An Investigation of the Relationship Between Severity of Specific ADHD Symptoms and Parent and Child Locus-Of-Control Orientation in the Expression of Parental Stress.

Esther Marie Winters
Louisiana State University and Agricultural & Mechanical College

Follow this and additional works at: https://digitalcommons.lsu.edu/gradschool_disstheses

Recommended Citation
https://digitalcommons.lsu.edu/gradschool_disstheses/5418

This Dissertation is brought to you for free and open access by the Graduate School at LSU Digital Commons. It has been accepted for inclusion in LSU Historical Dissertations and Theses by an authorized administrator of LSU Digital Commons. For more information, please contact gradetd@lsu.edu.
INFORMATION TO USERS

This manuscript has been reproduced from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps. Each original is also photographed in one exposure and is included in reduced form at the back of the book.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6" x 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.
An investigation of the relationship between severity of specific ADHD symptoms and parent and child locus-of-control orientation in the expression of parental stress

Winters, Esther Marie, Ph.D.
The Louisiana State University and Agricultural and Mechanical Col., 1992
AN INVESTIGATION OF THE RELATIONSHIP BETWEEN
SEVERITY OF SPECIFIC ADHD SYMPTOMS AND
PARENT AND CHILD LOCUS OF CONTROL ORIENTATION
IN THE EXPRESSION OF PARENTAL STRESS

A Dissertation
Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy
in
The Department of Psychology

by
Esther M. Winters
B.S., University of Dayton, 1986
M.A., Louisiana State University, 1988
August 1992
Acknowledgments

I would like to express my great appreciation to Dr. June M. Tuma, Chair of my committee, whose guidance, skills, and support have proved invaluable throughout my graduate studies. I also want to thank my minor professor, Dr. Bill Bankston, for broadening my understanding of the social sciences. I am also grateful to Drs. Drew Gouvier, Johnny Matson, and Dirk Steiner for their suggestions, time, and patience as committee members. Special thanks are extended to Dr. Jeff Rain for his considerable assistance in data analysis, and to Dr. Kelly Rain for her insights, editorial suggestions, and support.

I would also like to express my appreciation to Dr. Ann Goodrich, Sheila Couvillion, and the staff at Therapy and Child Assessment Group for their assistance in data collection, and for their encouragement and support.

Finally, I want to thank my husband, Jon S. Winters, for his strength, understanding, patience, and belief in my ability to achieve this goal.
# Table of Contents

Acknowledgments ........................................... ii  
Table of Contents ........................................ iii  
List of Tables ........................................... iv  
List of Figures .......................................... v  
Abstract .................................................. vi  
Literature Review ........................................ 1  
  Attention-deficit Hyperactivity Disorder .......... 2  
  Parent-Child Interactions .......................... 14  
  Stress ............................................... 19  
  Locus of Control Orientation ....................... 28  
  Purpose of the Study .................................. 40  
Method .................................................... 44  
  Subjects ............................................ 44  
  Measures ............................................ 47  
  Procedure ........................................... 55  
  Results ............................................. 57  
Discussion ................................................ 68  
References ................................................ 79  
Appendix A DSM-III-R Criteria for Attention-deficit  
  Hyperactivity Disorder ................................ 97  
Appendix B Consent Form ................................ 99  
Appendix C Conners Parent Rating Scale-Revised ........ 101  
Appendix D Parental Locus of Control Scale .......... 103  
Appendix E Children’s Nowicki-Strickland  
  Internal-External Scale ............................ 109  
Appendix F Parenting Stress Index ................. 111  
Vita ...................................................... 119
List of Tables

Table 1. Demographic Characteristics of Boys and Their Parents .................................. 45
Table 2. Descriptive Statistics for Dependent and Independent Variables .......................... 58
Table 3. Correlation Matrix: Dependent and Independent Variables ................................. 59
List of Figures

Figure 1. Interaction of Mothers’ PLOC and Impulsivity/Hyperactivity Symptoms in the Expression of Parental Stress ............... 73
Abstract

This study investigated the effects of the child’s specific ADHD symptoms, aggressive symptoms, and the parents’ and child’s locus of control orientation on parental stress. The frequently overlooked heterogeneous nature of the ADHD population was addressed, by assessing specific ADHD symptoms and the presence of aggressive symptomatology. Sixty boys, ages 6 to 12 years, diagnosed (using DSM-III-R criteria) as having ADHD by a licensed clinical psychologist in private practice, and their parents participated in the study. Parents were asked to sign a consent form and complete measures of parental locus of control and parenting stress. A children’s locus of control measure was administered to each child during his standard psychological assessment.

Results indicated that each of the ADHD symptom clusters (inattention, and impulsivity/hyperactivity) and aggression was positively related to the expression of parental stress. However, specific patterns of relationships emerged: For mothers, the presence of aggressive symptomatology in their sons was most predictive of elevated levels of parental stress, while for fathers, increased levels of parental stress were most highly associated with symptoms of inattention.
Parental locus of control orientation was found to be the most significant predictor of parental stress for both mothers and fathers. Specifically, it was found that a parent's perception that he/she has little influence or control over his/her child's behavior (external parental locus of control orientation) is highly related to increased levels of parental stress. The results of this study do not support the hypothesis that an external locus of control orientation in the child would be positively related to parental stress. The only significant interaction occurred between mothers' rating of impulsivity/hyperactivity symptoms and mothers' parental locus of control orientation.

The major contributions of this study lie in the identification of differences between fathers and mothers as to which specific ADHD symptom clusters best predict parental stress, and the identification of parental locus of control orientation as a highly significant predictor of parental stress for both mothers and fathers. These findings will benefit researchers and clinicians involved in the assessment, development of interventions, and treatment of ADHD children.

**Key words:** parental stress, ADHD, locus of control
Literature Review

Child psychopathology as a distinct and separate entity from that of adults is a relatively recent phenomenon. The first major attempts to differentially diagnose the etiology and composition of childhood psychopathology as different from that of adults were not made until after World War II. Since then, there has been a tremendous increase in the number of books and articles focusing solely on problems distinctive to children. Furthermore, there has been a substantial concomitant increase in the number of professionals and paraprofessionals involved in the investigation and treatment of childhood disorders (Matson & Ollendick, 1988).

One of the most studied childhood disorders, Attention-deficit Hyperactivity Disorder (ADHD), is also one of the most common. Epidemiological studies indicate that between three and fifteen percent of school-age children in the general population meet the qualitative and quantitative requirements of this disorder (Tuma, 1989; Whalen, 1983). Because of the large number of children involved and the difficulties they experience in their interactions with various people and in numerous situations, it is most important that ADHD be thoroughly investigated. It has recently been suggested that ADHD consists of several subtypes that were previously intermixed leading to unclear,
contradictory, and possibly misleading results. The primary objective of this paper is to define more clearly the relationship between the type and severity of symptoms presented by ADHD children and the difficulties experienced by their parents in interacting with them.

The first portion of the literature review will provide general information about Attention-deficit Hyperactivity Disorder (ADHD) and past and present diagnostic descriptions. The next section will include a review of the literature investigating the problematic interactions between ADHD children and their parents, as well as the subsequent stress experienced by the parents. A general overview of the locus of control research will be presented with more specific attention given to internal-external orientation in both parents and children. This is important in that the locus of control orientation of the parent and/or child may act to ameliorate or exacerbate interactions with these, often difficult, children.

**Attention-deficit Hyperactivity Disorder**

**General Description**

According to the Diagnostic and Statistical Manual of Mental Disorders, Third Edition-Revised (DSM-III-R, American Psychiatric Association, 1987) the essential features of Attention-deficit Hyperactivity Disorder (ADHD) are "developmentally inappropriate degrees of inattention,
impulsiveness, and hyperactivity." An individual with this disorder typically displays some disturbance in each of these areas, but to varying degrees. The individual may exhibit symptoms in multiple situations, including at home, in school, and at social events, or he may experience difficulty in only one or two specific situations.

