary et al.,
In these studies, discipline strategies have been measured through use of the Parenting Scale (see Arnold et al., for a full description), a 30-item measure utilizing a 7-point Likert scale to assess for “discipline mistakes” parents may make that can lead to child behavior problems. The scale measures three factors, overreactivity, laxness, and verbosity (the last of which did not correlate as strongly with child behavior problems and has not held up as a factor in subsequent studies; e.g., Collett, Gimpel, Greenson, & Gunderson, 2001; Harvey, Danforth, Ulaszek, & Eberhardt, 2001; Irvine et al.).

**Overreactivity and laxness in parents of children with ADHD.** Recent studies (Collett et al., 2001; Harvey et al., 2001) have also applied the Parenting Scale to children with ADHD or ADHD-like symptoms. Specifically, in a study utilizing a community sample of children, Collett and his colleagues found positive correlations between scores on the overreactivity and laxness factors (with higher scores reflecting stronger parental endorsement of such discipline mistakes) and ADHD symptoms in children (as assessed though parent reports of ADHD symptoms). However, a higher correlation was found between the overreactivity scale and ADHD symptoms than between the laxness scale and ADHD symptoms. Similarly, Harvey et al. also found significantly elevated overreactivity and laxness scale scores for mothers and fathers of children with ADHD, as compared with mothers and fathers of children without a diagnosis of ADHD. These studies suggested that overreactive and lax parenting styles may be associated with symptoms of ADHD. However, Harvey et al. reported this association only for parents of children with ADHD and additional externalizing problems (ODD and/or CD). Parents of children with only ADHD were similar to those of children without ADHD.
Thus, higher overreactivity and laxness scores might more accurately predict the comorbid externalizing problems. Unfortunately, in the study conducted by Collett and colleagues only ADHD symptoms were looked at; thus the influence of comorbid problems is unknown. Parenting style and comorbidity. Several studies have investigated the correlation between parenting style and comorbid problems in children with ADHD (e.g., Harvey, 2000; Hinshaw, 2002; Jensen et al., 2001; Johnston et al., 2002; Lindahl, 1998). These studies utilized varied methods of assessing parenting style and their direct comparison is thus limited by this factor. Overall, the lax parenting style (referred to as lax/inconsistent) was associated with the presence of ODD in a sample of children with ADHD (Lindahl). In addition, in a sample of girls with ADHD, the presence of authoritarian (which can be conceptualized as overreactive) and “overwhelmed/unsure” styles was significantly higher in the group of girls with ADHD-Combined Type, of which 70% had a comorbid diagnosis of ODD and/or CD (Hinshaw). Therefore, it can be hypothesized that the comorbid disorders may account for the higher presences of these particular parenting styles, further supporting Harvey and colleagues’ (2001) assertion that overreactivity and laxness could be better accounted for by the presence of comorbid externalizing disorders than ADHD itself.

Lastly, although not a parenting style per se, Harvey (2000) looked at the association between parenting similarity and rates of disruptive disorders (referred to hereafter as externalizing problems) in the parents of children with ADHD. Parenting similarity was assessed by looking at the general child rearing similarity and discipline
similarity between mothers and fathers, while controlling for the effects of parenting effectiveness. Harvey found that parenting similarity was associated with lower rates of externalizing problems in children with ADHD. Although Harvey did include an analysis of internalizing problems as well, no significant associations were found.

Overall, research looking at the relationship between parenting style (or discipline strategies) indicates that particular parenting styles (particularly lax and overreactive) may be associated with the presence of comorbid externalizing problems in children with ADHD. However, these results stem from a heterogeneous mixture of studies that utilized various measures of parenting style. Further research to help clarify this issue seems warranted. In addition, the presence of comorbid internalizing symptoms or comorbid externalizing and internalizing symptoms seems to have been overlooked by most studies investigating parenting style and comorbid problems in children with ADHD. Therefore, further research including children with such patterns of comorbidity is necessary.

Child Aggression and Its Association with Comorbid Problems

Aggression and Comorbid Problems in Community Samples of Children

While it is likely that parent characteristics are associated with the presence of comorbid problems in children with ADHD, it is also likely that child characteristics may be associated with comorbid problems. In particular, the presence of aggression in
children has been associated with comorbid depressive symptomatology (e.g., Capaldi, 1991, 1992; Coie et al., 1995; Panak & Garber, 1992). Aggression is often also a symptom of CD and/or ODD. Therefore, aggression is likely to be associated with both externalizing and internalizing problems.

Providing support that aggressive and depressive symptoms often co-occur, Capaldi (1991) found that 13% \((n = 26)\) of a community sample of young adolescent boys \((N = 203)\) had elevated conduct problems and elevated symptoms of depression, in comparison to 17% \((n = 34)\) who had elevated conduct problems only, and 15% \((n = 30)\) who had elevated depressive symptoms only. Overall, the boys with co-occurring conduct and depressive problems were found to be more poorly adjusted compared to boys with conduct or depressive problems only. Specific poor adjustment factors were found in the realms of academic functioning, peer relations (as reported by teachers and parents), self-esteem, and self-evaluation of parent and peer relations. Despite these findings, based on the methods employed by this study it is difficult to ascertain if the conduct problems led to depression or vice versa.

Capaldi (1992) conducted follow-up assessments with the aforementioned sample of adolescent boys. At Grade 8, the group of boys with both elevated conduct problems and depressive symptoms continued to show significant impairments in most areas of functioning. In addition, this group also showed elevated rates of suicidal ideation and elevated arrest rates, when compared to boys with only conduct problems. This finding suggested that the co-occurrence of conduct problems (which likely include the presence
of aggression) with depressive symptomatology represents a stable condition that has potentially deleterious effects on several domains of functioning.

Several other studies support Capaldi's (1991, 1992) findings. Panak and Garber (1992) conducted a study of a large community sample of third, fourth, and fifth graders at three points in time over a 1-year period. They found that increases in levels of aggression were significantly associated with concurrent increases in the level of self-reported depressive symptoms. In addition, Panak and Garber found that perceived peer rejection seemed to mediate the relationship between aggression and depressive symptoms and seemed to be a strong predictor of subsequent depressive symptoms. The authors' hypothesized that perceived peer rejection led to children feeling less socially competent and therefore led to lowered self-esteem, thus increasing symptoms of depression. Further supporting and adding to these findings, Coie et al. (1995) found that peer rejection and aggression were stable predictors of a chronic pattern of co-occurring internalizing problems and externalizing problems, particularly in boys. In their longitudinal study that followed 1,147 children from Grade 3 through Grade 10, Coie et al. found that boys who were aggressive and rejected by peers when assessed in third grade, displayed increasingly severe internalizing and externalizing problems as they got older.

Finally, of particular importance to the current study, Weiss and Catron (1994) explored the specific relationship between depression and aggression in children. The authors noted that previous research found moderate correlations between aggression and depression at the narrowband level and between externalizing and internalizing
symptoms at the broadband level. Therefore, they hypothesized that because aggression and depression are important components of broadband externalizing and internalizing problems, respectively, the relationship between aggression and depression may actually be related to an association between factors at the broadband level and may not be specific to the constructs of aggression and depression. Using second-order confirmatory factor analysis, Weiss and Catron found that the relationship between aggression and depression actually did seem to be better accounted for by a relationship at the broadband level (i.e., internalizing and externalizing). Therefore, as the authors noted, this finding implied that some children who have high levels of both aggression and depression may also show high levels of other comorbid externalizing and internalizing problems (e.g., hyperactivity and anxiety).

*Aggression and Comorbid Depressive Problems in Children with ADHD*

Only one known study has specifically looked at the relationship between aggression and depression in children with ADHD (Treuting & Hinshaw, 2001). Treuting and Hinshaw looked at the rates of depressive symptomatology in boys with ADHD who were classified as aggressive or nonaggressive based upon rankings of aggressive behavior by a senior staff member at the end of a summer program for boys with ADHD. As was hypothesized, Treuting and Hinshaw found that boys with ADHD who were aggressive reported more depressive symptoms than boys with ADHD who were not aggressive. Both groups of boys reported more depressive symptoms than boys in a comparison group who did not have ADHD. Specifically, 2% of boys with ADHD
who were not aggressive and 15% of boys who were aggressive met or exceeded the moderate clinical cutoff on the Children’s Depression Inventory (CDI). This was in comparison to 1% of the group of boys without ADHD who met or exceeded the moderate clinical cutoff point. The effect size for the difference in depression scores between boys with ADHD who were not aggressive and boys with ADHD who were aggressive was .39. In addition, it is noteworthy that the effect size remained at this level even when evaluating an abbreviated version of the CDI modified to remove items related to social, academic, and behavioral problems that may be confounded by boys’ ADHD status.

