SEX AND DEVELOPMENTAL DIFFERENCES IN THE PREVALENCE OF DISRUPTIVE BEHAVIOR DISORDER SYMPTOMS IN A PEDIATRIC SAMPLE

By

ELIZABETH K. LEFLER

Bachelor of Arts in Psychology

University of Nebraska - Lincoln

Lincoln, Nebraska

2003

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
MASTER OF SCIENCE
December, 2005

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Thesis Approved:

Cynthia Hartung, Ph.D.

Thesis Adviser

Douglas Scambler, Ph.D.

Maureen Sullivan, Ph.D

A. Gordon Emslie, Ph.D.

Dean of the Graduate College

ACKNOWLEDGEMENTS

I would like to express my gratitude to Dr. Cynthia Hartung for the countless hours that she has dedicated to this project and for her words of encouragement. I am also appreciative of my committee members, Dr. Douglas Scambler and Dr. Maureen Sullivan for their time and effort; as well as to my lab-mates, Monica Armendariz, Benjamin Sigel, and Carrie Little for their support. Additionally, this project would not have been possible without the dedicated undergraduate research assistants of the Disruptive Behavior Disorders lab, including Chelsea Bauer, Devin Hinds, Sara Penning, Brandi Shaw, David Short, Karen Stockwell, Laticia Wiggins, and especially Katie Gordon. Lastly, I would like to thank my family and friends whose unconditional love, support, encouragement, and humor have been invaluable.

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CHAPTER I

INTRODUCTION

The Disruptive Behavior Disorders (DBDs), as defined in the *Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition* (*DSM-IV*; American Psychiatric Association, 1994), are Attention Deficit/Hyperactivity Disorder (ADHD), Oppositional Defiant Disorder (ODD), and Conduct Disorder (CD). Historically, researchers interested in the DBDs have focused their efforts on exploring the development and manifestation of these disorders in boys (e.g. Hart, Lahey, Loeber, & Hanson, 1994; Pelham, Gnagy, Greenslade, & Milich, 1992). It is simply not appropriate to gather information from samples of boys and generalize the resulting data to girls. However, the historical tendency to study only one sex in the DBDs is likely due to several factors.

First, researchers can study boys with behavior problems more easily than girls with behavior problems because significantly more boys than girls have these disorders (APA, 1994). For example, it has been estimated that the ratio of boys to girls with ADHD is between 2 to 1 and 9 to 1 (APA, 1994) depending on the setting of the study (i.e., clinic vs. community samples). Also, according to Maughan, Rowe, Messer, Goodman, and Meltzer (2004), sex differences were evident in CD and ODD in several recent studies, such that boys had higher rates of these disorders. However, they noted that sex differences in ODD were not statistically significant and were very inconsistent.

Also, it appears that CD is more common in boys than girls at all age points, but the difference between boys and girls decreases in the mid-teen years. ODD, on the other hand has inconsistent findings with regard to age. Likewise, the *DSM-IV* notes that CD is more common in boys than girls overall, and that ODD is more common in boys before puberty, but equally common in boys and girls after puberty (APA, 1994). Thus, it seems that overall, more boys than girls have a DBD.

Second, adding a small number of girls with DBDs to a research study introduces variability to the results, and may not provide enough power to examine main effects of sex. If this is the case, then the inclusion of girls in the study may actually reduce the external validity of the results for boys, or yield results that are still only relevant for boys (Crick & Zahn-Waxler, 2003).

Third, boys' problems tend to manifest themselves in a more overt fashion. For example, young boys are overwhelmingly more likely than young girls to exhibit externalizing problems, such as ODD, CD, and physical aggression (Crick & Zahn-Waxler, 2003). Thus, because boys' problems may be more obvious, parents and teachers might more easily identify boys with behavior problems, and seek treatment for them.

Finally, boys' problem behavior is more likely to cause harm to the self or others (Crick & Zahn-Waxler, 2003). Because of the implications of physical harm, boys' problems tend to seem more serious to the adults involved (Crick & Zahn-Waxler, 2003). These reasons have limited the study of DBDs in girls. Because of unbalanced prevalence rates and the differential manifestation of behavior problems, recruiting members of the minority sex for any disorder is often quite difficult (Crick & Zahn-Waxler, 2003). Thus, the historical trend to study only boys with DBDs is understandable, although no longer

acceptable. To more fully understand the complex development and manifestation of DBDs, sex differences need continued examination.

It has become increasingly evident that DBD research based on samples of mostly boys is not an adequate base for the extrapolation of knowledge about the development and manifestation of DBD symptoms in girls. Because most of the research in the past has been biased toward the externalizing problems of boys, the efforts to develop prevention and intervention strategies may have limited utility for use with girls (Gaub & Carlson, 1997). Thus, there is a need for either sex-neutral theories of the etiology of the DBDs, or theories that embrace the potentially different development and manifestation of these symptoms in girls and boys. New theories will aid in the development and implementation of intervention and prevention strategies that could be effective for both boys and girls (Keenan & Shaw, 1997).

According to Crick and Zahn-Waxler (2003), three major areas of sex differences in childhood psychopathology have been studied to date. First, prevalence rates have been fairly well researched, but there is still no overwhelming consensus about every aspect of sex prevalence rates. For example, little is known about why sex differences in prevalence rates change from childhood to adolescence. Investigating sex differences across the lifespan is integral to more fully understanding whether sex differences are real, or are a product of biases in sampling and/or diagnostic criteria (Hartung & Widiger, 1998).

Second, sex differences in the etiologies of various psychopathologies have received some attention. In particular, with regard to the DBDs, differential time of onset has been studied. It seems that more boys than girls develop childhood-onset disorders,

whereas more girls than boys first display symptoms during adolescence (Moffitt, Caspi, Rutter, & Silva, 2001). Furthermore, it has been found that parenting factors are differentially related to the development of psychopathology in boys and girls. For example, Cole, Teti, and Zahn-Waxler (2003) found that anger directed toward preschool boys by their mothers was associated with later conduct problems, but that the same behavior was associated with decreased problems for girls. Clearly more research is needed to understand sex differences in the development and course of psychopathology.

Finally, the differential manifestation of symptoms has been of interest to researchers in this area. Specifically, externalizing symptomatology has historically been studied in terms of overt, physical aggression. Crick and Grotpeter (1995) however, have introduced the term 'relational aggression' to help researchers better understand aggression in girls. Relational aggression is a deliberate attempt to inflict harm on peers, just like traditional physical aggression, but involves social types of harm such as rumor starting and social isolation. This example illustrates that the manifestation of DBD symptomatology can be very different for boys and girls. More research is needed in this area to ensure the accurate identification of boys and girls with externalizing problems.

Continued research on sex differences in childhood externalizing disorders is needed to determine whether the results of previous studies of boys are generalizable to girls in terms of diagnosis, treatment, and prevention. Squires, Bricker, Heo, and Twombly (2001) emphasized the need for prevention and intervention strategies for all young children evidencing problem behaviors. This purportedly will reduce the number of children in special education placements and the rates of incarceration. It is important to be able to identify all children early because there are serious repercussions for both

boys and girls struggling with DBDs. For example, young children with overt behavior problems have been found to have continued problems later in life (Campbell, 1997). More specifically, both boys and girls who have symptoms of hyperactivity and aggression at the preschool level are at much higher risk of continued problems than their counterparts who did not have any overt problem behaviors as children. These later problems include not only future externalizing disorders, but also internalizing disorders, school problems, social isolation, and attention problems (Stormont, 2000). Therefore, the implications for not correctly identifying girls with externalizing behavior problems will likely impact their future mental health and adjustment. Expanding the knowledge base in the area of sex differences in externalizing behavior problems is critical for ensuring that girls receive treatment when necessary.

In a review of sex differences in mental disorders, Hartung and Widiger (1998) presented data that suggest women are at a greater risk of adult psychopathology than would be predicted by girls' lower rates of childhood psychopathology. Specifically, Hartung and Widiger reported that 17 of the 21 *DSM-IV* disorders usually first diagnosed in infancy, childhood, or adolescence are more common in boys than girls, whereas of the 80 disorders usually first diagnosed in adulthood, for which sex ratios are available, 35 are more common in men, 31 more common in women, and 14 are equally common in both sexes. This research points to either the lack of identification of young girls with psychopathology or to a discontinuous pattern of psychopathology in females. In either case, more research is warranted to uncover the reasons for the differential development and manifestation of psychopathology in girls and women.

Because of the tendency for boys' behavior problems to manifest themselves in more overt and physically dangerous ways, boys are far more likely to be referred to, and seen in a clinic for treatment (Callahan, 1994). Also, the differential comorbidity hypothesis posits that because boys are more likely to have a comorbid disorder, they are consequently more likely to be referred for treatment (Hartung et al., 2002). These factors lead to falsely inflated estimates of the prevalence rates of boys with DBDs, and falsely deflated estimates of girls with the same problems, in studies emerging from clinic settings. Clinics simply see more boys, which confounds any results regarding differential sex prevalence rates coming out of clinic research. Therefore, it is necessary to investigate sex differences in large, community based studies in order to obtain accurate prevalence estimates.

CHAPTER II

REVIEW OF LITERATURE

Theories of sex differences in DBD prevalence rates

There are several theories that attempt to explain the differential sex prevalence rates in the Disruptive Behavior Disorders (DBDs). Because ADHD is the most common DBD, it is not surprising that there are more theories about differential sex prevalence rates for ADHD than for ODD or CD. However, because of the high rates of comorbidity between all three of the DBDs, theories developed for ADHD may generalize to CD and ODD. Likewise, theories regarding specifically ODD or CD may have some utility for use with ADHD.