There are also developmental differences in the manifestation of ADHD symptoms. In preschool children the most prominent features are usually signs of gross motor overactivity (i.e., excessive running and climbing), whereas restlessness and excessive fidgeting are more prominent in older children and adolescents (DSM-III-R, American Psychiatric Association, 1987). Inattention and impulsivity are also more likely to be evident in adolescents. Although the severity of various symptoms may change with age, individuals with ADHD continue to have problems throughout childhood and adolescence. In addition, follow-up studies of clinic samples indicate that approximately one third of children with ADHD continue to exhibit some symptoms of the disorder in adulthood (DSM-III-R, American Psychiatric Association, 1987). It is important to note that the considerable variability with which symptoms are exhibited across age and situations results in a heterogeneous group of children diagnosed with the common label of ADHD.

Current prevalence rates suggest that, conservatively, approximately three to five percent of the school age population may present with ADHD (DSM-III-R, American
Psychiatric Association, 1987; Lambert, Sandoval, & Sassone, 1977; McGee, Williams, & Silva, 1984; Trites, Dugas, Lynch, & Ferguson, 1979). If these prevalence rates are correct, there are enough children with ADHD for there to be at least one in every classroom across the country. The sex ratio of children diagnosed as ADHD has ranged from six to eight boys for one girl (Lambert, Sandoval, & Sassone, 1977; Stewart, Pitts, Craig, & Dieruf, 1966) to three boys for one girl (Trites, Dugas, Lynch, & Ferguson, 1979).

**Diagnosis**

The conceptualization of ADHD and the criteria for its diagnosis have undergone numerous changes throughout its development. As researchers' theoretical conceptualizations of ADHD changed, so did the terminology used to identify children with the disorder.

Identification of the entity now known as ADHD can be traced to the late nineteenth century with the first descriptions of behavioral disorders occurring as sequelae of an insult to the brain. One of the first terms used to describe these symptoms was *defects in moral control* (Still, 1902) followed by *minimal brain damage* and *minimal brain dysfunction* (Clements & Peters, 1962). When such symptoms as inattention, hyperactivity, and poor impulse control followed a head injury or a central nervous system infection, the etiology seemed obvious, and thus it is not surprising that such sequelae was referred to as brain
damage. However, with time, the behavioral manifestations that were considered to be the result of brain injury were observed in children who had no history of such an insult. In these cases the damage to the central nervous system was considered so minimal that its only manifestations were the behavioral symptoms, hence the idea of minimal brain damage.

By the early 1960's the behavioral syndrome associated with minimal brain damage and the frequently concomitant occurrence of learning disability was linked under the classification of minimal brain dysfunction (Shaywitz & Shaywitz, 1988). Early efforts to clarify minimal brain dysfunction resulted in an emphasis on overt behavioral symptoms such as hyperactivity. Subsequently, such terms as hyperkinesis (Langhorne, Loney, Paternite, & Bechtoldt, 1976; Loney, 1980), hyperactivity (August & Stewart, 1982), and hyperactive child syndrome were used to describe the disorder.

As one would expect, the diagnostic manuals also reflected the changes in conceptualization and terminology. The DSM-II (American Psychiatric Association, 1968) included the diagnostic category "Hyperkinetic Reaction of Childhood" which identified hyperactivity as the core symptom of the disorder. However, DSM-II did not offer any operational criteria to use in the differential diagnosis of the disorder.

When DSM-III (American Psychiatric Association, 1980) was published, the "Hyperkinetic Reaction of Childhood" had
been revised such that a child was diagnosed as either Attention-Deficit Disorder with Hyperactivity (ADD/H) or Attention-Deficit Disorder without Hyperactivity (ADD/WO). This change in conceptualization with its emphasis on the child's inability to sustain attention was partially the result of research by Douglas (1972,1976). Douglas suggested that overactivity was not the primary symptom or even a necessary symptom of the disorder. She maintained that an inability to sustain attention and control impulses was the essential feature of hyperactivity (Douglas, 1972).

Using the DSM-III system, the diagnosis of ADD/H was made when an individual exhibited the specified number of symptoms in each of the three categories: inattention, impulsivity, and hyperactivity. If the inattentive individual did not exhibit the required number of hyperactivity symptoms, but did display the specified number of inattentive and impulsive behaviors, the diagnosis of ADD/WO was made.

Further changes in the diagnosis of hyperactivity came with the publication of the DSM-III-R (American Psychiatric Association, 1987). There was insufficient empirical evidence to support the continued use of ADD/H and ADD/WO as two distinct diagnostic categories (Maurer & Stewart, 1980). Specifically, the two groups could not be reliably discriminated from one another. Therefore, the symptoms listed separately under the Inattention, Impulsivity, and Hyperactivity dimensions in the DSM-III were combined to
form a single list of symptoms. To receive the diagnosis of Attention-deficit Hyperactivity Disorder (ADHD) an individual must exhibit at least eight of the fourteen symptoms included in this list: 1. Often fidgets with hands or feet or squirms in seat. 2. Has difficulty remaining seated when required to do so. 3. Is easily distracted by extraneous stimuli. 4. Has difficulty awaiting turn in games or group situations. 5. Often blurts out answers to questions before they have been completed. 6. Has difficulty following through on instructions from others (not due to oppositional behavior or failure of comprehension), e.g., fails to finish chores. 7. Has difficulty sustaining attention in tasks or play activities. 8. Often shifts from one uncompleted activity to another. 9. Has difficulty playing quietly. 10. Often talks excessively. 11. Often interrupts or intrudes on others, e.g., butts into other children’s games. 12. Often does not seem to listen to what is being said to him. 13. Often loses things necessary for tasks or activities at school or at home (e.g., toys, pencils, books, assignments). 14. Often engages in physically dangerous activities without considering possible consequences (not for the purpose of thrill-seeking, e.g., runs into street without looking). There are no stipulations as to which symptoms or combination of symptoms must be present to fulfill the diagnostic criteria, but only that “the behavior is
considerably more frequent than that of most people of the same mental age" (American Psychiatric Association, 1987).

In summary, it is evident from this review that the cluster of symptoms now known as ADHD has gone through numerous theoretical conceptualizations, multiple changes in terminology, and several classification systems. The emphasis at various times has been on organicity, excess overt behavior, and, most recently, inability to sustain attention.

**Subtypes**

As was mentioned previously, the children who exhibit a sufficient number of symptoms to receive the diagnosis of Attention-deficit Hyperactivity Disorder form a very diverse and heterogeneous group. This is due to the large number of combinations of symptoms that can occur, as well as to the variability of symptoms across developmental stages and situations. Because of this heterogeneity, several researchers have reported the need to define subtypes of ADHD children (Barkley, 1982; Langhorne, Loney, Paternite, & Bechtoldt, 1976; Loney, Langhorne, & Paternite, 1978; Milich, Loney, & Landau, 1982; Shaywitz & Shaywitz, 1988). Identifying homogeneous subtypes of ADHD children would allow researchers and clinicians to make more accurate predictions regarding prognosis and treatment outcomes. Furthermore, the meaningfulness of the ADHD diagnostic classification would be greatly increased if positive
correlations could be found between specific subtypes and other variables such as etiology, environment, and symptom severity.