Summary of Literature Review

ADHD is a chronic childhood disorder that has high comorbidity rates with externalizing and internalizing problems. The multiple comorbid problems often lead to worse long-term outcomes for children with ADHD than children with ADHD only or children with ADHD and only one type of comorbid problem. Factors that may be associated with the presence of comorbid problems in children with ADHD are important to study so that better prevention and treatment planning can be provided to children with ADHD. In addition, children with ADHD who also have both externalizing and internalizing problems seem to be a group of children typically overlooked in research studies. Therefore, this represents an area of research that needs to be explored further.

Specific characteristics that may be associated with the presence of comorbid problems in children with ADHD include parent characteristics and child characteristics.
In particular, parent psychopathology and parenting style have both been linked to comorbid problems in children with ADHD. However, most of these studies neglected to look specifically at the combined comorbidity of externalizing and internalizing problems. In addition, the presence of aggression in children with ADHD has been associated with the additional presence of depressive symptoms. However, further research is needed to support or challenge this finding.

**Purpose and Objectives**

The purpose of this study was to determine if there are significant associations between parenting style, parent psychopathology, and comorbid externalizing and/or internalizing problems in children with ADHD. Another aim of this study was to determine if there is a significant association between child aggression and comorbid externalizing or internalizing problems in children with ADHD. This information is important because comorbid problems in children with ADHD have been associated with poorer long-term outcomes than ADHD alone. In addition, identification of correlates of comorbid symptomatology could be important in providing better treatment planning for children with ADHD. The identified correlates could be targeted in treatment along with the comorbid externalizing and/or internalizing symptoms. Furthermore, identification of the correlates could be important in developing prevention methods to preclude the development of comorbid symptomatology. The specific research questions addressed in this study were as follows:
1. What are the relationships between externalizing and internalizing symptoms of children with ADHD and the following variables: parenting style, parent psychopathology (e.g., depression, anxiety, and antisocial characteristics such as aggression), and child aggression? Based on previous research, it was hypothesized that overreactive and lax parenting styles would be associated with comorbid externalizing behaviors. It was hypothesized that overreactive parenting may also be associated with comorbid internalizing behaviors. In addition, based on previous research, it was hypothesized that parent depression would be associated with both externalizing and internalizing problems in children. Parent aggression was hypothesized to be associated with comorbid externalizing problems but no specific hypothesis was made regarding the association between parent aggression and child internalizing problems. In addition, based on inconclusive past research no specific hypothesis was made regarding parent anxiety and its relationship to comorbid problems. Lastly, based on previous research, it was hypothesized that child aggression would be associated with comorbid externalizing and internalizing problems.

2. Are there significant differences with respect to parenting style, parent psychopathology (depression, anxiety, and aggression) and child aggression between a group of children with ADHD and comorbid externalizing problems and a group of children with ADHD and comorbid externalizing and internalizing problems? Because few past studies have looked at children with ADHD and both externalizing and internalizing problems, there were no specific hypotheses made regarding this research question.
3. If there are significant differences found between the groups, what combination of these variables (parenting style, parent psychopathology, and child aggression) best predicts group membership? If less than two significant differences are found, this question will be dropped. This analysis would represent an exploratory analysis of the best predictors of group membership in two groups of children with ADHD and comorbid problems. Therefore, no hypothesis was made regarding what combination of variables will best predict group membership.
CHAPTER III

METHODS

Participants

A total of 29 mothers and 3 fathers of children with ADHD participated in this study. Overall, 45 mothers and 9 fathers of children with ADHD completed and returned study packets; however, data were used from only 32 parents. This was due to the inclusion criteria that children had to fall into either the "externalizing only" category or the "externalizing and internalizing" category in order for their data to be utilized in this study. These criteria were based on parents rating children in at least the borderline range on the externalizing problems scale (t-score of 60 or above) or in at least the borderline range on both the externalizing and internalizing problems scales (t-scores of 60 or above on both scales) of the CBCL. An additional inclusion criterion required that parents rated children in at least the "at-risk" range on one of the three subscales (inattentive, hyperactive-impulsive, total) of the ADHD-Symptoms Rating Scale (SRS). For all three subscales of the ADHD-SRS, the at-risk range is defined as the 85th percentile and above. The inclusion criteria resulted in data for 17 children being excluded because the children did not fall into either of the aforementioned categories (externalizing problems only or both externalizing and internalizing problems) or because children did not meet the ADHD inclusion criterion.

Additionally, an effort was made to include both parents of two-parent families by providing study packets to both mothers and fathers to be filled out independently about
the same child. Unfortunately, only five families returned two-parent information. Thus, for most children ($n = 29; 90.6\%$) data from mothers only were analyzed, while in three instances data from fathers were analyzed as there were no data from mothers available for these children.

The majority of parents were married ($n = 30; 93.8\%$) and the biological parent of the child being rated ($n = 24; 75\%$). The overall mean age of parents was $40.25 (SD = 8.75)$. Most parents were well educated, having completed at least some college ($n = 30; 93.8\%$). There was not a statistically significant difference ($\chi^2 = 6.19, p = 0.186$) in the mean education level of parents from the externalizing group ($M = 3.73$, $SD = .704$) and parents from the externalizing and internalizing group ($M = 3.06$, $SD = .748$). Parent demographic characteristics are presented by group in Table 1.

Children ranged in age from 6 to 17. There was not a statistically significant difference ($t = -0.336, p = .739$) in the mean age of children in the externalizing only group ($M = 10.00, SD = 3.140$) and the mean age of children in the externalizing and internalizing group ($M = 10.35, SD = 2.805$). Overall, when looking at the total sample, most children were in grades 1 through 5 ($n = 22; 68.8\%$), though the range of grades was 1 through 12. Broken down by groups, 86.67\% ($n = 13$) of children in the externalizing only group were in elementary or middle school grades (Grades 1 through 8), while 82.35\% of children in the externalizing and only group were in elementary or middle school grades. The majority of children were male ($n = 24; 75.0\%$), with 12 males in each group. Additionally, a majority of children were Caucasian ($n = 29; 90.6\%$). All children in this study were previously diagnosed with ADHD. Over half of the children
Table 1

**Demographic Characteristics of Parents**

| Demographic characteristics | Externalizing group  
|                            | (n = 15) | Externalizing and internalizing group  
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<td>1</td>
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<tr>
<td>Female</td>
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<td>16</td>
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<td>14</td>
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<tr>
<td>Adoptive parent</td>
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<td>2</td>
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<tr>
<td>Legal Guardian</td>
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<td>1</td>
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<tr>
<td>Other</td>
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<table>
<thead>
<tr>
<th>Highest level of education completed</th>
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<tr>
<td>Completed college</td>
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<td>Completed graduate / postgraduate education</td>
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<table>
<thead>
<tr>
<th>Marital status</th>
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<tbody>
<tr>
<td>Married</td>
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<td>17</td>
</tr>
<tr>
<td>Separated / divorced</td>
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<td>0</td>
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</table>

(n = 18; 56.3%), were identified by their parents as being diagnosed with the combined subtype of ADHD, which includes both hyperactive-impulsive and inattentive symptoms. Only five parents (15.6%) indicated not knowing which subtype of ADHD their child had been diagnosed with. Parents of all children reported their children had some form of treatment for ADHD. For children from both groups, a combination of medication and
behavior management therapy was the most common form of treatment ($n = 18$; 56.3%). Eight children (53.3%) in the externalizing only group were reported by their parents to have at least one diagnosed comorbid disorder, with half of the children having a comorbid disruptive disorder. In the externalizing and internalizing group, eight children (47.1%) were also reported to have at least one diagnosed comorbid disorder, with comorbid diagnoses being spread almost evenly amongst affective, anxiety, disruptive, and developmental disorders. Child characteristics are listed separately by group in Table 2.