Keenan and Shaw (1997) presented two leading theories about the development of girls' early problem behaviors. First, Keenan and Shaw point out that young girls with problem behaviors may be socialized *out of* externalizing problems and *into* internalizing problems. The idea is that toddler girls with behavior problems are more strongly discouraged from acting out compared to toddler boys with behavior problems. Basically, being anxious, withdrawn, and dependent is considered normative for girls, whereas acting-out and physical aggression are thought to be negative attributes in girls. In a study by Kerig, Cowan, and Cowan (1993) girls more often than boys were ignored by their parents when they attempted to make declarations or direct play activities and were

reinforced more than boys for compliance. This type of sex-stereotyped reinforcement is not limited to the home. It has also been established that teachers respond more negatively to highly active girls than to highly active boys (Fagot, 1984).

The second theory presented by Keenan and Shaw (1997) to explain the differential sex prevalence rates of the DBDs is related to girls developing more quickly than their male counterparts. This theory posits that because girls tend to develop cognitively, emotionally, and physically more rapidly than boys, they 'outgrow' externalizing problem behaviors more quickly. For example, according to Eme (1992), at school-entry girls are typically one year ahead of boys socially, cognitively, and physically, and are two years ahead of boys in these areas at puberty. Both theories presented by Keenan and Shaw have garnered moderate support, and a theory that integrates the two ideas is likely to gain additional support.

Another pair of theories regarding the differential sex prevalence rates in ADHD suggests differential etiologies for boys and girls. These theories are presented by Eme (1992) and Silverthorn, Frick, Kuper, and Ott (1996). The first model is called the polygenetic multiple threshold model (PMT). This theory states that many factors, including genetic and environmental factors, result in a person developing a disorder. The individual's liability, or sum of all risk factors, must cross a certain threshold to develop the disorder. In relation to ADHD, the PMT model states that there is a quantitative difference in etiology such that girls need more risk factors to reach the threshold than boys.

The second theory in this line of thought is the constitutional variability (CV) model (Eme, 1992; Silverthorn, Frick, Kuper, & Ott, 1996). Unlike the PMT model, CV

holds that there are qualitative differences in the etiology of ADHD. Basically, this theory assumes that males have more diverse genetic characteristics, and are thus more likely to show mild forms of a disorder. Girls, on the other hand, only develop a disorder because of some kind of severe pathology, such as prenatal difficulties or a head trauma. Both theories have received some support, but the PMT model seems to have more support overall.

A theory is also emerging in reaction to the two sub-types of conduct disorder listed in the *DSM-IV* (APA, 1994). The *DSM-IV* distinguishes between childhood onset CD and adolescent onset CD, which is based on research with boys (McCabe, Hough, Wood, & Yeh, 2001). Childhood onset CD is diagnosed in a child who displays three or more symptoms and had at least one of these symptoms prior to the age of 10. Childhood onset CD is associated with a severe and persistent course. Adolescent onset CD alternatively is more likely to be short term and in reaction to new found autonomy (McCabe, Rodgers, Yeh, & Hough, 2004). Some researchers, including Silverthorn and Frick (1999) and McCabe, Rodgers, Yeh, and Hough (2004) do not believe that these two trajectories are valid for girls. It is rare for a girl to have childhood onset CD, but when she does develop adolescent onset CD, it seems to have more in common with boys' childhood onset CD than boys' adolescent onset CD. That is, girls with adolescent onset CD have the severe and persistent course that has traditionally been seen in boys with childhood onset CD (Silverthorn & Frick, 1999). On the other hand, Moffitt, Caspi, Rutter, and Silva (2001) found that males and females who exhibit conduct problems before adulthood have only 6 months difference in age of onset of the antisocial

behaviors. Thus, all of the DBDs are complicated and multifaceted, and more research is needed to untangle these issues.

Although there is no clear consensus for an explanation of sex differences in the prevalence of the DBDs, it is clear that this difference exists. Additional research has been conducted to examine differences in the manifestation of ADHD. Specifically, these studies examined sex differences in the external and internal correlates of ADHD. Two research teams have attempted to summarize these differences with meta-analyses. The information gleaned from these meta-analyses is summarized here.

Results from ADHD meta-analyses

Two major meta-analyses exist that examine sex differences in ADHD, and Gaub and Carlson (1997) conducted the first. At the time of their publication, they noted that little was known about girls with ADHD because most studies did not include enough girls to make sex-based comparisons. Only 18 studies were included in the meta-analysis because so few studies met the criteria for having a direct comparison of ADHD boys to ADHD girls. Also, specific information about whether the 18 studies were community or clinic samples was not included, but referral source was used as a moderator variable. However, with the available data, interesting results emerged. No sex differences were found in children with ADHD on measures of impulsivity, academic performance, social functioning, fine motor skills, parental education level, or parental depression. Sex differences were found, however, in several other areas.

Based on the data from the Gaub and Carlson meta-analysis, boys with ADHD tended to have higher levels of inattention, peer aggression, internalizing problems, and overall family SES as compared to girls with ADHD. In addition, girls with ADHD had

lower rates of hyperactivity and CD than boys with ADHD. Notably, girls with ADHD had more intellectual impairment than did boys with ADHD, although this finding was only based on 6 of 18 studies. Thus, Gaub and Carlson hypothesized that boys get referred to clinics more often for treatment of ADHD because of their higher rates of overt, externalizing behaviors, including comorbid CD, whereas girls with ADHD show more signs of intellectual impairment, and may be getting services at school but not in clinics. Also, this meta-analysis suggests that girls with ADHD are less impaired than boys with ADHD in community samples on measures of inattention, peer aggression, and internalizing behavior. However, girls with ADHD who are severe enough to be referred to a clinic for treatment are equally as impaired as boys with ADHD who were referred to a clinic. This finding suggests that community and clinic samples yield quite different information.

More recently, Gershon (2002) conducted a similar meta-analysis of sex differences in ADHD. This meta-analysis included 38 studies, many of which were not included in the Gaub and Carlson paper due to stricter inclusion criteria. In addition, some studies had not been published prior to the Gaub and Carlson paper. However, 13 studies were in both meta-analyses. Due to the overlap in studies, it is not surprising that the results from this paper replicated many of the findings of the previous meta-analysis. Overall, sex differences were evident in hyperactivity, inattention, and impulsivity such that girls were significantly less impaired in these areas. Further, girls with ADHD showed fewer externalizing problems and lower intellectual functioning than boys with ADHD. These findings are consistent with Gaub and Carlson's report, but the finding that girls with ADHD had significantly more internalizing problems than their male

counterparts is not. This suggests that girls with ADHD are more susceptible than boys to depression and anxiety. Gershon hypothesized that because girls' symptoms manifest themselves in more subtle ways, many girls with ADHD may go unnoticed and may be under-referred.

Referral source was also examined as a moderator variable in this meta-analysis. It seems that in community samples girls with ADHD are less impaired than boys with ADHD in ratings of hyperactivity, inattentiveness, and reading achievement scores. However, in clinic samples girls with ADHD were actually found to be significantly more impaired than boys with ADHD in ratings of inattention. In both ADHD meta-analyses, ADHD girls appeared to be less impaired than boys when community samples were used, and equally, or even more impaired than boys when clinic samples were used.

Together, these meta-analyses provide significant information regarding sex differences in ADHD. In general, it seems that more boys than girls suffer from ADHD. Also, of children who have ADHD, it seems that boys and girls may manifest the symptoms differently and may have differing rates of comorbidity. Therefore, it is important to understand the development and manifestation of DBD symptomatology more fully. Other studies have been conducted regarding sex differences in the DBDs. These studies were either not included in the meta-analyses, examined sex differences in CD or ODD, or were published after the meta-analyses were completed.

Results from studies of young children with DBDs

Recently, a number of studies have been published about sex differences in DBD symptomatology in young children that add to the knowledge base of the nature of these differences. Based on a review of the literature regarding the psychopathology of children

younger than four, Keenan and Shaw (1997) described sex differences in this age group as virtually nonexistent. The studies that Keenan and Shaw reviewed were mostly community samples of very young children. To briefly review the findings, no sex differences were found in temperament (e.g. Macoby, Snow, & Jacklin, 1984; Prior, Smart, Sanson, & Oberklaid, 1993) or behavioral inhibition (e.g. Kagan, 1989; Kochanska, 1991) before age four. Likewise, very few sex differences were found in externalizing and internalizing problems in this age group (e.g. Earls, 1987; Achenbach, 1991). These studies in combination suggest that sex differences in psychopathology tend to emerge after age four.

Several more recent studies of sex differences have also been conducted. Cunningham and Boyle (2002) conducted a community study of 129 four-year-old children who were at risk for developing ADHD and ODD. They observed parent-child interactions and coded several child behaviors including compliance with parental requests. They found that boys at risk for ADHD were more compliant than girls at risk for ADHD, and that girls at risk for ODD were more compliant than boys at risk for ODD. However, other than this distinction regarding compliance, few other sex differences emerged. Thus, in this four-year-old sample, very few sex differences were evident.

Lumley, McNeil, Herschell, and Bahl (2002) examined 149 clinic-referred children between the ages of 1 year, 7 months to 8 years, 8 months who exhibited signs of a DBD. They found that boys scored significantly higher than girls on the Child Behavior Checklist (CBCL; Achenbach & Edelbrock, 1983) externalizing scale, but equal to girls on the internalizing scale and the total CBCL scale. Also, more boys than

girls in this sample qualified for a diagnosis of CD, but equal numbers of boys and girls received the diagnosis of ADHD and ODD. Notably, although the difference between boys and girls with ADHD and ODD was statistically non-significant, there was a tendency for more boys than girls to meet criteria for two or more DBDs. These findings point to clinic-referred boys and girls having similar behavior problems, but that boys' problems manifest themselves slightly more severely.