Variables which have been examined as possibly useful in differentiating subtypes of ADHD include: situational (ADHD symptoms evident either at home or in school) versus pervasive (ADHD symptoms identified in both the home and school settings) ADHD (Schleifer, Weiss, Cohen, Elman, Cvejic, & Kruger, 1975); drug responsiveness (Swanson & Kinsbourne, 1979); presence and/or degree of aggressiveness (Loney, 1980; Milich & Fitzgerald, 1985; Milich & Loney, 1979); presence of learning disabilities (Halperin, Gittelman, Klein, & Rudel, 1984); and various measures of organicity (Zametkin & Rapoport, 1986). Although many of these variables have not proven useful in identifying groups that are significantly different, research investigating several of them has resulted in useful information. The first of these to be discussed is the presence of a learning disability.

**Learning Disability.** Although the assumption that ADHD and various learning disabilities frequently co-occur is widely accepted, the actual estimates of co-occurrence vary considerably. The prevalence of learning disability in hyperactive children has ranged from highs of 80 to 92 percent (Silver, 1981) to lows of 9 to 10 percent in hyperactive boys (Halperin, Gittelman, Klein, & Rudel, 1984). Conversely, the prevalence of hyperactivity in
learning disabled populations has varied from 41 percent (Holborow & Berry, 1986) to 80 percent (Safer & Allen, 1976). Furthermore, there has been little research into their actual relationship. It is not known whether they are subtypes of the same disorder, whether one predisposes a child to the other, or whether they share a common etiology that produces two distinct disorders.

A study by Halperin, Gittelman, Klein, and Rudel (1984) tried to determine whether a group of pure hyperactive children was significantly different from a group of hyperactive/reading disabled children. There were no demographic or behavioral differences; however, the groups did differ in their performance patterns on the Wechsler Intelligence Scale for Children-Revised. The children in the pure ADHD group had a significantly higher Verbal IQ, while the children in the hyperactive/reading disability group demonstrated a significantly higher Performance IQ (Halperin, Gittelman, Klein, and Rudel, 1984). The authors suggest that reading disabled/ADHD children may have defective verbal skills which discriminate them from children with pure ADHD. These results provide minimal support to the hypothesis that pure hyperactive and mixed hyperactive/reading disabled children constitute distinct subgroups of ADHD. However, further research is needed to verify and extend these results.

Aggression. Another variable that has been presented as being a diagnostically relevant subtype of ADHD is the
presence of aggression. In the past, researchers have questioned whether hyperactivity and aggression are two entirely separate disorders or whether they represent different aspects of a third disorder, conduct disorder (Frick, Lahey, Christ, Loeber, & Green, 1991; Hinshaw, 1991; Lahey, Green, & Forehand, 1980; Quay, 1979; Sandberg, Rutter, & Taylor, 1978; Sandberg, Wieselberg, & Shaffer, 1980). The two disorders are thought to co-occur with co-occurrence rates ranging from 30 percent to 90 percent (Hinshaw, 1987). However, these co-occurrence rates may be misleading.

Loney and Milich (1982) suggest that there are distinct groups which researchers have been unable to identify because of the absence of a measure with relatively pure factors for both the hyperactivity and aggression dimensions. Loney and her colleagues (Loney, Langhorne, & Paternite, 1978; Milich & Loney, 1979; Milich, Loney, & Landau, 1982) were able to identify through factor analysis behaviors that load on independent hyperactivity and aggression dimensions. For example, the hyperactivity dimension was defined by behaviors such as overactivity, inattention, and impulsivity, whereas the behaviors associated with the aggression dimension included aggressive interpersonal behavior, antisocial acts, and irritability. Furthermore, the behaviors associated with the aggression factor were typically more interpersonal in nature, often involving inappropriate social interactions. The
hyperactive factor was more highly correlated with task specific behaviors such as failing to focus on classwork, minor motor activity, and playing with objects (Milich & Fitzgerald, 1985). Following the identification of these factors, researchers reported that there are three clinical groups of hyperactive/aggressive children: purely hyperactive, purely aggressive, and a mixed hyperactive-aggressive group (Loney, Langhorne, and Paternite, 1978). This view, that there are distinct groups of hyperactive and aggressive children and also a mixed group, is supported by the results of another large-scale study (Trites & LaPrade, 1983). These investigators were also able to identify subgroups of pure hyperactivity, pure conduct problem, and a mixed hyperactivity-conduct problem group.

Additional research by Loney (Loney & Milich, 1982) and other researchers (Frick, Lahey, Christ, Loeber, & Green, 1991; Hinshaw, Hanker, Whalen, Erhardt, & Dunnington, 1989; Raymond, 1990; Reeves, Werry, Elkind, & Zametkin, 1987) indicates that ADHD children who are also rated as exhibiting aggressive symptoms are demonstrably different when compared to ADHD children who are not rated as aggressive on a number of social, behavioral, and cognitive measures. For instance, boys rated as both hyperactive and aggressive were found to be more aggressive, impulsive, and bossy in their interactions than boys who were rated as only hyperactive (Pelham & Bender, 1982).
Evidence for two subtypes of hyperactivity (with conduct problem and without conduct problems) is further supported by family studies. Characteristics such as parental psychopathology, socioeconomic status, and family hostility were significantly associated with aggression scores but not with hyperactivity scores (McGee, Williams, & Silva, 1985). Hyperactive boys who had a positive family history for antisocial disorders were also more likely to be deviant on measures of conduct disorder and to have siblings who also had a high prevalence of conduct disorder (August & Stewart, 1983). In contrast, hyperactive boys with a negative family history of antisocial disturbances did not exhibit conduct disorders, nor did their siblings.

With regard to prognosis, ADHD boys with aggressive symptoms are initially less responsive to stimulant medication and are considerably more likely to have significant problems into adulthood than are boys with ADHD alone (Loney, Langhorne, & Paternite, 1978; Schachar, Rutter, & Smith, 1981). However, more recent research suggests that ADHD boys with verbal and physical aggressive symptoms may respond positively to stimulant medication at higher dosages (Hinshaw, 1991; Gadow, Nolan, Sverd, Sprafkin, & Paolicelli, 1990; Kaplan, Busner, Kupietz, Wassermann, & Segal, 1990).

In summary, research indicates that ADHD with aggressive features is one subtype of ADHD that is significantly different in manifestation, treatment, and
prognosis from ADHD without aggressiveness. This finding has important implications, especially considering that the majority of research on ADHD has been done without taking into account the differences between these two groups. Consequently, the literature on childhood hyperactivity is confounded by the presence of externalizing behavior problems (e.g., fighting, arguing, destructiveness), resulting in possibly inaccurate conclusions.

The hyperactivity/aggression discussion illustrates the importance of identifying homogeneous subtypes within the heterogeneous group of children currently classified as ADHD. Success in identifying contributing etiological variables, prescribing effective treatments, and making accurate predictions regarding prognosis depends upon the identification of homogeneous subtypes. Continued use of heterogeneous samples of ADHD children will likely result in conflicting and, at times, useless results.

**Parent-Child Interactions**

The observation of parent-child interactions dates to Tiedeman's diary in 1787 (cited in Lytton, 1971), and yet several fundamental questions are just beginning to be addressed. Investigations undertaken as recently as the early 1970's examined the effects of the adult's behavior on the child without any mention of the child as an active participant in the interaction (Lytton, 1971). However, Bell (1968) suggested that while it was true that parents
have a great effect on the social adjustment of their children, the children also have an effect on the response patterns of the parents. In a further development of this position, Bell stated that the child was not a passive recipient of environmental influences that many believed, but was a manipulator of the environment, an active participant in social interactions, and possessed substantial stimulus control over adult behavior toward the child (Bell & Harper, 1977).