Instrumentation

Demographic Information

Parents filled out a form created by the student investigator that assessed both parent and child demographic information (see Appendix for a copy). Information provided by the parents about themselves included whether they are the biological parent, adoptive parent, legal guardian, or “other.” In addition, information about the parent’s highest level of education was obtained, as well as the parent’s current marital status. Parents provided the following information about their child: age, grade level, ethnicity, ADHD subtype diagnosis (primarily inattentive, primarily hyperactive/impulsive, or combined) and when the diagnosis was made, any ADHD treatment obtained (including medication and behavioral management techniques) and specific information regarding such treatment. Additionally, parents provided information about whether their child had been diagnosed with any other psychological and/or behavioral disorders. If parents
Table 2

*Demographic Characteristics of Children*

<table>
<thead>
<tr>
<th>Demographic characteristics</th>
<th>Externalizing group (n = 15)</th>
<th>Externalizing and internalizing group (n = 17)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>n</td>
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<td>3</td>
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<td>0.0</td>
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<td>12</td>
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<td>Combined</td>
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<td>Inattentive</td>
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*(table continues)*
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<th>Demographic characteristics</th>
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<th>Externalizing and internalizing group ((n = 17))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment received for ADHD</td>
<td>(n)</td>
<td>(%)</td>
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<tr>
<td>Medication only</td>
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<tr>
<td>Behavior management only</td>
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<td>6.7</td>
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<tr>
<td>Medication and behavior management</td>
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<td>53.3</td>
</tr>
<tr>
<td>Medication and other form of treatment</td>
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<td>13.3</td>
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<tr>
<td>Medication, behavior management, and other form of treatment</td>
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<td>0.0</td>
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<td>Diagnosed with other psychological and / or behavioral disorders</td>
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<tr>
<td>No</td>
<td>7</td>
<td>46.7</td>
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<tr>
<td>Yes</td>
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<tr>
<td>Comorbid diagnoses</td>
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<td>Anxiety disorder</td>
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<td>Disruptive disorder</td>
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<td>26.7</td>
</tr>
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<td>Disruptive disorder and mood disorder</td>
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<td>0.0</td>
</tr>
<tr>
<td>Disruptive disorder and anxiety disorder</td>
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<td>6.7</td>
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<tr>
<td>Developmental disorder</td>
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<td>0.0</td>
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<td>Other</td>
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<td>6.7</td>
</tr>
<tr>
<td>Not specified</td>
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<td>6.7</td>
</tr>
</tbody>
</table>
endorsed that their child had been diagnosed with another disorder, they were prompted to list the disorder(s).

**Parent Measures of Child Behaviors**

*Child Behavior Checklist.* The CBCL/6-18 (Achenbach & Rescorla, 2001) is a 113-item behavior checklist that assesses a variety of behavior problems that children might demonstrate. Parents rated each behavior on a 3-point scale with 0 = not true, 1 = somewhat or sometimes true, and 2 = very true of often true, based on the preceding 6 months.

The CBCL yields the following eight subscales (developed through factor analysis): anxious/depressed, withdrawn/depressed, somatic complaints, social problems, thought problems, attention problems, rule-breaking behavior, and aggressive behavior. Second-order factor analyses yielded: internalizing and externalizing scales. In addition, a total problem scale is derived by summing all of the items. Achenbach and Rescorla (2001) found that the anxious/depressed, withdrawn/depressed, and somatic complaints factors loaded highest on the Internalizing scale while the aggressive behavior and rule-breaking behavior factors loaded highest on the Externalizing scale. The social problems, thought problems, and attention problems factors seemed to moderately load on both scales; therefore, these are not utilized to derive the Internalizing or Externalizing scale scores. Finally, based on the normative data, Achenbach and Rescorla developed the following clinical cutoff scores: borderline clinically significant scores on the internalizing, externalizing and total problems scales range between t-scores of 60 through 63 (corresponding to the 84th through 90th percentiles) and clinically significant
scores are t-scores equaling or exceeding 64 (corresponding to the 91st percentile and greater). For the eight factors, borderline clinically significant scores range from t-scores of 65 through 69, with clinically significant scores equaling or exceeding 70.

According to Achenbach and Rescorla (2001), the CBCL demonstrates good internal consistency, with coefficient alphas ranging from .78 - .97 for the eight factors and three scale scores. In addition, the CBCL also evidences good stability, with test-retest correlations (over a mean interval of 8 days) ranging from .82 - .94 for the eight factors and three scale scores. Finally, the CBCL also correlates well with other behavior rating systems. In particular, as discussed by Achenbach and Rescorla, the CBCL correlated well with the Behavior Assessment System for Children (BASC) Scales. Correlations with the BASC ranged from .54 - .89 for the various factors and the internalizing, externalizing, and total problems scales.

*ADHD-Symptoms Rating Scale.* Parents completed the ADHD-SRS, a 56-item standardized, norm-referenced rating scale that was designed to assess behaviors that are typical of ADHD in children and adolescents aged 5 to 18 years (Holland, Gimpel, & Merrell, 2001). The ADHD-SRS asks parents and/or teachers to rate the frequency of children’s behaviors on a 5-point scale with choices ranging from “behavior does not occur” (corresponding to a score of 0) to “behavior occurs one to several times an hour” (corresponding to a score of 4).

A factor analysis conducted by the authors yielded two subscales, the hyperactive-impulsive (H-I) subscale and the inattentive (IN) subscale. These subscales correspond well with the hyperactive-impulsive and inattentive subtypes delineated by the *DSM-IV*-
Based upon standardization results, norms are provided for males, females, and males and females combined. Norms are also provided for two age ranges, 5-11 years of age and 12-18 years of age. Furthermore, separate norms are provided for parents' and teachers' ratings of children's behaviors. The resulting raw scores on the H-I, IN, and total scales are converted to t-scores and percentile ranks. Subsequently, the percentile ranks can be used to assess the child's overall risk level for ADHD, as well as risk levels for the two subtypes of ADHD.

According to Holland et al. (2001), the ADHD-SRS demonstrates good internal consistency, with median alpha coefficient values for single age levels ranging from .97-.99. Holland et al. also provided test-retest reliability information based on teachers' ratings over a 2-week time interval. The ADHD-SRS demonstrated high stability over the 2-week interval, with correlations ranging from .93-.98. In addition, the subscales and total scale of the ADHD-SRS correlated well with several commonly used ADHD rating scales, thus demonstrating adequate concurrent validity.

Children's Hostility Inventory. Parents also completed the Children's Hostility Inventory (CHI) to assess for the presence and severity of aggressive behaviors demonstrated by their children. The CHI is a 38-item measure that was constructed from the Buss-Durkee Hostility Inventory that assesses aggression and hostility in adults (Kazdin, Rodgers, Colbus, & Siegel, 1987). Derived from factor analysis, the CHI has two factors, aggression and hostility. In addition, the CHI contains the following subscales: assaultiveness, indirect hostility, verbal hostility (which all load on the aggression factor) and resentment, suspicion, and irritability (which all load on the
hostility factor). Furthermore, there is a negativism subscale which only loads on the total score.

The CHI was normed on a clinical sample of children. According to Kazdin et al. (1987), the CHI demonstrates good internal consistency, with an average coefficient alpha of .82 across the seven subscales. In addition, the CHI positively correlated with other measures of aggression, including the externalizing scale of the CBCL (Achenbach, 1991). Furthermore, children with diagnoses of CD scored significantly higher on most subscales of the CHI than children with other psychiatric diagnoses, thus evidencing good ability to discriminate children with and without CD. Though there is limited research that has utilized the CHI, a recent study (Williams, Waymouth, Lipman, Mills, & Evans, 2004) utilized the CHI as a means of evaluating the effectiveness of an anger management program for children. Williams and her colleagues chose to utilize the two main factors of the CHI (aggression and hostility) as a means of assessing change, thus suggesting more empirical support for use of the factors instead of the seven subscales; however, the authors did not specifically evaluate the psychometric properties of the factors.

**Parent Measure of Discipline Style**

Information about parents’ discipline styles was obtained through use of the Parenting Scale, which was developed by Arnold et al. (1993). This 30-item scale was designed to assess particular discipline strategies associated with childhood externalizing disorders. This self-report measure asked parents to rate themselves on a 7-point scale. For each item, there is a “discipline mistake” listed as one anchor and the effective
counterpart of the mistake listed as a second anchor. Parents indicated on the scale where their parenting behavior typically falls. Arnold et al. conducted a principal-components factor analysis on a sample of 168 mothers which yielded three factors, “laxness,” “overreactivity,” and “verbosity.” In addition, a Parenting Scale Total score is derived by averaging the ratings of all 30 items. Higher scores on the three subscales and the total score indicate higher levels of dysfunctional parenting. Arnold et al. suggested that laxness and overreactivity are equivalent to Baumrind’s (1966) conceptualizations of permissive and authoritarian parenting styles, respectively. Verbosity does not correspond to a parenting style; however, Arnold et al. (1993) suggested that high verbosity scores may indicate use of lengthy verbal responses that could serve to reinforce children’s problematic behaviors.