Another study of sex differences in 252 young children (3 years, 10 months to 7 years, 0 months) with and without ADHD was conducted by Hartung et al. (2002). Children with ADHD were recruited mostly from clinics and comparison children were recruited mostly from the schools the ADHD children attended. Among the children who met criteria for ADHD, mothers and teachers disagreed on several symptoms. For example, according to mothers, boys and girls with ADHD were equally inattentive, but teachers reported more inattention in boys with ADHD. Likewise, mothers reported equal levels of hyperactivity/impulsivity in boys and girls with ADHD, but teachers reported higher levels in boys with ADHD. It was also found that young children with ADHD had higher rates of ODD and more impairment than comparison children. Further, boys with ADHD were more likely than girls with ADHD to have a comorbid DBD. These findings suggest that children may behave differently at school than at home, or that mothers have different expectations or thresholds for misbehavior than teachers. Because the ADHD children were recruited from clinics, the mothers' reports are more consistent with the existing data that suggest more equal levels of impairment in clinic referred boys and girls with ADHD.

Gadow, Sprafkin, and Nolan (2001) conducted a study of sex differences in 1,261 community and clinic-referred children ages 3 to 6 years on *DSM-IV* symptoms. Sex differences were found in parent-rated ADHD and CD and in teacher-rated ADHD, CD, and ODD such that boys had higher prevalence rates than girls. It was also found that boys were rated as more impaired than girls. Gadow, Sprafkin, and Nolan also found that the male-to-female ratio of ADHD was 2.1:1 in the community and 1.2:1 in the clinic. This study showed that parents and teachers rated boys as having more DBD symptomatology than girls, but that rates for girls in community and clinic samples may be closer to the rates for boys than was previously believed.

Results from studies of school-aged children with DBDs (not included in the meta-analyses)

A nationwide sex prevalence study was conducted by McDermott (1996). Findings from this community study of 1,400 children and adolescents aged 5 to 17 showed interesting patterns. When holding sex constant, there was a significant pattern in which the youngest children had the highest levels of psychopathology and the adolescents had the lowest prevalence rates. This suggests that young children have more problems than older children and adolescents. Also, this pattern was more pronounced in boys with externalizing problems such that the youngest boys had the most externalizing problems. Conversely, this pattern was reversed for girls with internalizing disorders such that they showed increased prevalence rates of internalizing problems as they got older. Furthermore, no disorders were significantly more common in girls than in boys, including internalizing disorders. Internalizing disorders were found to be equally common in girls and boys except in the Avoidant factor, including behaviors such as

withdrawal and aloofness, where boys were found to be significantly more severe than girls overall.

Also, in a nationwide study of the developmental epidemiology of CD and ODD, Maughan, Rowe, Messer, Goodman, and Meltzer (2004) reviewed the literature and reported that all studies with appropriate data support the male preponderance of CD. That is, boys had higher rates of CD at every age level examined by the researchers. However, Moffitt, Caspi, Rutter, and Silva (2001) found that the difference in CD prevalence rates between boys and girls was reduced in the mid-teen years. Girls did not surpass boys in the rate of CD, but the relatively smaller difference between girls and boys at this age level was notable.

Maughan et al. (2004) also examined the literature surrounding sex differences in ODD. The literature in this area is less conclusive than the CD literature. In their review they reported that boys usually had higher rates of ODD than girls, but this trend was often not statistically significant. In their own study, Maughan et al. (2004) examined the rates of CD and ODD in 10,438 5- to 15-year-old children in a community sample. These researchers found significantly more instances of CD in boys than in girls, supporting most of the research to date. Interestingly, they also found that significantly more boys than girls had a diagnosis of ODD. In addition, Maughan et al. found that over half of boys and girls with CD also meet criteria for ODD, and that this high rate of comorbidity was more pronounced in boys than in girls.

Greene et al. (2001) examined the social impairment in a clinic sample of 127 girls aged 6 to 17 with ADHD. No differences were found between girls and boys with ADHD on measures of social impairment. Also, girls and boys with ADHD who also had

a comorbid disorder were more socially impaired than children with ADHD only. Therefore, on most measures in this study, boys and girls with ADHD had equal levels of symptomatology and impairment. However, girls with ADHD were significantly less impaired than boys with ADHD on ratings of school behavior. Thus, these results are consistent with previous findings showing that girls with ADHD are as symptomatic as boys with ADHD when samples are recruited from clinic settings.

A study of sex differences in 522 school-aged clinic-referred children was conducted by Biederman, et al. (2002). Children in this study were between the ages of 6 and 17. Surprisingly, girls with ADHD were 2.2 times more likely than boys with ADHD to be diagnosed with the predominately inattentive subtype, but were less likely to have a learning disability or problems at school. Also, it was found that girls and boys in this clinic-referred setting had similar rates of comorbidity, with the exception of substance use, which was more common in girls. This study illuminated the differences between community and clinic samples. Girls who were referred to a clinic, it seems, were as severe, if not more severe than boys. This finding is consistent with both the Gaub and Carlson (1997) and Gershon (2002) meta-analyses.

One thousand two hundred eighty five school-aged children and adolescents aged 9 to 17 were included in a community-based study of sex differences in oppositional behavior and conduct problems conducted by Lahey et al. (2000). This study yielded interesting results. Boys were significantly more likely than girls to be rated by parents as aggressive, especially from ages 12 to 18. Also, by both parent- and self-report boys were more likely to have committed property offenses. However, no sex differences were found in ratings of oppositional behavior or ODD diagnosis. The diagnosis of CD, on the

other hand, was significantly more common in boys. In this community sample, boys had more severe ratings of aggression and conduct problems than girls.

Levy, Hay, Bennett, and McStephen (2005) conducted a community study on ADHD comorbidity in Australia with over 4,000 children aged 4-18 years. They found that ODD, Separation Anxiety Disorder, and Generalized Anxiety Disorder were more common in children with ADHD than in children without ADHD. Also, they found sex differences in comorbidity. Specifically, girls with the inattentive subtype of ADHD were more likely to have Separation Anxiety Disorder than boys with inattention; and girls with the combined type were more likely to have Generalized Anxiety Disorder than boys with the combined type. Further, they found that regardless of ADHD diagnosis, boys were more likely to have ODD. They also reported no sex differences in the comorbidity of CD, but noted that because of the low incidence of the disorder, these results were imprecise.

Another Australian community study of ADHD was conducted by Graetz, Sawyer, and Baghurst (2005). Their participants were 324 children with ADHD aged 6-13 years, gathered from a sample of over 2,000 children. They found that 18.7% of boys met criteria for ADHD, whereas only 8.4% of girls met criteria. In terms of comorbidity, ADHD girls and boys were more likely than their non-ADHD counterparts to have CD. Also, twice as many boys with ADHD met criteria for CD than girls with ADHD. On the other hand, girls and boys with ADHD were equally likely to have comorbid depression.

Another recent community study of school-aged children was conducted by Gorman-Smith and Loeber (2005). They were interested in whether the developmental pathway that has been proposed for boys is appropriate for girls. Their sample consisted

of 338 girls and 377 boys who were 12 or 13 years old in the first wave of the National Youth Survey. They found that girls displayed their first antisocial behavior approximately one month later than boys first displayed an antisocial behavior. Also, girls were less likely than boys to engage in delinquent behavior at all.

Overall it seems that boys with a DBD have more problems than girls with a DBD when the sample was gathered from the community. This finding appears to be more accurate for ADHD and CD than for ODD, which has much more inconsistent results. Further, the literature suggests that boys and girls with ADHD from clinic settings have similar levels of DBD symptomatology.

Therefore, it seems that although the literature has clarified some issues related to DBD sex differences, there are still several questions that remain. One important question regards referral source. There is still a need to explain the differential prevalence rates and manifestations between boys and girls in *community* samples. Several methods exist for gathering community sample data, but the pediatric setting may be optimal. Collecting data in the pediatric setting allows for the examination of a wide range of children in the community, and the ability to explore prevalence rates across age and sex.

Mental health screening in pediatric settings

In the past, participants in sex difference research in community samples, were recruited through the distribution of screeners via school settings or mailed to large numbers of randomly selected community members (e.g. Carlson, Tamm, & Gaub, 1997; Lahey et al., 2000). Both of these methods have strengths. For example, distributing screeners via a school setting allows for a large number of children to be screened and randomly selecting members of a community gives the researcher a completely random

sample. However, neither method is administered in an environment that fosters honest reporting of mental health problems or that facilitates a high rate of participation. Screeners given to parents in a pediatric setting may carry more credibility. In this environment, parents may be more invested in accurately completing a screener because the physician is requesting the information.

In addition to the research benefits of collecting data in a pediatric setting, clinical benefits exist as well. Mental health care providers are typically not part of a family's first line of care, and pediatricians often lack comprehensive training in mental health diagnoses (Olfson, 1992). In a study by Costello et al. (1987) 11.8% of children in the sample showed signs of some psychopathology as indicated by a diagnostic interview. By contrast, only 5.6% of the same sample of children was identified by a pediatrician as having some form of psychopathology. Had the pediatrician been the only source of information, more than half (52.5%) of the children with psychopathology would not have been referred to a mental health practitioner. Thus, it appears that pediatric patients may benefit from completing a mental health screener at their well-child visits.