Parent Interactions with ADHD Children

A number of studies have examined the parent-child (most commonly the mother-child) relationship in ADHD (Barkley, Karlsson, & Pollard, 1985; Campbell, 1973, 1975; Campbell, Schleifer, Weiss, & Perlman, 1977; Mash & Johnston, 1982, 1983; Tallmadge & Barkley, 1983). These studies have found that hyperactive children are less compliant, more attention-seeking, and more negative than normal or learning-disabled children. The mothers of hyperactive children are more commanding and negative, provide more structure and supervision, and give more help and encouragement than mothers of normal children. While fathers interacted with their ADHD sons in much the same way that mothers did, one study found that the hyperactive boys responded differently, depending upon which parent was involved (Tallmadge & Barkley, 1983). Hyperactive boys engaged in more negative and competing behavior than did
normal boys in response to their mother’s interactions. In response to their father’s interactions, hyperactive boys engaged in the same percentage of negative and competing behavior as normal boys. This finding seems to support the complaints of mothers of hyperactive boys that their sons tend to behave better for their fathers than their mothers (Barkley, 1981a).

Hypotheses as to the direction of effects in the relationship between parent and child behaviors have ranged from ascribing the child’s hyperactivity to the mother’s behavior, (Bettelheim, 1973) to suggestions that the mother’s behavior was a response to the child’s hyperactive behavior (Bell & Harper, 1977). To clarify this relationship, a number of studies introduced a medication and placebo condition (Barkley & Cunningham, 1979; Barkley, Karlsson, Pollard, & Murphey, 1985; Barkley, Karlsson, Strzelecki, & Murphey, 1984; Cunningham & Barkley, 1978). These studies clearly demonstrated that the maternal controlling behaviors were in reaction to the antecedent noncompliant behavior of the child. The hyperactive children on medication were more compliant and less dependent; and, as a result their mothers exhibited more positive attention to compliance and were less directive toward these children.

Mash and Johnston (1983) included siblings in their studies of hyperactive boys and their mothers. Not surprisingly, the interactions between the hyperactive boys
and their siblings demonstrated higher rates of negative interactions and conflict than did the nonhyperactive-sibling pairs. It is interesting to note that the mothers of hyperactive boys were also more negative and controlling with their nonADHD children compared to mothers of control children.

The difficulties in both parent-child and sibling-child relationships appear to diminish as the ADHD child matures (Barkley, Karlsson, & Pollard, 1985; Barkley, Karlsson, Pollard, & Murphey, 1985; Barkley, Karlsson, Strzelecki, & Murphey, 1984; Mash & Johnston, 1982, 1983). The interactional nature of the relationship between the hyperactive child's behavior and his parents' behavior is evident throughout the developmental stages. As hyperactive children mature and become more compliant and independent, their mothers' become less directive, respond less negatively, and spend more time simply observing rather than correcting their behavior. However, it is important to note that while the interactions of ADHD children improve with age, they continue to lag behind normal children in their social appropriateness and self-control (Barkley, Karlsson, & Pollard, 1985).

Consistent with the results of the medication studies previously discussed, developmental investigations demonstrate that the mothers of hyperactive boys are not necessarily rigid in their directive, intrusive approach to sons' excessive noncompliant behaviors. They appear to
shift readily to a less controlling and more positive style of management when the child is able to exert his own self-control (Barkley & Cunningham, 1979). These findings clearly support Bell's (1968, 1977) findings that the direction of effect in parent-child interactions is bidirectional and that the child's role is as important as the parent's in establishing the overall nature of their interactions.

Raising children involves nearly constant interaction revolving around household chores, academic assignments, social etiquette, and sibling relations. The previously presented research on interaction conflicts and the pervasiveness of these conflicts across most situations (Tarver-Behring, Barkley, & Karlsson, 1985) suggests that parents of ADHD children legitimately find the day-to-day care of such children much more stressful than that of normal children (Breen & Barkley, 1988). In families of hyperactive children, there are likely to be more negative interactions between the child and his mother, as well as more family disruptions and maternal stress. Research thus suggests the emergence of a self-perpetuating cycle in which an already overburdened mother with diminished tolerance must cope with a hyperactive, impulsive, and possibly aggressive child to whom she responds with controlling and negative behaviors of her own, which further maintains the child's difficulties (Shaywitz & Shaywitz, 1988). This
supposition leads to the next topic of discussion, parental stress.

**Stress**

**General Overview**

Health professionals have long commented on the relationship between stressful life changes and problems in health and adjustment. However, empirical research in the area of life stress is a relatively recent phenomenon. In 1919, Adolf Meyer advocated a systematic listing of life events, "the changes of habitat; of school entrance, graduations, changes, or failures; the various 'jobs'; the dates of possibly important births and deaths in the family and other fundamentally important environmental incidents." (p. 53 Meyer, 1919). Meyer called this listing a Life-Chart, and it may have been the first attempt to quantify environmental stressors.

**Major Life Events.** The next major step in the area of life stress research occurred in 1967 when Holmes and Rahe developed an assessment measure, the Schedule of Recent Experiences. In developing this instrument, Holmes and Rahe (1967) adopted Selye's (1956) notion that life stress is the physical or psychological change elicited in response to an event, independent of the desirability of the event, and can be quantified in terms of either the number of events experienced or the additive total of changes required by all
events. Their initial measure contained 43 common life events and a subject's life stress score was simply the number of events he or she reported experiencing during a recent interval of time (usually 6-24 months).

Since the development of that first assessment measure, the life events method has been used with a wide variety of populations, differing from the original samples in age (Coddington, 1972a, 1972b; Ruch & Holmes, 1971), ethnic composition (Hough, Fairbank, & Garcia, 1976), and nationality (Cochrane & Robertson, 1973; Masuda & Holmes, 1967). Examination of this literature leaves little doubt that a significant relationship exists between the experience of stress, as assessed by life events scales, and a host of adverse physical conditions, including diabetes (Bradley, 1979), asthma (de Araujo, Van Arsdel, Holmes, & Dudley, 1973), hypertension (Lal, Ahuja, & Madhukar, 1982), genital herpes (Watson, 1983), cardiac death and myocardial infarction (Lunberg, Theorell, & Lind, 1975), accidents (Selzer & Vinokur, 1974; Levenson, Hirschfeld, Hirschfeld, & Dzubay, 1983), athletic injuries (Bramwell, Masuda, Wagner, & Holmes, 1975), menstrual discomfort (Siegel, Johnson, & Sarason, 1979), and pregnancy and birth complications (Gorsuch & Key, 1974). Other studies have found significant correlations between adult life stress and psychological adjustment such as clinical depression (Paykel, 1979), schizophrenia (Brown, Sklair, Harris, & Birley, 1973),
anxiety (Dekker & Webb, 1974; Lauer, 1973), and child abuse (Egeland, Breitenbucher, & Rosenberg, 1981).

Minor Stressors. Although research involving major life events has dominated life stress research in the past, Lazarus and his colleagues have more recently published several studies suggesting that minor stressors are related to physical conditions and psychological adjustment (DeLongis, Coyne, Dakof, Folkman, & Lazarus, 1982; Kanner, Coyne, Schaefer, & Lazarus, 1981; Lazarus, 1984; Lazarus, DeLongis, Folkman, & Gruen, 1985). These researchers suggest that the impact of day-to-day events should have an influence on the individual simply because of their high likelihood and frequency. Minor events are defined as those stressors that can occur frequently, even daily, as compared to major life events some of which may occur only once in a lifetime. This conceptualization led to the development of at least two minor stressor assessment measures, the Hassles Scale (Kanner, Coyne, Schaefer, & Lazarus, 1981), and the Daily Stress Inventory (Brantley, Waggoner, Jones, & Rappaport, 1987).