Arnold et al. (1993) reported the internal consistency of the laxness, overreactivity, verbosity, and total scores to be .83, .82, .63, and .84, respectively. Over a 2-week period, the test-retest correlations for the laxness, overreactivity, verbosity, and total scores were .83, .82, .79, and .84, respectively. In addition, Arnold et al. demonstrated that scores on all of the scales (including the total score) correlated well with observed ratings of parental behaviors (correlations ranged from .82 - .88). Furthermore, the Parenting Scale scores also correlated well with parental ratings of their children’s externalizing behaviors. The correlations ranged from .22 - .54, with the verbosity scale having the lowest correlation and the overreactivity scale having the highest correlation.
According to O'Leary et al. (1993) the Parenting Scale was originally designed for use with children from 18 months to 48 months. However, Irvine et al. (1999) conducted an assessment of 298 parents of middle-school-aged children to assess the utility of the Parenting Scale for this age range. The authors conducted an exploratory factor analysis that yielded only two factors, the overreactivity and laxness factors. Irvine et al. included scale items that shared at least 30% of the variance of their respective factor to create a shortened, 13-item scale they titled Parenting Scale-Adolescent (PSA). The factors of the PSA significantly correlated with various measures of parents' behaviors, and measures of children's internalizing and externalizing behaviors. Further support for the two-factor structure (overreactivity and laxness) was found by Collett et al. (2001), who assessed a normative sample of 785 parents of children ranging in age from 2 to 12 years.

Finally, Harvey et al. (2001) validated use of the Parenting Scale with parents of children with ADHD. These authors again found support for only two of the original proposed factors, overreactivity and laxness. Harvey et al. found that both factor scores were significantly higher for parents of children with ADHD than parents of children without ADHD or other behavior problems. Based on the authors' analyses, this finding seemed to be accounted for by the presence of additional externalizing behaviors (e.g., aggression and conduct problems) in the children with ADHD.

This study utilized the Parenting Scale to assess for dysfunctional parenting practices employed by parents of the two groups of children. This represents the only known study to date that used the Parenting Scale to assess parenting practices of high-
school aged children. Based on assessment of the wording and content of the Parenting Scale items, this was deemed an appropriate instrument to assess this age range.

**Measures of Parental Psychopathology**

*Beck Depression Inventory- Second Edition.* The Beck Depression Inventory-Second Edition (BDI-II; Beck, Steer, & Brown, 1996) is a 21-item self-report measure used to assess for the presence and severity of depressive symptomatology in the parents of the two groups of children with ADHD. The items are based upon the *DSM-IV* criteria for depression. With the exception of two items, parents were asked to choose between four options for each item, which varied by question based on the particular symptom being assessed each question. For the two remaining items assessing changes in sleeping habits and appetite, parents rated the items based on seven options.

According to Beck et al. (1996), the BDI-II has good internal consistency with an alpha coefficient of .92 in a clinical sample of 500 outpatients and an alpha coefficient of .93 in a sample of 120 college students. In addition, the authors cited a 1-week test-retest correlation of .93. Furthermore, Beck et al. demonstrated that the BDI-II correlates well with other measures of depressive symptomatology. In particular, the BDI-II was positively correlated with the Hamilton Psychiatric Rating Scale for Depression \(r = .71, n = 87\), the Beck Hopelessness Scale \(r = .68, n = 158\), and the Scale for Suicide Ideation \(r = .37, n = 158\). In a clinical sample of college students, the BDI-II yielded a 93% true positive rate and 18% false positive rate with regard to a diagnosis of depression. Lastly, the BDI-II provides the following interpretative cutoff scores for total
scores: 0 - 13: none or minimal depression; 14 - 19: mild depression; 20 - 28: moderate depression; and 29 - 63: severe depression.

State-Trait Anxiety Inventory. The trait portion of the State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1969) was utilized to assess for the presence and severity of stable, dispositional anxiety in the parents of the two groups of children with ADHD. The STAI is a self-report instrument that is widely used in research and clinical practice. The trait portion of the STAI contains 20 items related to the presence and severity of anxiety symptomatology. Parents rated each item on a 4-point scale that ranges from “almost always” to “almost never.” The items are given a weighted score of 1 - 4 (with some items being reverse scored) and are totaled to yield a composite score.

According to Spielberger et al. (1969), the STAI is a stable test that yielded trait anxiety test-retest correlations ranging from .73 - .86 for a college sample and from .65 - .75 for a high school sample. In various age group samples, the trait anxiety portion of the STAI yielded alpha coefficients ranging from .89 - .96, thus evidencing good internal consistency. Lastly, according to Spielberger, the trait anxiety scale of the STAI correlated well with other measures of trait anxiety, with correlations ranging from .52 - .80.

Aggression Questionnaire. The Aggression Questionnaire (AQ) was completed by parents to assess for the presence and severity of various types of aggression. The AQ is a 34-item self-report measure that is a full revision of the Buss-Durkee Hostility Inventory, a well-used tool for assessing anger and aggression (Buss & Warren, 2000).
The AQ is comprised of five scales: Physical Aggression, Verbal Aggression, Anger, Hostility, and Indirect Aggression and yields scores for each scale as well as a Total score. Norms for the AQ are broken into various age categories and separate norms are provided for males and females for the Verbal Aggression and Physical Aggression scales. Items on the AQ were rated based on a 5-point Likert scale with choices ranging from “Not at all like me” to “Completely like me.” The AQ has adequate internal consistency with coefficient alphas ranging from .71 -.94 on the various scales (including the Total scale). Furthermore, in previous research the AQ moderately correlated with various anger and provocation inventories, thus evidencing adequate concurrent validity.

Procedures

Prior to recruiting any participants the study was fully approved by the Utah State University Institutional Review Board. Parent participants were recruited by contacting parents of children previously diagnosed with ADHD. In all cases, only parents who expressed interest in the study were provided with the packet of study questionnaires. A majority of these parents were contacted through several Utah chapters of Children and Adults with Attention-Deficit/Hyperactivity Disorder (CHADD). These parents were either recruited in person (by the student investigator) at parenting classes hosted by CHADD, or were recruited via a letter sent out by the Davis County CHADD representative to parents on the Davis County CHADD mailing list. This letter was sent out to approximately 300 individuals on the mailing list. The letter requested that parents
interested in the study contact the student investigator via telephone or e-mail to ask questions about the study and/or express their willingness to participate in the study. Parents who were willing to participate were then sent a study packet. The study packet contained the following materials: two copies of the informed consent form (one for parents to sign and keep, and one to be signed and returned to the student investigator), all study questionnaires, an index card for parents to fill out indicating whether they would like to be contacted with overall study results and whether they would like to be entered in the incentive prize drawing, and a stamped, addressed envelope in which parents could return all completed materials to the student investigator.

Additionally, parents were recruited in several other ways. Parents whose children were receiving initial or ongoing treatment for ADHD at the Center for Persons with Disabilities (CPD; a part of Utah State University) were contacted by an employee of the CPD to see if they would be interested in participating in the study. These interested parents were provided with a study packet, which they completed and mailed back to the student investigator. A few parents were also recruited from an ongoing ADHD research study being conducted at Utah State University. These parents had expressed interest in the current research study and were provided with a study packet by the student investigator.

Because parent participants were recruited by so many different methods, a master list of parents who expressed interest in the study was not kept. However, it appeared that there were low return rates of study packets after parents expressed interest in the study. Due to the low return rates, recruitment was expanded to include two
newspaper advertisements in local newspapers. Only two interested parents replied to these ads. They were provided with study packets, which were mailed back to the student investigator. Additionally, a few parent participants were recruited through the Mankato Clinic, a primary care clinic in Minnesota that also provides ongoing treatment to children with ADHD. These parents were recruited in person by a colleague of the student investigator. A few parents expressed interest in the study and were provided with study packets. In all cases, parents were provided with either brief verbal information regarding the study (e.g., the purpose of the study, who is eligible to participate, what is required to participate in the study, and incentives being offered for participation) or written information about the study (provided in the form of the letter mailed to Davis County CHADD members).