Although handing out brief childhood psychopathology screeners in pediatric settings is not extremely common, it may have several advantages over the methods described above. This method allows for the examination of prevalence rates among children of different sexes, ethnicities, and ages, and from different locales. A few past studies have examined the use of childhood mental health screeners in pediatric settings. For example, Merritt, Thompson, Keith, Johndrow, and Murphy (1993) used the Missouri Children's Behavior Checklist (MCBC) at pediatric well-child visits. These researchers asked mothers to fill out the screener after seeing the pediatrician. The MCBC helped

improve under-identification and over-identification of mental health problems by the pediatricians. In a similar and more recent study, Borowsky, Mozayeny, and Ireland (2003) used the Pediatric Symptom Checklist (PSC) developed by Jellinek and Murphy (1990) to identify children who would benefit from a full psychological evaluation. It was assumed that children whose parents responded affirmatively to 50% or more of the possible summary score points (i.e. 7 points out of a possible 14) would benefit from a full evaluation. They found that 22% of children had at least one positive subscale, which is consistent with the 15 to 25% of children who are estimated to have any type of behavioral, emotional, or psychiatric problem (Wildman, Kinsman, Logue, Dickey, & Smucker, 1997). Importantly, this study also showed that children who presented to pediatric clinics for non-routine visits (i.e., sickness, injury) were more likely to score positively on the PSC than were children who presented for well-child visits.

The MCBC and the PSC have been useful, but they are lengthy and are not consistent with the *DSM-IV*. It is clear that childhood psychopathology measures have the potential for being effective screeners in pediatric settings, but that the most effective measure has yet to be identified. An ideal screener would identify most children with some pathology and few children with no pathology, be consistent to *DSM-IV* criteria for each disorder, be quick and easy to administer and interpret, and promote clear communication between pediatricians and consulting mental health providers.

The current study

Based on the clear need for more information about the differential prevalence rates of disruptive behavior symptoms by sex and age in community samples, the aim of the current study was to gather data from parents of 3- to 12-year-old children during

pediatric visits. Data were gathered from parents about their child's age, sex, behavior, emotional, and learning problems. The data were collected as pilot data for a larger longitudinal study. The future research will determine whether the screeners were good predictors of diagnosis and/or impairment.

In the current study sex and age differences in the prevalence of DBD symptoms from early childhood to early adolescence were examined. A brief screener was created based directly on *DSM-IV* criteria for disorders that are common in childhood and early adolescence. This measure takes about 10 minutes to complete and yields information regarding a wide range of childhood psychopathology symptoms. Thus, the screener meets the criteria listed above for an effective pediatric screening tool. This new screening tool is not intended to be used alone to diagnose any disorders, but has the potential to be a useful screening instrument to help pediatricians determine whether a child should be referred for a complete psychological evaluation.

Specific hypotheses were as follows: (1) Boys would have higher scores than girls on all four DBD symptom dimensions (inattention, hyperactivity/impulsivity, oppositionality, and conduct problems); (2) A sex by age interaction would emerge for each DBD dimension such that the youngest children would show the fewest sex differences and the oldest children would show the greatest sex differences; (3) Boys would be more likely to show symptoms on more than one DBD dimension than girls; (4) Girls would be more likely to show anxiety/depressive symptoms in addition to DBD symptoms than boys.

CHAPTER III

METHODOLOGY

Participants

The parents of 74 children (96% mothers and 4% fathers) were the participants in this study. These parents brought their child to one of two clinics to see a pediatrician in Stillwater, Oklahoma. The participants in this study were parents who completed a mental health screener at the request of their pediatrician and also chose to share their child's data with the university researchers. Of the 74 children for whom ratings were collected and shared with the researchers, 33 were boys (45%) and 41 were girls (55%). The average age of the children was 7.03 years (SD = 3.08) with a range of 3.00 to 12.67. Girls and boys did not differ significantly in terms of age, t (71) = 1.40, p = .165. When broken down into developmentally-based age groups, there were 32 children in the 3- to 5-year-old group (31% boys, 69% girls), 19 children in the 6- to 8-year-old group (63% boys, 37% girls), and 22 children in the 9- to 12-year-old group (50% boys, 50% girls). The racial/ethnic breakdown of the children was 83.8% Caucasian, 5.4% Native American, 1.4% African American, and 1.4% Hispanic, (8% of participants declined to report race). When asked about family income levels, 23.0% of families reported incomes less than $20,000 per year, 21.6% reported incomes between $20,000 and $40,000, 16.2% reported incomes between $40,000 and $60,000, 16.2% reported incomes between

$60,000 and $80,000, and 14.9% reported incomes over $80,000 (8% did not disclose their income levels). When asked about the purpose of the pediatric visit, 55.4% indicated that it was a well-child check, 12.2% indicated that it was a sick-visit, 16.2% indicated that there was an "other reason" for the visit and 16.2% did not provide a reason for the visit.

Materials

Parents were given three forms pertaining to the current study when they arrived at the pediatrician's office. First, the parent received the mental health screener (see Appendix A). The mental health screener was completed by parents at the request of the pediatrician and was used to make appropriate referrals if indicated. Second, the parent received a letter explaining the purpose of the research study (see Appendix B). Parents were informed that the mental health screener would only be shared with the researchers upon parental consent. Finally, parents received two copies of the consent form (see Appendix C), one was to be signed and returned to the experimenter if the parent chose to participate, and the other was for the parents' records.

Procedure

Data were gathered from two clinics with pediatric services in Stillwater, Oklahoma. The Stillwater Family Care practice consists of one pediatrician and three family practitioners. At this clinic only the pediatrician agreed to use the pediatric screener. The Warren Clinic practice consists of six pediatricians; two of whom agreed to use the pediatric screener. The pediatricians agreed to ask the parents of all 3- to 12-year-old children who presented for a well-child check to complete the screener. For visits other than well-child checks, the pediatricians used their discretion and asked parents to

complete the screener if there were mental health concerns. The mental health screeners were completed for the benefit of the patient and only shared with the researchers if parental consent was provided. The mental health screener and the signed or unsigned consent form were then returned to the receptionist or nurse. If parental consent was given, the signed consent forms and respective screeners were collected by a member of the research team during biweekly visits to the doctors' offices.

CHAPTER IV

FINDINGS

Data Preparation

Based on Cohen's (1992) recommendations, at least 67 participants were needed to conduct the proposed analyses under the following conditions: alpha of .05, medium effect size, and power of at least 0.80. Specifically, 67 participants were needed to conduct multiple regression analyses with two independent variables, and 64 participants were needed to conduct ANOVA with two groups. The minimum number of participants needed to test mean differences was 64. Therefore, the sample size of 74 in the current study was sufficient.

The dependent variables (DVs) in this study were summary scores on four dimensions of disruptive behavior (i.e., inattention, hyperactivity/impulsivity, oppositionality, and conduct problems). Responses were quantified by assigning zero points for responses of "never," one point for "rarely," two points for "sometimes," three points for "often," and four points for "very often." Next, these scores were summed to create each dimensional score. Thus, if a behavioral dimension had eight symptoms, the summary score could range from 0 to 32. Also, symptom counts were created by considering a response of "often" or "very often" as endorsement of a symptom and considering responses of "sometimes" or "never" as non-endorsements. Thus, if a

dimension had eight symptoms, symptom counts ranged from 0 to 8. Finally, overall externalizing and internalizing summary scores were created. The overall externalizing summary score was obtained by adding summary scores from all four DBD dimensions, and the overall internalizing summary score was obtained by adding summary scores for anxiety and depression.

Results

Based on symptom counts, 25.7% of children whose parents completed mental health screeners for this study met criteria for at least one DBD, and many of these children met criteria for more than one. Specifically, 21.6% of children (8 boys and 8 girls) met criteria for ADHD, 12.2% of children (4 boys and 5 girls) met criteria for ODD, and 5.4% children (2 boys and 2 girls) met criteria for CD. However, because dimensional analyses are more powerful than categorical analyses (MacCallum, Zhang, Preacher, and Rucker, 2002) and because many children would not make good comparison children due to their subthreshold levels of these disorders, the remaining analyses were conducted with summary scores rather than with these diagnostic scores.

Preliminary analyses were conducted to evaluate the relations among inattention, hyperactivity/impulsivity, oppositionality, conduct problems and age, by conducting Pearson product moment correlations. Of the 4 summary scores, only hyperactivity/impulsivity was significantly correlated with age, $r = -.31$, $p = .009$, such that age increased as hyperactivity/impulsivity decreased significantly. Age was not significantly correlated with inattention, oppositionality, or conduct problems. There were significant correlations among all of the DVs, however. Inattention was significantly correlated with hyperactivity ($r = .60$, $p < .001$), oppositionality ($r = .53$, $p <$

.001), and conduct problems (r = .32, p = .005). Similarly, hyperactivity was correlated significantly with oppositionality (r = .69, p < .001) and conduct problems (r = .58, p < .001). Finally, oppositionality was significantly correlated with conduct problems (r = .76, p < .001).

Contrary to predictions, there were no significant main effects of sex on any of the four DBD dimensions. For inattention the mean summary score was 11.3 for girls and 15.0 for boys, $t(72) = 1.96$, p = .054; for hyperactivity/impulsivity the mean score was 14.0 for girls and 15.5 for boys, $t(71) = .87$, p = .387; for oppositionality the mean score was 10.3 for girls and 10.5 for boys, $t(72) = .14$, p = .888; and for conduct problems the mean score was 4.0 for girls and 4.6 for boys, $t(72) = .52$, p = .605. However, it should be noted that these means are collapsed across a wide age range (3 to 12).

Therefore, hierarchical multiple regression analyses were conducted to examine the relations among sex, age, and the four DVs. Age and sex were entered on the first step and the Sex X Age interaction was entered on the second step. This allowed for the examination of the main effects of sex and age and the interaction of sex and age for each of the DVs.