The potential role of minor stressors on health conditions and psychological adjustment can be conceptualized in several ways. Hinkle (1974) proposed that major life events may affect health through their disruption of habits, patterns of activity, and social relations. In other words, major events have an impact on daily events and, thus, on minor stressors. It has also been suggested
that minor events may actually be mediating variables for major life events (Kanner, Coyne, Schaefer, & Lazarus, 1981). The number and intensity of minor stressors experienced may indicate the degree to which an individual’s routine has been upset. Kanner and associates (1981) found that the Hassles Scale was superior to major life events in predicting psychological distress. The results also suggested that the role of minor events may be independent of the role of major events. Monroe (1983) further investigated the role of minor and major events as predictors of psychological distress with similar results. Minor events were found to be significant and independent predictors of distress.

Because the research regarding the role of minor stressors appears promising, it is not surprising that researchers began to develop and use assessment measures for more specific populations. One area in which such development occurred is parental stress.

**Parental Stress**

Within the area of parental or family stress, stress has been defined as a perception of additional strain on the family system, produced by persons or events within or outside the family, which upsets the balance of the family system (Cautley, 1980). Stress is experienced as an anticipatory threat, that is, the fear that something will happen in the future. Such fear may be very explicit, as a
social worker's threat to remove the child, or it may be more general, such as the fear of still more difficult behavior on the part of the child, or increasingly unpleasant interchanges within the family.

It is apparent that parental stress, conceptualized in this manner, would be related to a wide number of conditions and situations and mediated by child, parent, and environmental variables. The birth and, later, the mere presence of a young child has been found to be stressful and can lead to or exacerbate already existing parental disharmony (Cowan & Cowan, 1986, 1987; Lerner & Spanier, 1978; McKinney & Peterson, 1987). This presence is found to be especially stressful if the child is premature (Frodi, Lamb, Leavitt, Donovan, Neff, & Sherry, 1978), fails to thrive (Singer, Song, Hill, & Jaffe, 1990), experiences episodes of apnea (Bendell, Culbertson, Shelton, & Carter, 1986; Phipps & Drotar, 1990), is chronically ill (Goldberg, Morris, Simmons, Fowler, & Levison, 1990; Kazak, Reber, & Snitzer, 1987; Wells & Schwebel, 1987), is mentally or physically handicapped (Breiner & Forehand, 1982; Cameron & Orr, 1989; Kazak & Marvin, 1984), or exhibits adverse temperamental or behavioral characteristics (Balkwell & Halverson, 1980; Bates, Freeland, & Lounsbury, 1979; Breen & Barkley, 1988; Mash & Johnston, 1983a, 1983b).

Parent-child interactions and the subsequent experience of stress are also affected by the parent's own psychopathology (Brody & Forehand, 1986; Dumas, Gibson, &
Albin, 1989; Griest, Forehand, Wells, & McMahon, 1980; Lahey, Russo, Walker, & Piacentini, 1989; Panaccione & Wahler, 1986; Webster-Stratton & Hammond, 1988), as well as their beliefs regarding their parenting role (Gilbert, Hanson, & Davis, 1982; Mouton & Tuma, 1988; Webster-Stratton, 1988), and their relationships with other adults (Garbarino, 1977; Porter & O'Leary, 1980; Wahler, 1980). Finally, a family's socioeconomic background can also contribute to parent-child interaction difficulties and stress as evidenced by fact that such difficulties have been found to be associated with adverse factors such as low income, lack of education, large family size, and related variables such as inadequate housing, and unemployment (Adamakos, Ryan, & Ullman, 1986; Dumas, 1986; Kellam, Ensminger, & Turner, 1977; Knapp & Deluty, 1989; Tonge, James, & Hillam, 1975).

**Parental Stress in Parents of ADHD Children.** Of specific interest to the proposed study are the presence and source of parental stress in parents of ADHD children. Dealing with ADHD children requires time and energy from all members of the family. The resulting modifications in the family's functioning can generate stresses and conflicts within the family (Balkwell & Halverson, 1980). Conflicts can occur between the parents if they disagree on child-rearing practices in general and particularly if they disagree on the proper management techniques for dealing with the hyperactive behaviors. If the assumption is made
that one caregiver is responsible for the ADHD child, little
time or energy will be left to devote to the spouse and
marital stresses may arise. In those cases where the child
is so severely hyperactive that constant supervision is
essential, the parents may be forced to engage separately in
family activities that otherwise they would choose to share.
In addition, family outings might be limited because certain
activities provide too much stimulation for the hyperactive
child and willing babysitters are difficult to find. If
babysitters are found, they often require special training
or extensive instructions in how to deal with and control
the ADHD child's behavior (Balkwell & Halverson, 1980).

Resources that usually are available to families
through informal helping networks may not be as available to
a family with a ADHD child. For example, friends,
relatives, and neighbors may be less willing to exchange
such services as keeping children overnight if one child is
difficult to manage. As a result, social outlets that
provide variety to daily life may rarely be available for
parents who need a respite from the demands of rearing an
unusually difficult child. Thus, parents may be forced to
rely exclusively on each other in dealing with their
"problem" child, a situation that, understandably, can
produce a great deal of stress.

Problems centered around sibling conflicts also add to
the stress in a family with a hyperactive child. Research
indicates that mothers of hyperactive children interact more
frequently with hyperactive children than did mothers of either normal or learning disabled children (Campbell, 1975; Mash & Johnston, 1983b). If the parents' attention is directed toward the management of one difficult child, the other children in the family may come to resent the fact that they do not receive as much time and/or care. Stresses and resentments may develop as well, if the ADHD child is rewarded for behavior that would not be considered appropriate for a normal sibling of the same age. If the family's social activities (vacations, traveling, having friends over for dinner, or attending formal events together) have to be restricted because of the presence of a severely hyperactive child, the siblings may feel hurt or resentful. Embarrassment over the unpredictable behavior of a hyperactive child may affect the peer relationships and interactions of the siblings (Balkwell & Halverson, 1980). All of these scenarios involving the ADHD child and his siblings act either directly or indirectly to increase the likelihood of elevated parental stress.

Interactions with members of the larger community can add additional stress to that experienced within the family of an ADHD child. Complaints about the child's behavior may come from officials of the school system or from neighbors who come in contact with the child. To control the behavior of their ADHD children, parents often use behavioral techniques and medications that are not well understood by others within their community. In some instances, the
parents' behavior as well as that of the child is criticized (Cole, 1975). It should also be noted that behavior modification programs designed by helping professionals to increase appropriate behavior require a heavy investment of time and energy from the child's parents if the desired behaviors are to be developed and maintained (Balkwell & Halverson, 1980). These demands are likely to add to the parental stress.

Research supports the conceptualization that parental stress is caused by the interaction of child, parental, and situational variables. For instance, self-reports of maternal depression were significantly related to the perceived degree of distress mothers attributed to their children (Breen & Barkley, 1988; Brody & Forehand, 1986; Panaccione & Wahler, 1986), while Compas, Howell, Phares, Williams, and Giunta (1989) found that mothers' reports of children's problems were predicted by mothers' psychological symptoms. The type of situation in which the child was involved (whether play or a supervised task) was also related to the mothers' reports of stress and self-esteem (Mash & Johnston, 1983b). Thus, it is likely that, as Dumas (1986) suggested, the child's actual behavioral characteristics, parental and family functioning, and available social resources all contribute unique effects to parental perceptions of child deviance and stress in caretaking.
It is evident from the preceding review of the parental stress literature that a useful assessment measure of parental stress must incorporate child variables, parental variables and situational variables directly related to the role of being a parent. Some possible child variables to be included are temperament, demandingness, conduct problems, and follow-through. Seemingly important parent variables include depression, competency, and role satisfaction. Situational variables of interest include spousal support, social resources, and socioeconomic factors. Such an assessment measure, the Parenting Stress Index (PSI; Loyd & Abidin, 1985), has been developed and will be described in detail in the method section of this paper. Two additional variables of particular interest in the proposed study are the parents' locus of control orientation, and the child locus of control orientation.