Following the completion of data collection, the names of parents who indicated wanting to be included in the incentive prize drawing were entered into the drawing. Three parents were selected for the three separate incentive prizes. The lowest level incentive was a pair of movie tickets to a local movie theater. The middle level incentive was a $25 Wal*Mart gift card, while the highest-level incentive was a $75 Wal*Mart gift card. Selected parents were contacted in writing to inform them that their names were selected to receive one of the incentives. The letter sent to parents included the incentive prizes.
CHAPTER IV
RESULTS

Descriptive Statistics

Descriptive statistics were analyzed to assure that children in both the externalizing group and the externalizing and internalizing group met the aforementioned required inclusion criteria. Means and standard deviations for the CBCL and ADHD-SRS scaled scores are displayed in Table 3. These scores show that both groups met the criteria for being in at least the borderline range (t-scores of 60 and above) on the appropriate CBCL problems scales (the externalizing scale for both groups, and also the internalizing scale for the externalizing and internalizing group). Additionally, both groups met the criteria of being in at least the at-risk range for the ADHD-SRS (t-scores of approximately 60 and above).

Preliminary analyses were conducted to determine if expected differences emerged between the externalizing group and the externalizing and internalizing group in the areas of internalizing problems, and total problems (as assessed by the CBCL). Preliminary analyses for the two groups, including means, standard deviations, t values, p values, and effect size values for CBCL and ADHD-SRS raw scores appear in Table 4. These analyses show that there were statistically significant differences between groups on the CBCL in the expected areas of internalizing problems and total problems. These differences were expected because children in the externalizing group were required to only be rated as having externalizing problems in order to be included in this group for
### Table 3

**CBCL and ADHD-SRS Mean Scaled Scores**

<table>
<thead>
<tr>
<th>Child measures</th>
<th>Externalizing group $(n = 15)$</th>
<th>Externalizing and internalizing group $(n = 17)$</th>
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<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
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<tr>
<td>CBCL Internalizing</td>
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<tr>
<td>CBCL Total</td>
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<tr>
<td>ADHD-SRS Hyperactive-impulsive</td>
<td>68.00</td>
<td>7.50</td>
</tr>
<tr>
<td>ADHD-SRS Inattentive</td>
<td>70.60</td>
<td>4.53</td>
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<tr>
<td>ADHD-SRS Total</td>
<td>70.00</td>
<td>5.84</td>
</tr>
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</table>

### Table 4

**CBCL and ADHD-SRS Mean Raw Scores**

<table>
<thead>
<tr>
<th>Child measures</th>
<th>Externalizing group $(n = 15)$</th>
<th>Externalizing and internalizing group $(n = 17)$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>CBCL Internalizing</td>
<td>7.13</td>
<td>1.89</td>
</tr>
<tr>
<td>CBCL Externalizing</td>
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<td>8.54</td>
</tr>
<tr>
<td>CBCL Total</td>
<td>61.27</td>
<td>16.12</td>
</tr>
<tr>
<td>ADHD-SRS Hyperactive-impulsive</td>
<td>76.00</td>
<td>25.10</td>
</tr>
<tr>
<td>ADHD-SRS Inattentive</td>
<td>58.13</td>
<td>8.33</td>
</tr>
<tr>
<td>ADHD-SRS Total</td>
<td>134.13</td>
<td>30.84</td>
</tr>
</tbody>
</table>
this research study. Additionally, children in the externalizing and internalizing group were required to be rated as having both externalizing and internalizing problems (as assessed by parent ratings on the CBCL) in order to be included in this group for this research study.

As expected, there were not statistically significant differences between groups on hyperactive-impulsive, inattentive, or total ADHD symptoms, as measured by the ADHD-SRS. Because all children in this research study were required to have a diagnosis of ADHD, and were required to be rated by parents as having ADHD symptoms in at least the at-risk range, it was expected that there would not be differences in ADHD symptoms between the externalizing group and the externalizing and internalizing group.

Relationships Between Parenting Style, Parent Psychopathology, Child Aggression, and Externalizing and Internalizing Problems

The first objective of this study was to examine the relationships between externalizing and internalizing problems and the following variables: parenting style, parent psychopathology (e.g., depression, anxiety, and antisocial characteristics such as aggression), and child aggression. These variables were all measured via parents' self-reports or parents' reports of children's behaviors. These relationships were analyzed through use of Pearson correlations.
Statistically significant correlations were not found between parenting style variables (parent laxness, overreactivity, or total parenting scores) and externalizing or internalizing problems. Higher reports of parent laxness or parent overreactivity were surprisingly not associated with either externalizing or internalizing problems in children. This did not support the hypothesis that higher ratings of parent laxness and overreactivity would be associated with higher ratings of child externalizing problems. Additionally, these results did not support the hypothesis that higher ratings of parent overreactivity would be associated with higher ratings of child internalizing problems.

In the area of parent psychopathology, statistically significant correlations were found between internalizing problems and the following variables: total parent anxiety scores, parent physical aggression, parent anger, and total parent aggression scores. Higher reports of parent anxiety, physical aggression, anger, and total aggression were associated with higher ratings of internalizing problems in children. Statistically significant correlations were not found between any of the parent psychopathology variables and parents’ ratings of externalizing problems. These findings did not support the hypothesis that higher ratings of parent depression and parent aggression would be associated with higher ratings of child externalizing problems. Additionally, these findings did not support the hypothesis that higher ratings of parent depression would also be associated with higher ratings of child internalizing problems. Hypotheses were not made regarding the association between parent aggression and child internalizing problems or regarding the association between parent anxiety and child externalizing or internalizing problems.
Statistically significant correlations were found between child hostility and internalizing problems. Higher parent-reported hostility ratings of children were associated with higher ratings of internalizing problems. This result supported the hypothesis that higher ratings of child aggression (in this case, a form of aggression, hostility) would be associated with higher ratings of child internalizing problems. Additionally, as expected, there was a statistically significant correlation between child aggression and externalizing problems. Higher parent-reported aggression ratings of children were associated with higher ratings of externalizing problems. This finding was expected because aggression is a type of externalizing problem; thus children that are rated with higher aggressive behaviors would be expected to be rated as having higher overall levels of externalizing problems. The results of all correlational analyses are presented in Table 5.

Differences Between Externalizing Only and Externalizing and Internalizing Groups on Parenting Style, Parent Psychopathology, and Child Aggression Variables

The second objective of this study was to determine if there were any statistically significant differences between the externalizing group and the externalizing and internalizing group on the following variables: parenting style, parent psychopathology, and child aggression. Statistically significant differences were not found between the groups on any of the parenting style variables (i.e., laxness, overreactivity, or total
Table 5

Total Sample Correlations Between CBCL Internalizing and Externalizing Scales and Parenting Style, Parent Psychopathology, Parent Aggression, and Child Aggression

<table>
<thead>
<tr>
<th>Parenting style</th>
<th>CBCL internalizing</th>
<th>CBCL externalizing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parenting characteristics</td>
<td>n</td>
<td>r</td>
</tr>
<tr>
<td>Lax</td>
<td>31</td>
<td>.224</td>
</tr>
<tr>
<td>Overreactive</td>
<td>30</td>
<td>.190</td>
</tr>
<tr>
<td>Parenting Scale total score</td>
<td>30</td>
<td>.210</td>
</tr>
<tr>
<td>Parent psychopathology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beck Depression total score</td>
<td>30</td>
<td>.324</td>
</tr>
<tr>
<td>State Trait Anxiety total</td>
<td>32</td>
<td>.503**</td>
</tr>
<tr>
<td>Parent aggression</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical aggression</td>
<td>32</td>
<td>.545**</td>
</tr>
<tr>
<td>Verbal aggression</td>
<td>32</td>
<td>.093</td>
</tr>
<tr>
<td>Anger</td>
<td>32</td>
<td>.434*</td>
</tr>
<tr>
<td>Hostility</td>
<td>31</td>
<td>.328</td>
</tr>
<tr>
<td>Indirect</td>
<td>32</td>
<td>.256</td>
</tr>
<tr>
<td>Total aggression score</td>
<td>31</td>
<td>.474**</td>
</tr>
<tr>
<td>Child aggression</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHI hostility</td>
<td>31</td>
<td>.491**</td>
</tr>
<tr>
<td>CHI aggression</td>
<td>30</td>
<td>.045</td>
</tr>
<tr>
<td>CHI total score</td>
<td>30</td>
<td>.318</td>
</tr>
</tbody>
</table>

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

A hypothesis had not been made regarding this research question. Effect sizes were calculated to determine the clinical significance of between group differences on the various parent-related and child-related variables. Cohen (1988)
suggested the following interpretation guidelines regarding effect sizes: .20 should be considered small, .50 moderate, and .80 and higher should be considered a large effect size. There were no clinically meaningful differences found between the groups on any of the parenting style variables.