With inattention as the DV, there were no significant effects at Step 1 or Step 2. Thus, age and sex did not account for significant unique variance in predicting inattention (see Table 1). Similarly, the age by sex interaction did not account for significant variance in inattention. With hyperactivity/impulsivity as the DV, Step 1 was statistically significant (see Table 2). Specifically, age accounted for significant unique variance (p = .005) beyond that accounted for by age and sex. There was also a significant Sex X Age interaction at Step 2 (p = .017). Thus, the Sex X Age interaction accounted for additional

variance in hyperactivity/impulsivity scores beyond that accounted for by age. With oppositionality as the DV, there were no significant effects at Step 1 or Step 2 (see Table 3). However, the Sex X Age interaction accounted for significant unique variance in oppositionality (p = .024). Finally, with conduct problems as the DV, there were no significant effects at Step 1 (see Table 4). However, Step 2 was statistically significant. Specifically, the Sex X Age interaction accounted for significant unique variance (p = 004). Thus, age accounted for significant unique variance in hyperactivity and the Sex X Age interactions accounted for significant unique variance in predicting three out of four DVS (i.e., hyperactivity, oppositionality, and conduct problems).

For the next set of analyses, three age groups were computed so that age differences could be examined from a developmentally-based perspective. Thus, ANOVAs were conducted to analyze the effects of sex (female vs. male) and age group. The preschool group consisted of children who were at least 3 but not yet 6 years of age. The middle childhood group consisted of children who were at least 6 but not yet 9 years of age. Finally, the early adolescence group consisted of children who were at least 9 but not yet 13.

With inattention as the DV, there was no significant main effect of age but there was a significant main effect of sex, F (1, 67) = 4.31, p = .042, such that boys had higher levels of inattention than girls. However, the Sex X Age Group interaction was not significant, F (2, 67) = 2.33, p = .105. For hyperactivity, there was no significant main effects of sex or age but the Sex X Age Group interaction was significant, F (2, 66) = 4.67, p = .013 (see Figure 1). Similarly, for oppositionality, there were no significant main effects of sex or age but the Sex X Age Group interaction was significant, F (2, 67)

= 4.06, p = .022 (see Figure 2). Finally, there were no significant main effects of sex or age for conduct problems but there was a significant Sex X Age Group interaction, F (2, 67) = 5.31, p = .007 (see Figure 3). All three significant Sex X Age Group interactions indicated that girls had higher summary scores than boys in preschool age group, but lower summary scores than boys in the middle childhood and early adolescent groups.

To determine whether there was a main effect of sex in the rate of comorbidity, multiple regression analyses were used to examine the contribution of sex and the overall externalizing summary score to the overall internalizing summary score. The main effect of sex was not significant, t (71) = .30, p = .766. Also, the Sex X Externalizing Score interaction did not account for significant variability in the internalizing score, t (70) = .09, p = .926. Similarly, there were no significant interactions when sex and each of the four DBD dimensions were used to predict the externalizing score. Neither the Sex X Hyperactivity interaction [t (69) = .18, p = .856], the Sex X Inattention interaction [t (70) = 1.70, p = .094], the Sex X Oppositionality interaction [t (70) = .41, p = .680], nor the Sex X Conduct Problems interaction [t (70) = .80, p = .428] accounted for significant variability in the externalizing score. Thus, there were no sex differences in comorbidity found in this study.

CHAPTER V

CONCLUSION

The present study had two major findings. First, contrary to past findings and to the first hypothesis, there were no significant sex differences for any of the four DBD variables (Inattention, Hyperactivity/impulsivity, Oppositionality, and Conduct Problems). This finding is inconsistent with both the Gaub and Carlson (1997) and Gershon (2002) meta-analyses. Gaub and Carlson (1997) reported that across 18 studies girls had lower levels of hyperactivity, inattention, peer aggression, conduct disorder, and other externalizing behaviors than boys; and Gershon (2002) found that girls evidenced lower levels of hyperactivity, inattention, and impulsivity than boys. In terms of conduct problems, the lack of sex differences found in the current study is also contrary to the previous literature. Specifically, Moffitt, Caspi, Rutter, and Silva (2001) reported that at every age, more males than females meet criteria for Conduct Disorder. As mentioned earlier, however, a sex difference in oppositionality has not been sufficiently documented (Lahey et al., 2000; Maughan, 2004), so the fact that the current study did not find a difference between boys and girls is not surprising. Therefore, it seems that the present study has found data contrary to the literature in terms of inattention, hyperactivity, and conduct problems. This suggests that in a community sample the discrepancy in externalizing problems between boys and girls was not as pronounced as in clinic

samples, and that data from clinic samples only is not a good representation of true prevalence rates. Alternatively, because the meta-analyses did not examine the combined effects of sex and age, the current data may simply go one step further than the existing literature, but not contradict it. Gaub and Carlson (1997) reported that only two of the studies in their meta-analysis contained age effects, and did not examine it themselves. Also, Gershon (2002) reported that no age restrictions were used to eliminate a study from inclusion. Thus, the Gershon meta-analysis included adolescents and adults, and did not examine sex differences at different developmental levels of childhood.

Second, the results indicated that simply examining sex without looking at the effects of age does not yield a complete picture of the data. That is, when examining age and sex as independent variables and DBD dimensions as dependent variables, interesting interactions emerge (see Figures 1-3). Specifically, in the preschool age group (3- to 5-year-olds) girls had higher levels of hyperactivity, oppositionality, and conduct problems, but in the middle childhood and early adolescent groups this pattern was reversed such that boys scored higher than girls on hyperactivity, oppositionality, and conduct problems. This same pattern is not significant for inattention, suggesting that girls and boys have similar levels of inattention across the developmental periods examined in the current study. However, boys progressively surpass girls in hyperactivity, oppositionality, and conduct problems. Also, it has been suggested that the inattentive only subtype of ADHD may be a disorder that is distinct from the combined and hyperactive subtypes (Milich, Balentine & Lynam, 2001). Therefore, it would follow that the pattern seen for hyperactivity, oppositionality, and conduct problems might not be seen for inattention which may not be appropriately referred to as a "disruptive behavior."

For the middle childhood and early adolescent groups the current findings regarding sex differences are consistent with the meta-analyses such that boys had higher levels of hyperactivity, oppositionality, and conduct problems than girls. However, the current study adds unique information to the literature because girls showed higher levels of these behaviors in the preschool age group. Keenan and Shaw (1997) proposed that there are no differences between boys and girls at the youngest ages, but that boys surpass girls in middle childhood and early adolescence in terms of externalizing behaviors.

It is also of note that there were no significant findings in terms of comorbidity. Sex did not account for significant variability in internalizing or externalizing behaviors. Likewise, the interaction of sex and externalizing behavior did not explain significant variance in internalizing behavior, and the joint effect of sex and the internalizing behaviors did not explain significant variance in externalizing behaviors. Therefore, girls and boys in this community sample did not differ on externalizing and internalizing symptom comorbidity. This finding is inconsistent with the some of the previous literature which has suggested that girls have higher levels of internalizing comorbidity than boys (Gershon, 2002) and boys have higher levels of externalizing comorbidity than girls (Lumley, McNeil, Herschell, and Bahl, 2002). This difference could be attributed to the fact that the current study was conducted with a community sample. In addition, the current sample may have been too young for differences in internalizing behaviors to emerge due to the relatively later age of onset for these behaviors.

Finally, the present study found that 22% of children in a community sample of 3- to 12-year-olds have ADHD, 12% have ODD, and 5% have CD. These results are

somewhat higher than expected for a community sample with regard to ADHD, but are on-target for ODD and CD (APA, 2000). The higher incidence of ADHD in this sample could be a result of pediatricians over-selecting children whom they believed needed the mental health screener. Similarly, parents of children with behavioral symptoms may have been more likely to agree to share their data for research purposes.

Implications for Future Research

This study exemplifies the difficulties with collecting data in non-research based medical settings. It is estimated that approximately 1,000 children were seen by these three pediatricians between November 2004 and November 2005. However, data were completed and shared for research purposes by only 74 caregivers. It was much more difficult than anticipated to ensure that the pediatric office staff consistently distributed and collected the screeners. Based on correspondence with the staff, it appeared that most of the caregivers who were asked to complete the screener did so and that the majority of these parents agreed to share the data for research purposes. Thus, it seems that hundreds of caregivers who brought their children to the pediatrician during the data collection phase of this study were not asked to fill out a screener. The primary investigators of this project met with the pediatricians and their staff on several occasions to trouble-shoot and problem-solve, and yet only 74 screeners were completed. Ideas for improving participation rates include: 1) asking for permission for a member of the research team to be present in the office and help with distribution during the initial phase of the study, 2) building a good working relationship with the office staff (not just the pediatricians) prior to beginning the study; 3) shortening the screener from two pages in length to one page in

length to ensure that parents will have time to complete the screener particularly if they are bringing more than one child in for a pediatric visit.

Data collection difficulties notwithstanding, collecting data from a community sample is an excellent way to avoid some of the problems found when studying clinic samples. However, a larger sample is needed to increase external validity by ensuring that a more representative sample of children participate in the study. Because the current study is a pilot study for several future studies, the screeners continue to be used at the pediatricians' offices. It is the goal of the research team to continue collecting data and to obtain grant funding to complete full psychological evaluations on at-risk and comparison children. These full evaluations would allow the researchers to determine if the screeners are valid predictors of psychopathology and impairment.

Limitations

This study has several limitations. First, the data are not representative of the racial/ethnic makeup of the United States. The sample was made up of mostly (84%) Caucasian participants from rural/small town Oklahoma. Second, the screener was developed by the authors based on *DSM-IV-TR* criteria for use by pediatricians, and has not been tested for reliability or validity. Third, it was expected that a high percentage of the screeners would be distributed at well-child checks and thus provide a relatively random sample of children. However, only 55% of the screeners were distributed at well-child visits, which means that the pediatricians were electing to give the screeners to children for whom they deemed it necessary or to children who were being seen due to illness. Children who are seen for sick visits rather than well-child visits are known to have higher rates of emotional and behavioral symptoms (Borowsky, Mozayeny, and

Ireland, 2003). Thus, the current sample was not completely random and probably displayed more psychopathology symptoms than the population.