Locus of Control Orientation

The internal-external control of reinforcement construct was first described in Rotter's social learning theory (Rotter, 1954). As summarized by Lefcourt (1966), Rotter's control construct is a generalized expectancy, operating across a wide variety of situations, that describes the degree to which a person believes that he possesses or lacks the power to control what happens to him. The construct is further described as distributing individuals on a continuum according to the degree to which
they accept personal responsibility for what happens to them. As a general rule, internal control refers to the perception of positive and/or negative events as being a consequence of one's own action and thereby, under personal control; external control refers to the perception of positive and/or negative events as being unrelated to one's own behaviors and, therefore, beyond personal control (Rotter, 1966).

Early research attested to the validity of the locus of control construct (Abrahamson, Schludermann, & Schludermann, 1973; Mirels, 1970) and predicted that an internal orientation would be associated with more positive characteristics and outcomes. Specifically, it was predicted that an internal person (someone who perceives himself as personally responsible for the rewards and punishments that come to him) would be more adaptive, demonstrate better adjustment patterns, and have a better self-concept. The external person, on the other hand, perceiving himself as a pawn with little control over his fate, would be less adaptive and more prone to maladjustment (DuCette, Wolk, & Soucar, 1972). In certain respects, these original hypotheses have been upheld. For example, the personality configuration of internals is generally more positive than that of externals (Hersch & Scheibe, 1967), whereas schizophrenic and retarded individuals are more external than normal individuals (Bialer, 1961; Cromwell, Rosenthal, Shakow, & Kahn, 1961). Furthermore, internals
score lower on indices of suicide potential (Williams & Nickels, 1969), are less likely to demonstrate extreme, non-adaptive behavior (DuCette & Wolk, 1972), and are more likely to be successful in school (Crandall, Katkovsky, & Crandall, 1965; Crandall, Katkovsky, & Preston, 1962; McGhee & Crandall, 1968).

However, additional research has pointed out that there are situations in which a degree of externality may be a positive characteristic in that it may serve as a defense against negative self-evaluation (Epstein & Komorita, 1971; Phares, Ritchie, & Davis, 1968). This is supported by research showing that the differences between externals and internals in attributing responsibility for an outcome to personal characteristics are greater following failure than following success (Davis & Davis, 1972). More recent research also indicates that individual differences such as gender, and situational variables such as the intensity of the situation may moderate the adaptive effects of locus control orientation (Solomon, Mikulincer, & Benbenishty, 1989; Toves, Schill, & Ramanaiah, 1981). Once again the interaction between individual characteristics and situational variables appears important.

**Parental Influences**

Since it is believed that an internal locus of control is preferable in many situations, research as to the parental antecedents of locus of control has been
undertaken. Joe (1971) presents several studies which suggest that the parent who is warm, supportive, permissive, flexible, approving, consistent in discipline, and who expects early independent behaviors from his child is more likely to encourage his child's belief in internal control than is the parent who is rejecting, punitive, dominating, and critical (Katkovsky, Crandall, & Good, 1967; Davis & Phares, 1969). Wichern and Nowicki (1976) attempted to pursue this research further and found that mothers of internals not only allow autonomy at an earlier age but also provided their children with earlier intentional independence training. Subsequent research found that mothers of externals exhibited a protective child-rearing style (Barling, 1982) and gave more direct help than did mothers of internals (Tennis, 1977). In addition, researchers found that mothers of internal sons were more likely to be suggestive, rather than directive (Loeb, 1975) as well as rewarding of independence, and internal in their own control orientation (Chandler, Wolf, Cook, & Dugovics, 1980).

Whether a parent's locus of control orientation is an antecedent in the development of their child's locus of control orientation or a reaction to a specific child has not yet been unequivocally determined. However, the assumption is often made that parents view the results of their own child-rearing practices in much the same way that they regard other activities in their lives, either as a product of skill or of chance. Consequently, it is not
surprising that those parents who have internal orientations view themselves as having a more direct influence on their children's behavior than those parents with external orientations. Thus, parents who see their child's behavior problems as outside parental control have a more external orientation than those parents who see their child's behavior problems as a direct consequence of their parenting efforts (Harris & Nathan, 1973). A study by Ollendick (1979) found that children who had two parents with external locus of control orientation exhibited significantly more anxiety (as measured by the State-Trait Anxiety Inventory for Children) than other children who had at least one, or both, parents with internal locus of control orientation. Externally scoring parents also had children higher in external control and lower in achievement. These results indicate the benefits of children having at least one internally controlled parent, and point out the need for investigation of parental locus of control and specific child-rearing attitudes and behaviors.

The investigation of parental locus of control has been made easier by the development of such assessment measures as the Parenting Sense of Competency Scale (PSOC: Johnston & Mash, 1989) and the Parental Locus of Control Scale (PLOC: Campis, Lyman, & Prentice-Dunn, 1986). The PSOC examines parental satisfaction and competency, while the PLOC, which will be discussed in more detail later, examines the parent's perception of locus of control as it relates to the
parenting role and parent-child interactions. One study using the PLOC found that mothers who exhibit external locus of control are more likely to have a child with behavior problems which they (the parents) feel unable to control (Mouton & Tuma, 1988).

In summary, it appears that parental locus of control orientation is related to parental perceptions of their child's behavior and to their way of interacting with the child. However, the impact of the child's locus of control orientation remains to be discussed.

**Child Locus of Control Orientation**

The investigation of the locus of control variable was extended to children after considerable research had been done with adults. Nowicki and Strickland (1973) developed a scale, which will be described in detail later, to assess locus of control orientation in children. The first area examined using this measure involved internal-external locus of control and its relationship to school achievement. Nowicki and his colleagues (Nowicki & Roundtree, 1971; Nowicki & Strickland, 1973; Nowicki & Walker, 1974) found significant relationships between internal locus of control and higher grade point averages, but not intelligence, for twelfth graders' and college students. They also report a significant correlation between internal locus of control and reading achievement for both sexes and a significant relationship with mathematics for males but not for females.
Learning disabled children also exhibit a more external locus of control (Hallahan, Gajar, Cohen, & Tarver, 1978). The hypothesis that a more internal locus of control orientation is related to higher achievement levels has received support from numerous other studies as well (Bartel, 1971; Bottinelli, & Weizmann, 1973; Shore, Milgram, & Malasky, 1971).

Effect of Locus of Control on Motivation and Cognition. In an attempt to explain the tendency for internals to exhibit higher academic achievement than externals, Bar-Tal and Bar-Zohar (1977) suggest that the perception of locus of control may have an impact on an individual's motivational and cognitive reactions. These motivational and cognitive reactions, in turn, may influence an individual's achievement performance. It seems likely that the extent to which children believe that they have control over the environment affects their motivation to perform within that environment. Specifically, internal children who believe that their behavior accounts for their academic successes and failures, and that they can manipulate and control their own reinforcements (e.g., teacher and parent approval), will actively direct their efforts to succeed in academic tasks. These children are more likely to show vigorous initiative in academic performance and are more likely to manifest continuous progress, as well as persistence in the face of temporary failure. Conversely, external children, who feel that they cannot change events in school, that successes and
failures are dependent on the whim or desire of other people or circumstances, and that they cannot control their own reinforcement, have little reason to exert task-oriented effort in an attempt to improve their academic achievement (Bar-Tal & Bar-Zohar, 1977).