There were no statistically significant differences found between the groups on any measures of parent psychopathology (i.e., depression, anxiety, and aggression). Small effects were found in differences between the externalizing group and the externalizing and internalizing group on the following variables: parent depression, parent anxiety, parent anger, parent indirect aggression, child aggression, and total CHI scores (a combination of child aggression and child hostility). In the case of all of these variables, the externalizing and internalizing group had higher mean scores than the externalizing group. This suggests that these differences between the groups may have some clinical meaning. Additionally, these results suggest that parents of children with ADHD and both externalizing and internalizing problems may have a tendency toward higher psychopathology ratings than parents of children with ADHD and externalizing problems only. These results also suggest that children with ADHD and both externalizing and internalizing problems may have a tendency toward higher overall aggression ratings than children with ADHD and externalizing problems only.

There was a statistically significant difference between the groups on parent-related child hostility. Children from the externalizing and internalizing group had significantly higher mean ratings of hostility than children from the externalizing only group. In addition to being statistically significant, a large effect size was found for the
group difference in parent-reported child hostility. This suggests that the finding has clinical significance as well as statistical significance. Table 6 summarizes the \( t \)-test findings.

Table 6

**Analyses of \( t \)-Tests Comparing Externalizing Only and Externalizing and Internalizing Groups on Measures of Parenting Style, Parent Psychopathology, Parent Aggression, and Child Aggression**

<table>
<thead>
<tr>
<th>Parent and child measures</th>
<th>Externalizing group ((n = 15))</th>
<th>Externalizing and internalizing group ((n = 17))</th>
<th>( t )</th>
<th>( p )-value</th>
<th>ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parenting style</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lax</td>
<td>2.66 .749</td>
<td>2.59 .809</td>
<td>.220</td>
<td>.827</td>
<td>0.08</td>
</tr>
<tr>
<td>Overreactive</td>
<td>3.16 .677</td>
<td>3.28 .662</td>
<td>-.482</td>
<td>.634</td>
<td>0.18</td>
</tr>
<tr>
<td>Total score</td>
<td>3.16 .562</td>
<td>3.17 .450</td>
<td>-.072</td>
<td>.943</td>
<td>0.03</td>
</tr>
<tr>
<td>Parent psychopathology</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression total score</td>
<td>8.85 7.11</td>
<td>12.35 9.89</td>
<td>-1.08</td>
<td>.289</td>
<td>0.40</td>
</tr>
<tr>
<td>Anxiety total score</td>
<td>36.93 8.33</td>
<td>40.76 9.78</td>
<td>-1.24</td>
<td>.225</td>
<td>0.44</td>
</tr>
<tr>
<td>Parent aggression</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical</td>
<td>10.47 3.16</td>
<td>10.76 4.45</td>
<td>-.216</td>
<td>.831</td>
<td>0.07</td>
</tr>
<tr>
<td>Verbal</td>
<td>8.80 2.24</td>
<td>9.06 3.05</td>
<td>-.270</td>
<td>.789</td>
<td>0.10</td>
</tr>
<tr>
<td>Anger</td>
<td>12.80 3.65</td>
<td>14.00 4.50</td>
<td>-.821</td>
<td>.418</td>
<td>0.29</td>
</tr>
<tr>
<td>Hostility</td>
<td>14.36 5.18</td>
<td>14.94 5.89</td>
<td>-.290</td>
<td>.774</td>
<td>0.10</td>
</tr>
<tr>
<td>Indirect</td>
<td>10.53 2.59</td>
<td>11.18 3.61</td>
<td>-.572</td>
<td>.572</td>
<td>0.20</td>
</tr>
<tr>
<td>Total score</td>
<td>57.43 10.62</td>
<td>59.94 16.56</td>
<td>-.490</td>
<td>.628</td>
<td>0.18</td>
</tr>
<tr>
<td>Child aggression</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHI hostility</td>
<td>5.53 2.83</td>
<td>8.56 2.63</td>
<td>-3.09</td>
<td>.004**</td>
<td>1.11</td>
</tr>
<tr>
<td>CHI aggression</td>
<td>13.29 2.46</td>
<td>12.75 2.57</td>
<td>.581</td>
<td>.566</td>
<td>0.21</td>
</tr>
<tr>
<td>CHI total</td>
<td>20.79 5.09</td>
<td>23.13 5.03</td>
<td>-1.26</td>
<td>.217</td>
<td>0.46</td>
</tr>
</tbody>
</table>
Best Predictors of Group Membership

(i.e., Externalizing Only Group Versus the Externalizing and Internalizing Group)

Because there was only one statistically significant difference found between the groups (child hostility), an analysis of best predictors was not conducted. The results of this study suggest that higher ratings of child hostility would predict higher levels of internalizing symptoms in children who also have clinically elevated externalizing symptoms. However, the results of this study did not support any group membership predictors in the areas of parenting style or parent psychopathology.
CHAPTER V
DISCUSSION

Overview

The purpose of this study was to determine if there are significant associations between parenting style, parent psychopathology, and comorbid externalizing and/or internalizing problems in children with ADHD. Another aim of this study was to determine if there is a significant association between child aggression and comorbid externalizing or internalizing problems in children with ADHD. Additionally, this study sought to determine if there are significant differences between a group of children with ADHD and externalizing problems and a group of children with ADHD and both externalizing and internalizing problems on the following variables: parenting style, parent psychopathology (e.g., parent aggression, parent depression, and parent anxiety), and child aggression. Overall, the findings of this study did not support one of the main hypotheses that there would be significant relationships between parenting style variables and externalizing or internalizing problems in children. Additionally, only one significant difference was found between the group of children with ADHD and externalizing problems and the group of children with ADHD and both externalizing and internalizing problems. This precluded analysis of the best predictors of group membership when looking at the two groups of children with ADHD (i.e., those with externalizing problems only and those with externalizing and internalizing problems).
Despite the limited findings, this study does contribute to existing literature on comorbidity in children with ADHD. Additionally, the findings of this study contribute unique information regarding children with ADHD who have both externalizing and internalizing problems, an area that has not received much research attention in the past. The results of this study provide support for relationships between parent psychopathology (i.e., parent anxiety and parent aggression) and child internalizing problems. Significant relationships were also found between child hostility and child internalizing problems and child aggression and child externalizing problems. These results support prior research that has showed a consistent relationship between child aggression and both internalizing and externalizing problems in community samples of children; however, this study contributes more information to the small research available specific to children with ADHD and the relationship between aggression and internalizing problems. Additionally, significantly higher mean hostility ratings were reported for the group of children with ADHD and both externalizing and internalizing problems than those with only comorbid externalizing problems. Overall, these findings suggest the importance of assessing for different types of comorbid problems in children with ADHD, as well as assessing for various factors that are associated with these problems. This could lead to more thorough, comprehensive treatment for children with ADHD and various comorbid problems.
The first objective of this study was to examine the relationships between externalizing and internalizing problems in a sample of children with ADHD and the following variables: parenting style, parent psychopathology (e.g., depression, anxiety, and aggression), and child aggression (e.g., hostility and overt acts of aggression). Statistically significant correlations were not found between parenting style factors (e.g., laxness and overreactivity) and internalizing or externalizing problems in this sample of children with ADHD. Given previous research that suggested that higher parent reports of overreactivity or laxness (as measured by the Parenting Scale; Arnold et al., 1993) are typically associated with externalizing problems in children, it was surprising that in this study neither overreactivity or laxness were significantly correlated with externalizing problems. Additionally, because overreactive parenting styles are hypothesized to potentially lead to low self-esteem, depression, and/or anxiety in children, it was also surprising that higher parent reports of overreactivity were not correlated with higher reports of child internalizing problems. Laxness has not been as strongly linked to child internalizing problems in previous literature, thus a hypothesis regarding this association was not made for this study.