Conclusions

The results showed that if age is not considered, it appears that there are no sex differences in DBD symptomatology. That is, when 3- to 12-year-olds are taken together, girls and boys do not differ on symptoms of hyperactivity, inattention, oppositionality, or conduct problems. However, when age is added to the analyses an interesting pattern emerges. For hyperactivity, oppositionality and conduct problems 3- to 5-year-old girls have higher levels of DBD symptoms than boys, but 6- to 12-year-old boys have higher levels of DBD symptoms than their female counterparts. The sex difference found for the 3- to 5-year-olds needs to be replicated since previous studies have tended to show that boys and girls in this age range are equally disruptive. In addition, this study highlights the importance of examining sex by age interactions in order to fully understand sex differences in developmental psychopathology.

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APPENDIX A

PEDIATRIC MENTAL HEALTH SCREENER

PEDIATRIC MENTAL HEALTH SCREENER FOR AGES 3-12

Name of child: _____ Child's date of birth: _____ Sex of child: M F

Name of person completing form: _____

Relationship to child: _____ Date completed: _____

Please read these instructions before completing this checklist: Check the column that best describes your child in comparison to other children the same age. Some items may not be relevant for younger children; therefore, items in the shaded sections are optional for parents of 3-5 year olds.

	Compared to others the same age, my child…	Never	Rarely	Some-times	Often	Very often
A1	Has difficulty sustaining attention in tasks or play activities					
A2	Does not seem to listen when spoken to directly					
A3	Is easily distracted nearby noises or activities					
A4	Is forgetful in daily activities					
A5	Does not follow through on adult requests or instructions and fails to finish things (ex. putting on coat, doing homework, finishing chores)					
A6	Fails to give close attention to details or make careless mistakes					
A7	Has difficulty organizing tasks and activities					
A8	Avoids or dislikes activities that involve a lot of mental effort (ex. puzzles, math worksheets, board games)					
A9	Loses or misplaces necessary items (ex. homework, coat, or toys)					
B1	Fidgets with hands or feet or squirms in seat					
B2	Leaves seat when staying seated is expected (ex. school, church, or dinner)					
B3	Runs or climbs when it is unacceptable (ex. doctor's office, grocery store)					
B4	Has difficulty playing or engaging in activities quietly					
B5	Is "on the go" or acts as if "driven by a motor"					
B6	Talks excessively					
B7	Has difficulty waiting for a turn in games or group situations					
B8	Interrupts ongoing conversations, games or activities					
B9	Blurts out answers before questions have been completed					
C1	Loses temper					
C2	Argues with adults					
C3	Defies or refuses to comply with adults' requests or rules					
C4	Deliberately annoys people					
C5	Blames others for his/her mistakes or misbehavior					
C6	Is touchy or easily annoyed by others					
C7	Is angry and resentful					
C8	Is spiteful (bitter) and vindictive (unforgiving)					
D1	Excludes other children from activities or play					
D2	Initiates physical fights					
D3	Lies or "cons" for personal gain or to get out of something					
D4	Has been physically cruel to people and/or animals					
D5	Ignores or stops talking with other children when he/she is mad at them					
D6	Threatens to end friendship unless friends do what he/she says					
D7	Bullies, threatens, or intimidates others					
D8	Stays out at night or skips school (plays hookey) without parent permission					
D9	Has stolen valuable items (ex. shoplifting)					
D10	Has set fires and/or destroyed others' property on purpose					

PAGE 1 - PLEASE TURN PAGE OVER

PEDIATRIC MENTAL HEALTH SCREENER CONTINUED

Please read these instructions before completing this checklist: Check the column that best describes your child in comparison to other children the same age. Some items may not be relevant for younger children; therefore, items in the shaded sections are optional for parents of 3-5 year olds.

	Compared to others the same age, my child…	Never	Rarely	Some-times	Often	Very often
E1	Has difficulty with basic self-help skills (ex. asking for help, getting dressed)					
E2	Has or had difficulty with basic academic skills (ex. shape names, letter names, sounding out words, or spelling)					
E3	Has difficulty remembering important information (ex. names of close relatives, phone numbers, or dates)					
E4	Has or had difficulty learning the days of the week or months of the year					
E5	Reads slowly and/or below grade or expectancy level					
E6	Has difficulty in all academic areas (ex. reading, spelling and math)					
E7	Has more difficulty with reading and spelling than with math					
E8	Has more difficulty with math than with reading and spelling					
F1	Is distressed when he/she expects to be temporarily separated from caregivers (ex. parent going to work)					
F2	Refuses, or is reluctant, to go to school because of fear of separation from parents or caregivers (ex. child going to day care school)					
F3	Worries about many events or activities (ex. school performance)					
F4	Has difficulty controlling his/her worries					
F5	Worries that his/her parents or caregivers will be harmed or lost					
F6	Worries that he/she will be permanently separated from caregivers (ex. getting lost or being kidnapped)					
F7	Is irritable (grumpy) with others					
F8	Is unable to relax and/or feels tense or "on edge"					
G1	Seems sad, unhappy or hopeless					
G2	Has difficulty with falling asleep, staying asleep, or sleeping too much					
G3	Has low self-esteem and/or poor self-confidence					
G4	Has had significant changes in body weight and/or appetite not due to normal growth (ex. weight loss, poor appetite)					
G5	Seems to enjoy most activities less than he/she used to					
G6	Seems to have less energy or be more tired than he/she used to					
G7	Blames self and/or feels guilty when something goes wrong					
G8	Says "I wish I were dead" or "I wish I had never been born"					
G9	Has expressed definite suicidal thoughts or wishes					
H1	Has difficulty using eye contact, gestures, or facial expressions effectively when interacting with others					
H2	Has difficulty making or keeping friends					
H3	Has or had difficulty with language development (ex. late talker, difficult to understand speech)					
H4	Has difficulty pretending, using imagination, or imitating others when playing					
H5	Is extremely preoccupied with certain interests or activities (ex. only plays with "one" toy or type of toy)					
H6	Insists on doing things in a particular order and becomes distressed if required to change pattern					
H7	Has difficulty understanding how others are feeling and/or reacting					
H8	Has difficulty starting or continuing a conversation with others					

This screener was compiled by Cynthia M. Hartung, Ph.D., Department of Psychology, Oklahoma State University. Screener items were adapted from the DSM-IV-TR (American Psychiatric Association, 2000).

PAGE 2 – THANK YOU FOR COMPLETING THIS FORM

APPENDIX B

COVER LETTER TO PARENT

OKLAHOMA STATE UNIVERSITY

OSU

College of Arts and Sciences
Department of Psychology
215 North Murray
Stillwater, Oklahoma 74078-3064
405-744-6028

Dear Parents:

We are asking for your permission to use the screener you just completed for research purposes. We are interested in both mental health strengths and weaknesses. **Therefore, the invitation to participate in this study does not mean that your pediatrician thinks that your child has mental health problems.** In fact, we are inviting all parents of children ages 3- to 12-years of age to participate.

This research project is being directed by Drs. Cynthia Hartung and Douglas Scambler, Assistant Professors in the Department of Psychology at Oklahoma State University. This study is designed to help us understand the usefulness of mental health screening questionnaires during pediatric check-ups. If you have previously participated in this project, please consider participating again. Repeated participation will allow us to better understand how mental health symptoms change and develop over time.

According to the most recent Surgeon's General Report, approximately 20% of children have mental health disorders. Mental health disorders range in severity and include learning problems (e.g., reading disorder, math disorder), attention and behavior problems (e.g., inattention, hyperactivity, oppositional behavior), emotional problems (e.g., separation anxiety, depression), and developmental disorders (e.g., mental retardation and autism). Early detection and intervention is important for reducing the impact of these problems and may serve as a preventative measure for children who may be at-risk for developing mental health problems in the future.

Participating in this research study, by giving us permission to use your completed questionnaire, will allow us to better understand childhood mental health problems. Your participation will also benefit the scientific community by contributing to our efforts to prevent and treat mental health problems in children.

It is important to note that your participation is completely voluntary. If you choose to participate, please review and complete the attached consent form. An extra copy of the consent form is provided for your records so that you may contact us directly with questions. We will also be giving a copy of the consent to your physician for their records. After completing the consent form, please return it with the screener to the receptionist. If you choose not to participate, please return the uncompleted consent forms to the receptionist.

Thank you for your time and your consideration of this study. If you have any questions please feel free to discuss them with your pediatrician or contact us by telephone or e-mail.

Sincerely,

Cynthia M. Hartung, Ph.D.
Assistant Professor
405-744-7495
cmhart@okstate.edu

Douglas J. Scambler, Ph.D.
Assistant Professor
405-744-4392
scamble@okstate.edu

APPENDIX C

CONSENT FORM

CONSENT FORM
The Utility of Mental Health Screening in a Pediatric Setting
Cynthia M. Hartung, Ph.D., Principal Investigator
Douglas J. Scambler, Ph.D., Co-Investigator

Project Purpose

This research project is designed to examine the usefulness of providing mental health screenings in pediatric clinics during pediatric check-ups.

Participation

To participate in the project, you must be the parent or legal guardian of a child 3- to 12-years of age. Signing this consent will allow us to use your child's mental health screener for research purposes. The data on the mental health screener is the only information that will be accessed by the researchers.

Benefits

Participating in this research study, by giving us permission to use your completed questionnaire, will allow us to better understand childhood mental health problems. Your participation will also benefit the scientific community by contributing to our efforts to prevent and treat mental health problems in children.

Risks

If you agree to participate in this study, the only inconvenience that we anticipate is the time involved in reading and signing this consent form (2-5 minutes).