Perception of locus of control also may be linked with differential cognitive reactions. Individuals who feel they can influence the environment will actively seek ways to control that environment, when that control can be instrumental in the attainment of their goals. In order to manipulate the environment effectively individuals must be able to collect and use relevant information. It is important to note that the ability to collect and use information implies that the individuals pay attention to it, are able to distinguish relevant from irrelevant information, are able to efficiently extract information even from ambiguous situations, and are capable of organizing and utilizing the collected information. If the assumption is made that internal individuals possess these abilities to a greater extent than externals, then it would be expected that success-motivated internals would tend to engage more vigorously in the collection and utilization of information that could help them in the pursuit of their academic goals. Conversely, it would be expected that external individuals, who feel that they cannot influence the environment, would not see much utility in collecting task-related information in order to change their

Several studies have focused on the types of cognitive reactions displayed by internals and externals. For instance, Seeman (1963) found that internals are superior to externals in recall of information that was relevant to the attainment of personal goals. These results suggest that individuals who believe that they can control the environment are more likely to attempt to collect and recall useful information. In another study, Davis and Phares (1967) found that internals not only recall more information than externals, but also engage in seeking additional information, especially with respect to an ambiguous situation. Both Ducette and Wolk (1973), and Bottinelli and Weizmann (1973) found that internals extracted, recalled, and used task-relevant information in a manner superior to that of externals. In addition, Gozali, Cleary, Walster, and Gozali (1973) noted that internals, in comparison to externals, use specific identifiable test taking strategies that result in high achievement test scores.

In summary, it appears that in task-related situations internals tend to exhibit a distinct motivational style. They tend to show more initiative, exert more effort, and persist to a greater degree than externals. Internals also tend to differ in their cognitive reactions. They focus on task-relevant information to a greater extent than externals, and they use it more effectively (Bar-Tal & Bar-
Since it appears that an internal orientation is preferable, at least in achievement situations, it is necessary to determine whether locus of control orientation can be modified.

Modification of Locus of Control. In an effort to investigate whether internal-external beliefs are susceptible to modification, the locus of control orientation of seventh, eighth, and ninth-grade males (predominantly black) from inner-city schools was assessed as they entered a structured camp situation in which the counselors sought to make clear the connection between the campers' behavior and resultant rewards. As hypothesized, campers were significantly more internal upon reassessment at the end of their camp session (Nowicki & Strickland, 1973). Other special educational programs aimed at changing a child's perception of locus of control, either directly (Shore, Milgram, & Malasky, 1971) or indirectly, through teacher training (De Charms, 1972), have proven successful as well. These findings suggest that perception of locus of control can be modified by manipulating the environment. It appears that certain structured programs have succeeded in changing the perception of locus of control toward a more internal orientation, and that these orientation changes are related to improvement in academic achievement. Such results, if replicable have significant implications for educators and parents.

**Treatment of ADHD and Locus of Control.** One final topic involves both ADHD and the locus of control construct. Stimulant medication is a frequently used and widely accepted treatment for ADHD. Despite its success, the use of medication with ADHD children has been criticized for its possible iatrogenic effects. Specifically, it has been suggested that stimulant medication may lower self-esteem (Whalen, Henker, & Hinshaw, 1985) and lead children to attribute their behavior to external factors (e.g., the medication) and view their own efforts or abilities as playing a relatively minor role (Whalen & Henker, 1976; Rosen, O'Leary, & Conway, 1985). Henker, Whalen, and Hinshaw (1980) pointed out that although external causal attributions for the source of behavior problems may be adaptive by reducing guilt and blame, external attributions for the control of those problems may be counterproductive. Parents whose ADHD children are given medication may come to believe that their children are incapable of controlling
their own behavior (Whalen & Henker, 1976). Such parental attributions may have secondary negative effects on their children’s sense of control and behavior.

Two recent studies (Borden & Brown, 1989; Milich, Licht, Murphy, & Pelham, 1989) investigating these concerns found that the treatment condition (medication, cognitive-training, placebo) did not negatively affect the attributions children made. The children actually used medication as an explanation for their success significantly less often than either ability or effort. However, Borden and Brown (1989) did report a significant effect of treatment condition on the parents’ attributions. They found that, while parents in the three groups did not differ in their beliefs about the role of medication, parents of children who received cognitive therapy and the placebo were more likely than the cognitive therapy alone group to consider problem solutions outside their children’s control. The researchers suggest that these findings are important because the child on medication might detect, and come to believe, their parent’s external attributions regarding their behavior.

In summary, the locus of control literature indicates that internal-external orientation may affect the parent-child relationship in several ways. The parental locus of control is related to the parent’s perception of their child’s behavior and of themselves, and may result in particular strategies for handling their child’s behavior.
and their own stress. The child's locus of control has an impact on his/her functioning in various areas including academic achievement, delay of gratification, and problem solving. It also seems quite likely, although it is not well researched, that the locus of control orientation of both parent and child would have an impact on their interactions with each.

Purpose of the Study

The preceding literature review supports the widely held belief that Attention-deficit Hyperactivity Disorder is a common childhood disorder that results in varying degrees of difficulty across multiple situations. One of the most problematic areas for ADHD children involves their interactions with their parents. Research has shown that raising a normal child can be stressful, and raising an ADHD child is even more likely to increase parental stress. Parental stress also is related to numerous parent, child, and environmental variables which act to moderate the degree of distress experienced. One such variable, locus of control orientation, has been shown to affect both parent and child functioning.

The present study proposes to define more clearly the relationship between parental stress in mothers and fathers and the severity of specific symptoms of ADHD (namely, hyperactivity/impulsivity, and inattention). As was previously emphasized, individuals diagnosed with ADHD
constitute an extremely heterogeneous population. While it is assumed that, by definition, these children will exhibit some degree of hyperactivity, impulsivity, and inattention, the extent to which these symptoms are present in each child varies considerably. Prior research has examined the interpersonal functioning of ADHD children as a heterogeneous whole, without regard to the possibility that children, exhibiting different symptoms to a greater or lesser degree, also may vary in their ways of interacting with each of their parents. These differential patterns of interaction could subsequently result in varying degrees of parental stress.

The present study addresses the problem of heterogeneous samples by including as independent variables each of the specific symptoms and by examining their individual relationships with parental stress. The current study also includes aggression as an independent variable and determines its relationship to parental stress. This is done in accordance with recent research that indicates that ADHD children who exhibit aggressive symptomatology may constitute a distinct subtype of ADHD which is significantly different in manifestation, treatment, and prognosis from ADHD without aggressiveness. Thus, the inclusion of aggression as a separate variable extends the current understanding of the relationship between aggressiveness in ADHD children, and parental stress. The first hypothesis evolves from these goals.
H1: Impulsivity-hyperactivity, inattention, and aggression, as symptoms of Attention-deficit Hyperactivity Disorder, will each be positively related to the expression of parental stress.

An additional purpose of the proposed study is to investigate the interaction of parent locus of control and child locus of control orientation with the severity of specific ADHD symptoms in the presentation of parental stress. The literature review indicates that parents with an external locus of control orientation tend to view their child’s behavior problems as outside parental control, while parents with an internal locus of control orientation tend to see their child’s behavior problem as a direct consequence of their parenting efforts. It is possible that internal-external orientation could exacerbate or ameliorate parental stress in the face of ADHD symptoms and behaviors. Furthermore, children's locus of control orientation is related to the way they approach difficult situations and interpersonal interactions. Thus, their internal-external orientation could also indirectly affect parental stress. The second set of hypotheses is based upon these suppositions.

H2a: Parental locus of control will be significantly related to the expression of parental stress.