One possible explanation for these surprising findings is that the Parenting Scale was designed for use with preschool age children, while the mean age of the children
rated in this study was 10.19 years of age ($SD = 2.92$). However, previous research (Irvine et al., 1999) supported use of a modified 13-item version of the Parenting Scale with an adolescent population. In the current research study the original, 30-item scale was used, thus suggesting some questions may not have been as appropriate for this older sample of children with ADHD. Despite this possibility, other research (Collett et al., 2001; Harvey et al., 2001), supported use of the full version of the Parenting Scale with children as old as 12 years of age. Specifically, Collett and colleagues utilized a community sample of children that ranged in age from 2 - 12 years of age and found that the psychometric properties of the Parenting Scale remained strong with children in this age range. Harvey analyzed use of the Parenting Scale with a sample of children with ADHD who ranged in age from 8 - 12 years of age. The results of this study supported use of the Parenting Scale with an older sample of children with ADHD. Thus, it is unlikely that the age of the children in the current research study is the best explanation for the unexpected findings related to the lack of associations between laxness and externalizing problems and between overreactivity and externalizing or internalizing problems.

Another possible explanation for these surprising findings is that a majority of the sample were members of CHADD and had taken CHADD-sponsored parenting classes targeted for parents of children with ADHD. Specifically, 59.38% ($n = 19$) of parents indicated seeking some form of behavior management treatment for their children. Because of this, there is the potential that some parents perceived that they are
disciplining more effectively, despite all children in the study still having clinically significant (or borderline clinically significant) externalizing behavior problems.

With regard to the laxness scores in particular, it was noted that the mean scores for both the externalizing group \((M = 2.66, SD = .749)\) and the externalizing and internalizing group \((M = 2.59, SD = .809)\) were fairly low. These mean scores were similar to mean scores found in a community sample control group of 51 children \((M = 2.4, SD = .8)\) and were lower than mean scores found in a clinic group of 26 children \((M = 2.8, SD = 1.0; \text{Arnold et al., 1993})\). While the mean laxness scores found in the current research study were quite low, the mean overreactivity scores for both the externalizing only group \((M = 3.16, SD = .677)\) and the externalizing and internalizing group \((M = 3.28, SD = .662)\) were higher than the mean overreactivity scores of the clinic group used by Arnold and colleagues \((M = 3.0, SD = 1.0)\). It seems possible that parents would utilize either a lax or overreactive style, and not both; thus, in this sample of parents, potentially the overreactive style was favored. This could explain the low laxness scores found. This does not, however, address the issue that a significant correlation was not found between parent overreactivity and child externalizing or internalizing problems.

In the area of parent psychopathology, statistically significant correlations were found between parent anxiety and child internalizing problems, and between parent aggression and child internalizing problems. In both cases, higher levels of reported parent psychopathology were associated with higher ratings of child internalizing problems. Both of these findings contribute unique results to an inconclusive body of
literature regarding parent psychopathology and correlations with child internalizing problems. Given that anxiety is likely influenced at least partially by genetics, it makes sense that parent anxiety would be associated with child internalizing problems. Additionally, a modeling effect could also explain these results. With regard to parent anxiety, it would seem likely that parents who outwardly exhibit anxious behaviors and/or anxious coping methods would model these behaviors for their children. With regard to parent aggression, it would seem likely that aggression acted out against their children would be related to the presence of internalizing problems in children.

A surprising finding, particularly when utilizing a modeling effect theory, was that parent aggression was not significantly correlated with externalizing problems in children. It would be expected that parents who model aggressive behaviors would be more likely to have children who demonstrate aggressive behaviors. A possible explanation for this finding is that previous research (Pfiffner et al., 1999) that found an association between parental externalizing characteristics and child externalizing problems specifically found associations between paternal APD and externalizing problems in boys with ADHD. The current study primarily utilized data from mothers and did not assess for APD due to difficulties in assessing APD through paper-and-pencil self-report measures. Therefore, it may be that the construct of aggression, though a symptom of APD, differs significantly from an actual diagnosis of APD, and subsequently is not as linked to externalizing problems in children. Additionally, it may be that for some reason only paternal aggression is associated with externalizing problems in children with ADHD. Unfortunately in the current research study data were
only analyzed for three fathers and a conclusion cannot be drawn regarding the relationship between paternal aggression and externalizing problems in children with ADHD.

The most surprising finding, in the area of parent psychopathology and correlations with child internalizing or externalizing problems, was the lack of statistically significant correlations between parent depression and externalizing problems or internalizing problems in children. Previous literature (e.g., Anastopoulos et al., 1992; Johnston, 1996; Johnston et al., 2002; Nigg & Hinshaw, 1998) has supported that parent depression is associated with the presence of various externalizing problems in children with ADHD. Additionally, other research (e.g., Jensen et al., 2001; Piffner et al., 1999) found that parent depression was also associated with internalizing problems in children. A possible explanation for the surprising results of this research study is that mean parent depression scores for both the externalizing group and the externalizing and internalizing group were in the “none-to-minimal range” of depression. Therefore, mean parent depression levels were not clinically elevated. The lack of significant correlations between parent depression and externalizing or internalizing problems in children might better reflect a restriction of range issue with regard to parent depression scores. Furthermore, the demographic form filled out by parents did not ask if parents had been diagnosed with any psychological disorders or had received treatment for any psychological disorders. Thus, parents in this sample could have had prior problems with depression but had received, or were currently receiving, successful treatment of their depressive symptoms. This would lead to reports of only minimal symptoms of parent
depression and would make significant correlations with comorbid problems in their children less likely.

A final explanation regarding the surprising findings that parent depression was not associated with either internalizing or externalizing problems in this sample of children with ADHD could be related to the sample size of this study. While the correlation between parent depression and internalizing problems was low \( (r = .324) \), with a larger sample size this correlation would have emerged as statistically significant. In this case, this would have supported the body of literature that has found parent depression to be significantly correlated with internalizing problems in children with ADHD. However, given the low correlation between parent depression and externalizing problems, it is unlikely that even with a larger sample size these variables would have been significantly correlated. This does not support the body of literature that has found parent depression to be significantly correlated with externalizing problems in children with ADHD.

In the area of child aggression, statistically significant correlations were found between parent reports of overt acts of child aggression and parent ratings of child externalizing problems, as well as between parent reports of child hostility and parent ratings of child internalizing problems. In the case of overt acts of child aggression, higher ratings of child aggression were associated with higher ratings of child externalizing problems. This finding fits well with the conceptualization that overt acts of aggression are a type of externalizing problem that children with ADHD may
experience. Thus, it would be expected that children rated as having more severe aggressive problems would also be rated as having higher externalizing problems.

The statistically significant correlation between higher ratings of child hostility and higher ratings of child internalizing problems warrants further discussion. While this research study did not initially offer separate hypotheses for child aggression and child hostility, the findings of this study do support that a form of child aggression (i.e., hostility) is associated with higher ratings of child internalizing problems. This was one of the initial hypotheses made in this study. Additionally, the finding regarding hostility in particular supports previous conceptualizations of the relationship between child hostility and child internalizing problems. Kazdin and colleagues (1987) suggested that items on the hostility factor of their CHI were related to internalized aggressive and/or hostile thoughts and feelings rather than overt behavioral acts of aggression.

Additionally, Vargo (1995) utilized a similar inventory (Hostility Inventory for Children-Revised; HIC-R; cited in Vargo) and conceptualized resentment, suspicion, and covert hostility as internalized constructs. Similar to the current research study, Kazdin and colleagues found a statistically significant correlation between the hostility factor of the CHI and the internalizing problems scale of the CBCL ($r = .52$) for a clinical sample of children. This fit well with their conceptualization of child hostility as an internalized construct. Additionally, Vargo found a statistically significant correlation between covert hostility and children being classified as withdrawn ($r = .45$). Being withdrawn is a widely accepted symptom of internalizing problems, and represents a subscale of the CBCL internalizing problems scale. Vargo's findings, similar to Kazdin's findings,
suggest that hostility and internalizing problems are related. The current study also offers support for this theory.