Data Security

All information on the questionnaires will be kept confidential. A copy of the questionnaire and consent form will be sent to the consulting psychologists. At this point, a code number will be assigned and all names will be removed from the questionnaire which will be stored in a locked cabinet in a locked room at OSU Department of Psychology. This code number will also be put on the consent form, which will also be stored in a locked cabinet in another locked room. Data will be stored for 5 years and then shredded.

Additional Options

In addition to agreeing to participate in the current study by completing the attached questionnaire, we are also asking that you consider allowing us to contact you in the future for the following reasons:

1) To request that you complete additional questionnaire(s) as part of future research regarding your child's mental health. This type of information would allow us to determine how well this questionnaire worked as a screening tool. If you give us permission now to contact you in the future, you will still have the opportunity to choose not to participate.

2) To inform you about other research opportunities for children and parents in the Department of Psychology at OSU. Other research opportunities might involve psychological or educational assessment of your child. Under this option, you may be contacted because your child is at-risk or because he/she is symptom free. Again, if you give us permission now to contact you in the future, you will still have the opportunity to choose not to participate.

Please proceed to the back of this form.

****OFFICIAL COPY WITH SIGNATURES****

Please feel free to ask questions at any time by contacting Dr. Cynthia Hartung, Principal Investigator of the study, at (405)744-7495. If you have any concerns or questions about your rights as a research participant, please contact (confidentially, if you wish) Dr. Sue Jacobs, IRB Chair of University Research Compliance, Oklahoma State University, 415 Whitehurst, Stillwater, OK 74078. Phone: 405-744-5700.

STATEMENT OF CONSENT

This consent document has been prepared and reviewed in accordance with the regulations at 45 CFR 46, Federal Policy for Protection of Human Subjects. I understand the above information and voluntarily consent to participate by allowing my child's physician to share the mental health screening measure that I have completed for my child with the consulting psychologists.

Child's Name:_____Today's Date:_____

Child's Date of Birth:_____ Child's Sex (PLEASE CIRCLE): M F

Child's Ethnicity: ___ Caucasian; ___ African American; ___ Hispanic/Latino;
___ Asian American ___ American Indian; ___ Other (please describe) _____

Parent's Name (PLEASE PRINT): _____

Parent's Date of Birth: _____ Parent's Sex (PLEASE CIRCLE): M F

Parent Signature (PLEASE SIGN): _____

Parent's Relationship to Child (PLEASE CIRCLE): Mother Father Grandparent Other

Family Income (CIRCLE): 0-$20,000 $20,000-$40,000 $40,000-60,000 $60,000-80,000 > $80,000

Number of Family Members Dependent on Income: _____

Home Address: _____

City, State, Zip: _____

Phone Numbers: _____

E-mail Address: _____

PERMISSION FOR FUTURE CONTACT

Please put a checkmark next to the option(s) below to which you agree. **Please note that checking these options now indicates that we may contact you about additional opportunities but does not obligate you to participate.**

___Researchers from the OSU Study of Mental Health Screening in the Pediatric Setting **have my permission to contact me in the future to request follow-up information** about my child to help determine the usefulness of mental health screening questionnaire that I completed.

___Researchers from the OSU Study of Mental Health Screening in the Pediatric Setting **have my permission to contact me with information about other research opportunities** which might provide a psychological or educational assessment of my child.

Parent Signature (*Please sign here to confirm the above choices*): _____

APPENDIX D

IRB APPROVAL PAGE

Oklahoma State University Institutional Review Board

Protocol Expires: 1/20/2006

Date	Wednesday, February 09, 2005
IRB Application No:	AS0432
Proposal Title:	The Utility of the Child Symptom Inventories as Screening Tools in a Pediatric Setting
Reviewed and Processed as:	Expedited (Spec Pop) **Modification**

Status Recommended by Reviewer(s) **Approved**

Principal Investigator(s) :

Elizabeth Lefler
1004 South Main Street
Stillwater, OK 74074

The requested modification to this IRB protocol has been approved. Please note that the original expiration date of the protocol has not changed. The IRB office MUST be notified in writing when a project is complete. All approved projects are subject to monitoring by the IRB.

☒ The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

Signature : Sue C Jacobs

Sue C. Jacobs, Chair Institutional Review Board

Wednesday, February 09, 2005
Date

TABLE 1

Summary of Hierarchical Regression Analysis Predicting Inattention (N = 74)

Variable	B	SE B	β	Δ*R2*	*F* Δ*R2*
Step 1					
Sex	-3.29	1.94	-0.20		
Age	0.31	0.32	0.12	0.06	2.25
Step 2					
Sex X Age	-0.78	0.63	-0.37	0.08	0.12

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

TABLE 2

Summary of Hierarchical Regression Analysis Predicting Hyperactivity/Impulsivity (N = 73)

Variable	B	SE B	β	Δ*R2*	*F* Δ*R2*
Step 1					
Sex	-2.28	1.78	-0.15		
Age	-0.83	0.29	-0.33	0.12	4.47*
Step 2					
Sex X Age	-1.37	0.56	-0.70	0.19	5.20**

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

TABLE 3

Summary of Hierarchical Regression Analysis Predicting Oppositionality (N = 74)

Variable	B	SE B	β	Δ*R2*	*F* Δ*R2*
Step 1					
Sex	-0.06	1.49	-0.01		
Age	-0.02	0.24	-0.01	0.00	0.00
Step 2					
Sex X Age	-1.09	0.47	-0.70	0.07	1.79

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

TABLE 4

Summary of Hierarchical Regression Analysis Predicting Conduct Problems (N = 74)

Variable	B	SE B	β	Δ*R2*	*F* Δ*R2*
Step 1					
Sex	-0.59	1.108	-0.06		
Age	-0.13	0.18	-0.09	0.01	0.35
Step 2					
Sex X Age	-1.01	0.34	-0.88	0.12	3.22*

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

FIGURE 1

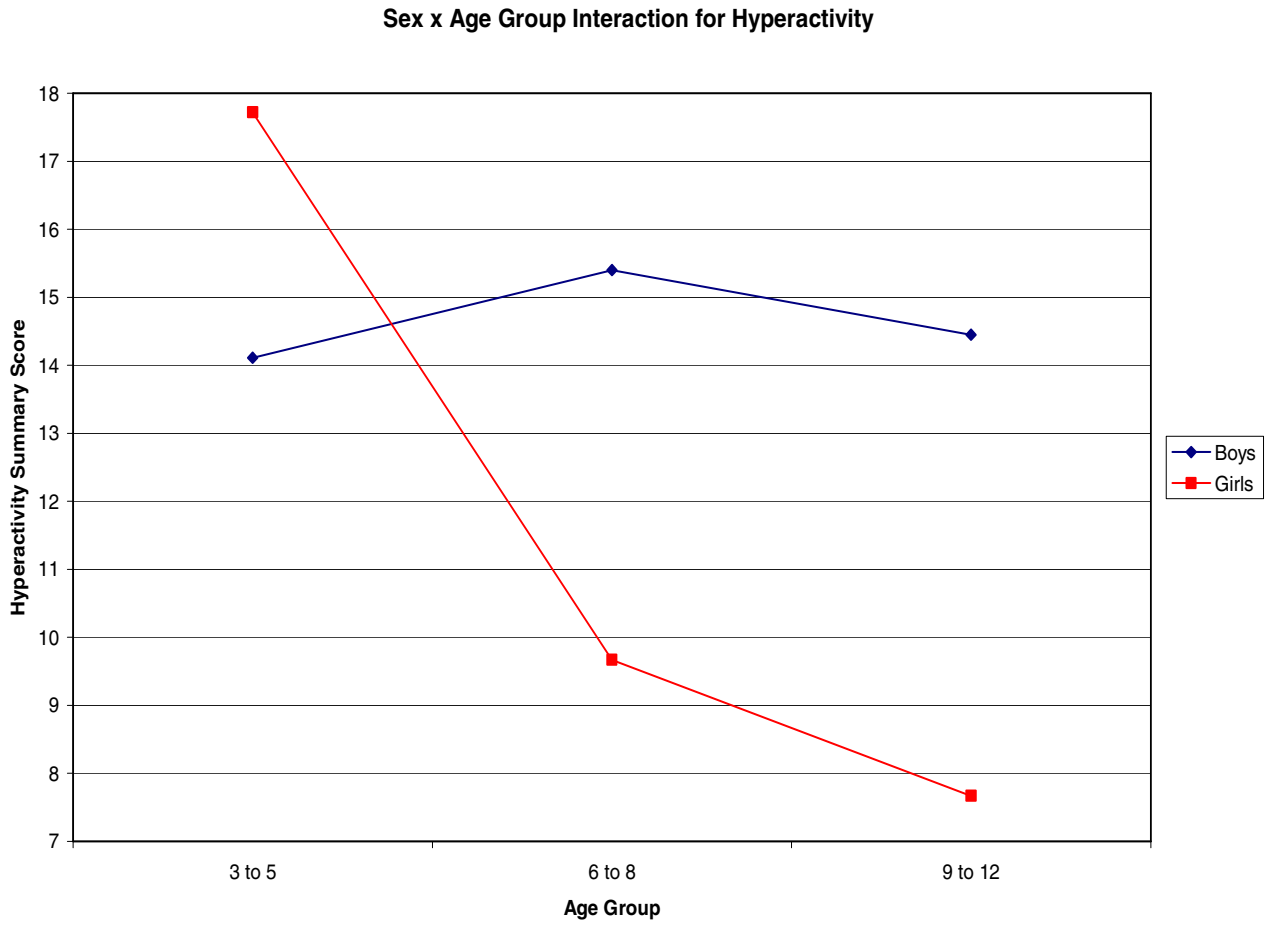

Sex x Age Group Interaction for Hyperactivity
Hyperactivity Summary Score
18
17
16
15
14
13
12
11
10
9
8
7
3 to 5
6 to 8
9 to 12
Age Group
Boys
Girls