Differences Between Externalizing Only and Externalizing and Internalizing Groups on Parenting Style, Parent Psychopathology, and Child Aggression Variables

The second objective of this study was to determine if there were any statistically significant differences between the externalizing group and the externalizing and internalizing group on the following variables: parenting style, parent psychopathology, and child aggression. The major finding of this study was that there were no statistically significant differences between the groups, except in the area of child hostility. Children in the externalizing and internalizing group had statistically significantly higher mean ratings of hostility than children in the externalizing group. As mentioned previously, this fits well with the hypothesis that hostility is an internalized form of aggression (i.e., internal aggressive thoughts and feelings rather than overt acts of aggression), which was offered by Kazdin and his colleagues (1987). Though this form of internalization is quite different than the internalizing problems measured on the CBCL (e.g., depressive symptoms, anxiety symptoms), this finding could suggest that children who internalize one type of problem (e.g., aggression) may be more likely to internalize other problems (e.g., depression).
While no specific hypotheses were made with regard to this research question, it was still surprising that no other variables were found to significantly differ between the externalizing group and the externalizing and internalizing group. However, despite not meeting statistical significance, several small, clinically meaningful differences were found between the groups. In the areas of parent depression, parent anxiety, and parent aggression (specifically, parent anger and parent indirect aggression), effect sizes were found that approached moderate size. In all cases, the mean raw scores of the externalizing and internalizing group were higher than the mean raw scores of the externalizing group. With a larger sample size, these would have been statistically significant effects. This suggests that parents of children with ADHD and dual comorbidity (i.e., externalizing and internalizing problems) are prone to more psychopathology than parents of children with ADHD and comorbid externalizing problems. While it is impossible to determine if additional problems in children with ADHD cause additional psychopathology in parents or if more parent problems cause more problems in children with ADHD, this finding is still important with regard to assessment and treatment for both children with ADHD and their parents. Specifically, the findings of the current research study suggest that it may be important to assess for, and treat, parent psychopathology, to possibly prevent the development of comorbid problems in children with ADHD. Alternatively, these findings could suggest that it would be important to assess for, and treat, comorbid problems in children with ADHD as a way of possibly preventing the development of parent psychopathology.
Best Predictors of Group Membership (i.e.,
Externalizing Group Versus
the Externalizing and
Internalizing Group)

The third objective of this study was to determine what combination of the following variables: parenting style, parent psychopathology, and child aggression, best predicts group membership (i.e., membership in the externalizing group or the externalizing and internalizing group) for this sample of children with ADHD. Because only one statistically significant difference was found between the two groups, this research question was eliminated. However, as mentioned earlier, several differences between the externalizing group and externalizing and internalizing group were found to have clinical meaning, based on calculation of effect sizes. These differences were in the following areas: parent depression, parent anxiety, parent anger, parent indirect aggression, and parent ratings of child aggression. Had the group sample sizes been larger, potentially several other statistically significant differences would have emerged between the groups. This would have allowed for an analysis of the best predictors of group membership and potentially would have yielded information important for the assessment and treatment of children with ADHD, and their parents.
Implications for Assessment and Treatment of
Children with ADHD and Assessment
and Treatment of Parents of
Children with ADHD

Overall, these findings suggest several important implications for the assessment
and treatment of children with ADHD, as well as the potential assessment and treatment
of parents of children with ADHD. With regard to parent psychopathology, based on the
results of this study, it seems important to assess for the presence of parent problems,
such as anxiety and aggression. Because a significant correlation was found in this study
between these parent problems and higher ratings of child internalizing problems, it
would also be important to assess for the presence of child internalizing problems in
children with ADHD. Though it is impossible from these data to determine whether the
parent problems cause the child problems or vice versa, or if a third factor mediates this
relationship, it still appears important to gain information about these factors. This
information would be beneficial in providing more comprehensive, and potentially more
effective, treatment to children with ADHD, and their parents. Furthermore, this
information could be important to prevention of problems, as well. For example, if a
parent was assessed to have clinically significant anxiety and/or aggressive problems, and
the parent’s child with ADHD did not yet have comorbid internalizing problems,
provision of treatment for the parent’s problems may be important to preventing future
development of internalizing problems in the child with ADHD. Additionally, this could
work in the direction of detecting internalizing problems and trying to prevent
development of parent psychopathology by providing parents with training on various coping skills. Though in this research study a statistically significant correlation was not found between parent depression and child externalizing and/or internalizing problems, it would likely be important to assess for this factor, too, given previous research that has linked parent depression to externalizing and internalizing problems in children with ADHD.

The major finding of this study showed that parent ratings of child hostility are associated with internalizing problems in this sample of children with ADHD. With regard to assessment and treatment of children with ADHD, this result has several implications. In particular, this finding suggests that it is important for clinicians to assess not only for the presence of overt acts of aggression (which are associated with comorbid externalizing problems), but also for child hostility. Child hostility, as suggested by Kazdin and colleagues (1987) and by Vargo (1995), might take on the form of more covert thoughts and feelings. Because there is the potential that more covert problems could be overlooked in favor of more overt behavior problems, assuring that clinicians do assess for internalizing problems seems important to prevention, or more comprehensive treatment of internalizing problems in children with ADHD.

Limitations and Future Directions

The major limitations of this study are linked to the particular sample used in this study. The small sample size in this study limited the statistical power available in various analyses. There was only one statistically significant difference found, yet there
were seven clinically meaningful differences found when effect sizes were analyzed. This was likely due to the small sample size of this study. Future studies would benefit from larger sample sizes, in order to more effectively examine the differences that might exist between a group of children with ADHD and externalizing problems and a group of children with ADHD and both externalizing and internalizing problems.

A second limitation of this sample was that the sample was comprised primarily of parents affiliated with the CHADD organization, who had behavior management training provided through CHADD-sponsored parenting classes. This is not typical of most parents of children with ADHD, and could reflect a unique sample of individuals who are more educated and willing to seek out help for their children. It is noteworthy that in this sample an overwhelming majority of parents (n = 31; 96.88%) also reported that their child was currently being treated for ADHD with medication. Though this could be looked at as a limitation of the study if children’s symptoms were eliminated with the use of medication, all children in this study were required to still be rated in at least the at-risk range with regard to ADHD symptoms. Additionally, a vast majority of parents were from Utah, again limiting the generalizability of the findings of this study. Future studies would benefit from use of a more typical sample of parents of children with ADHD (i.e., those without behavior management training), from more geographically diverse locations. Furthermore, it would be interesting for future studies to look at children with ADHD who are not being treated with medication to determine how this affects the results. However, it seems likely that this type of sample would be
difficult to find, as medication is the most common form of treatment that children with ADHD receive.

A third limitation of this study was the use of a small sample that included children of both genders. Due to the small numbers of girls in each group, separate analyses based on gender were not completed. This makes it impossible to determine if there were gender differences on the various variables studied. Future studies would benefit from use of large samples of both girls and boys to determine if there are significant differences based on gender. If differences were found, this would potentially also have important implications for the assessment and treatment of children with ADHD.

Finally, though this study intended to include data from both mothers and fathers, an overwhelming majority of the data used were from mothers. Because there were data used from three fathers, it is difficult to determine how this might have affected the overall study results. Additionally, the concept of parenting similarity (i.e., how much parents agree on various parenting variables) was not able to be analyzed in this study. Future studies would benefit from equal numbers of mothers and fathers, who provide data on the same child with ADHD. Therefore, variables could be examined separately by the two different types of parents, and an effort could be made to examine parenting similarity.
REFERENCES


Demographic Information

Parent Information

1) Relationship to child (Check One):
   ___ biological parent  ___ adoptive parent  ___ legal guardian
   ___ other

2) Highest level of education completed (Check One):
   ___ did not complete high school
   ___ completed high school
   ___ completed some college
   ___ completed college
   ___ completed graduate/postgraduate education

3) Current marital status (Check one):
   ___ married  ___ never married  ___ separated/divorced  ___ widowed

Child Information

1) Child’s age: _____

2) Child’s grade level: _____

3) Child’s gender (Check one):
   ___ male  ___ female

4) Child’s ethnicity (Check one):
   ___ Latino/a  ___ African American  ___ Caucasian
   ___ Asian  ___ Native American  ___ Other __________________

5) When was your child diagnosed with ADHD (please provide year): _________

6) What subtype of ADHD does your child have (Check one):
   ___ Combined (Hyperactive-Impulsive & Inattentive)  ___ Inattentive
   ___ Hyperactive-Impulsive  ___ Don’t Know
* QUESTIONS CONTINUED ON NEXT PAGE *
7) Please indicate any treatment (including medications or therapy) your child receives for his/her ADHD (Check one):

  ___ Medication (Please provide name of medication(s):

  ________________________________________________________________)

  ___ Behavior Management Therapy

  ___ Other (Please specify:

  ________________________________________________________________)

8) Has your child been diagnosed with any other psychological and/or behavioral disorders?

  ___ no  ___ yes

(please specify which ones) ___________________________________________