FIGURE 2

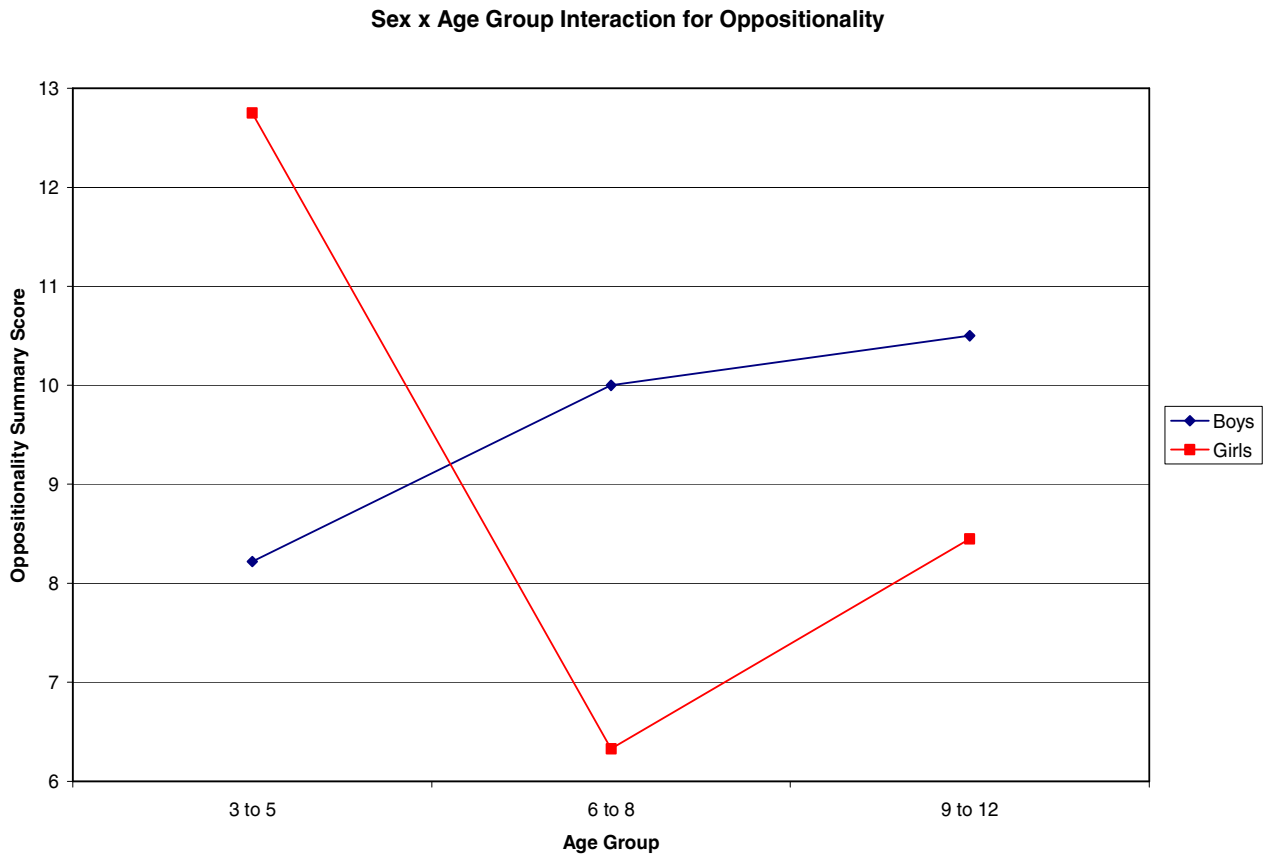
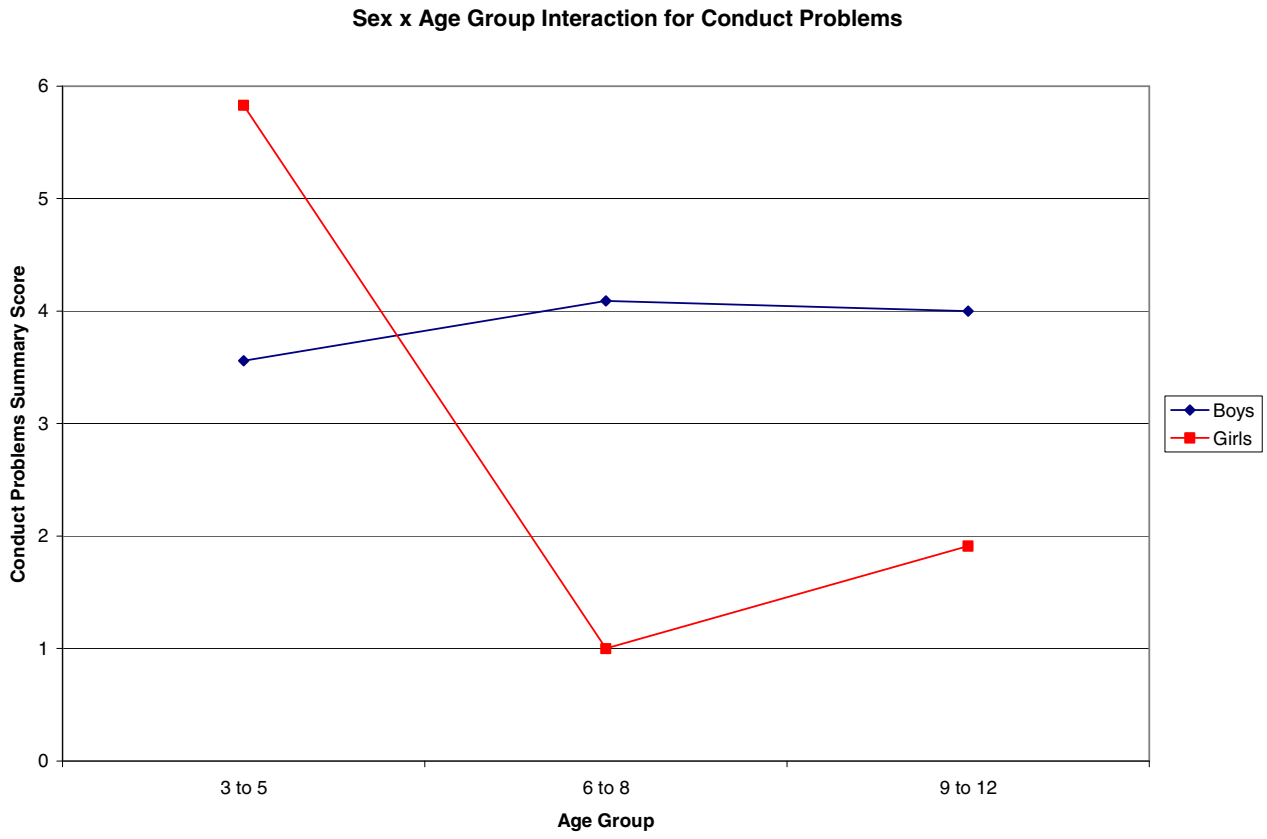

Sex x Age Group Interaction for Oppositionality
Oppositionality Summary Score
13
12
11
10
9
8
7
6
3 to 5
6 to 8
9 to 12
Age Group
Boys
Girls

FIGURE 3


Sex x Age Group Interaction for Conduct Problems
Conduct Problems Summary Score
6
5
4
3
2
1
0
3 to 5
6 to 8
9 to 12
Age Group
Boys
Girls

VITA

Elizabeth Kathryn Lefler

Candidate for the Degree of

Master of Science

Thesis: SEX AND DEVELOPMENTAL DIFFERENCES IN THE PREVALENCE OF DISRUPTIVE BEHAVIOR DISORDER SYMPTOMS IN A PEDIATRIC SAMPLE

Major Field: Clinical Psychology

Biographical:

Personal Data: Born in Omaha, Nebraska on November 7, 1980 to Steve and Eileen Lefler.

Education: Graduated from Gross High School, Omaha, Nebraska, in May 1999; received Bachelor of Arts degree in Psychology from the University of Nebraska - Lincoln, Lincoln, Nebraska, in May 2003. Completed requirements for the Master of Science degree with a major in Clinical Psychology at Oklahoma State University, Stillwater, Oklahoma, in December 2005.

Name: Elizabeth K. Lefler Date of Degree: December, 2005

Institution: Oklahoma State University Location: Stillwater, Oklahoma

Title of Study: SEX AND DEVELOPMENTAL DIFFERENCES IN THE PREVALENCE OF DISRUPTIVE BEHAVIOR DISORDER SYMPTOMS IN A PEDIATRIC SAMPLE

Pages in Study: 64 Candidate for the Degree of Master of Science

Major Field: Clinical Psychology

Scope and Method of Study: Research on the Disruptive Behavior Disorders (DBDs) has historically been based on boys. Results from previous research suggest that more boys than girls have DBD symptoms (e.g., hyperactivity, oppositionality, conduct problems), but these differences vary across studies. Thus, more research is needed to fully understand sex differences in the DBDs. The current study gathered data from the parents of 74, 3- to 12-year-old children who completed mental health screeners at a pediatric visit.

Findings and Conclusions: Sex by age interactions emerged such that in thepreschool age group (3- to 5-year-olds) girls were reported to have higher DBD levels than boys. However, in the middle childhood (6- to 8-year-olds) and early adolescent (9- to 12-year-olds)groups , the pattern was reversed such that boys were reported to have higher levels of DBD symptoms. Thus, to understand sex differences, consideration must also be given to developmental level.

ADVISER'S APPROVAL: Cynthia M. Hartung, Ph.D.