H2b: The relationship between a child’s aggressiveness and parental stress will depend on the parental locus of control orientation.
H2c: The relationship between a child's impulsivity/hyperactivity and parental stress will be moderated by the parental locus of control orientation.

H2d: The relationship between a child's inattentiveness and parental stress will depend on the parental locus of control orientation.

H2e: The child's locus of control orientation will be significantly related to parental stress. Specifically, an external locus of control in the child will act to intensify parental stress.

Please note that the same hypotheses are made for both mothers and fathers. The data collected from mothers and fathers will be analyzed separately in order to identify relationships that may be specific to one parent or the other.
Method

Subjects

Sixty boys aged 6 through 12 years (Mean age = 8.73, SD = 1.96) participated in the study (see Table 1). These boys were identified from the population of children referred by teachers, pediatricians, or parents to a private practice clinical psychologist for evaluation. One hundred and thirty-seven subjects were asked to participate in the study over the course of 18 months. Five of these either declined to be involved or failed to complete the necessary measures. Seventy-two subjects were omitted from the study after failing to meet the inclusion criteria described in the Procedure section.

Of the remaining sixty boys, fifty-nine were Caucasian while one was African-American. Eighty-five percent of the boys' parents were married while 15% were divorced at the time of the evaluation. In situations where the parents were married, both mothers and fathers completed parental inventories. In situations where the parents were divorced the parental involvement occurred as follows: in two instances only the child's mother completed inventories, in three instances the biological mother and biological father completed the inventories, and in four instances the mother and step-father completed the inventories. All the mothers
<table>
<thead>
<tr>
<th>Demographic Variable</th>
<th>n</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child's age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>11</td>
<td>18</td>
</tr>
<tr>
<td>7</td>
<td>9</td>
<td>15</td>
</tr>
<tr>
<td>8</td>
<td>7</td>
<td>12</td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>15</td>
</tr>
<tr>
<td>10</td>
<td>12</td>
<td>20</td>
</tr>
<tr>
<td>11</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>12</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Child's grade</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>13</td>
<td>22</td>
</tr>
<tr>
<td>2</td>
<td>9</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>4</td>
<td>12</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>11</td>
<td>18</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Medication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>no</td>
<td>52</td>
<td>87</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>59</td>
<td>98</td>
</tr>
<tr>
<td>African-American</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>51</td>
<td>85</td>
</tr>
<tr>
<td>Divorced</td>
<td>9</td>
<td>15</td>
</tr>
<tr>
<td>Mother's Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>high school graduate</td>
<td>18</td>
<td>30</td>
</tr>
<tr>
<td>some college/vo-tech</td>
<td>22</td>
<td>37</td>
</tr>
<tr>
<td>4-year college graduate</td>
<td>16</td>
<td>27</td>
</tr>
<tr>
<td>master's/doctoral degree</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>N/A</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Father's Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>some high school</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>high school graduate</td>
<td>11</td>
<td>18</td>
</tr>
<tr>
<td>some college/vo-tech</td>
<td>29</td>
<td>48</td>
</tr>
<tr>
<td>4-year college graduate</td>
<td>12</td>
<td>20</td>
</tr>
<tr>
<td>master's/doctoral degree</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>N/A</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
Table 1 (continued)

<table>
<thead>
<tr>
<th>Demographic Variable</th>
<th>n</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$11,000-20,000</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>$21,000-30,000</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>$31,000-40,000</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>$41,000-50,000</td>
<td>16</td>
<td>27</td>
</tr>
<tr>
<td>$51,000 or more</td>
<td>23</td>
<td>38</td>
</tr>
<tr>
<td>N/A</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

N/A = not available. Parents did not provide information.

participating in this study had graduated from high school. Thirty-one percent of the mothers did not pursue higher education, 38% had taken additional vocational/technical training or some college courses, 28% had graduated from college, and 3% held master’s or doctoral degrees. All but 5% of the fathers participating in this study had graduated from high school. Nineteen percent of the fathers halted their formal education after completing high school, 49% had taken additional vocational/technical or college courses, 20% had graduated from college, and 7% held master’s or doctoral degrees. The average income of the families was between $31,000 and $40,000. Eight of the boys were on medication for behavioral difficulties at the time of the assessment. Boys presenting with physical impairments such as seizure disorders, mental retardation, visual or hearing deficits were not included in the study, but were evaluated in the usual manner. Such exclusion is consistent with the literature in the field and is a means of eliminating
variables that would potentially confound the evaluation of boys with Attention-deficit Hyperactivity Disorder.

The boys included in the study were diagnosed as having Attention-deficit Hyperactivity Disorder by a licensed psychologist in a private practice setting using the DSM-III-R criteria (see Appendix A). The process of selection and diagnosis will be described further in the Procedure section.

**Measures**

**Conners Parent Rating Scale-Revised (CPRS-R)**

The CPRS-R (Goyette, Conners, & Ulrich, 1978) is composed of 48 items including behaviors that describe the core symptoms of ADHD (see Appendix B). This measure is an abridged version of a 93 item parent rating scale (Conners, 1970) which has been shown to discriminate between normal and hyperactive children (Conners, 1970; Kupietz, Bialer, & Winsberg, 1972). Principle component factor analyses of this 48 item instrument initially produced a six factor structure; however, two of the factors were combined because of their conceptual similarity resulting in a five factor structure. Factors I, II, and IV of the CPRS-R will be used in the current study and are of particular interest. Factor I, which will be referred to as Aggression, appears to be a clear factor of aggressive or defiant behavior problems (Goyette, Conners, & Ulrich, 1978). Factor II, which the
authors labelled Learning Problem, reflects attention and distractibility difficulties and will be referred to as Inattention. Factor IV, Impulsive-Hyperactive, reflects restlessness, excitability and troublesome behavior but lacks the aggressive components of Factor I. The other two factors, Factor III, Psychosomatic, and Factor VI, Anxiety will not be used in the present investigation.

The child's parents are asked to rate each behavior on a scale with the following anchors: "Not at All" (0), "Just a Little" (1), "Pretty Much" (2), and "Very Much" (3). Factor scores are obtained by summing the scores of those items composing a particular factor. With respect to interrater reliabilities, parents have been shown to be relatively consistent in rating their children's behavior using the CPRS-R. Correlations of parent versus teacher factor scores were found to be acceptable although lower than mother-father comparisons. This is understandable given the situational differences. Test-retest reliabilities are acceptable although there is some evidence of a practice effect.

**Parental Locus of Control Scale (PLOC)**

The PLOC (Campis, Lyman, & Prentice-Dunn, 1986) is an assessment measure used to investigate locus of control orientation as it relates to the parenting role and parent-child interactions with elementary school aged children (see Appendix C). The PLOC consists of 47 items that are rated
on a 5-point Likert-type scale ranging from "Strongly Agree" (1) to "Strongly Disagree" (5). Factor analysis resulted is five factors: Parental Efficacy, Parental Responsibility, Child Control of Parents' Life, Parental Belief in Fate/Chance, and Parental Control of Child's Behavior. High scores on the various subscales indicate the following: Parental Efficacy - parent who does not feel effective in the parenting role; Parental Responsibility - parent who does not feel responsible for their child's behavior; Child Control of Parent's Life - parent who feels that his/her child's needs and demands dominate his/her life; Parental Belief in Fate/Chance - parent who believes that parenting and child behavior are influenced by external factors such as fate or chance; Parental Control of Child Behavior - parent who feels unable to control his/her child's behavior.

Further item analysis resulted in the following Cronbach alpha reliability coefficients for the five subscales: Parental Efficacy (.75), Parental Responsibility (.77), Child Control of Parents' Life (.67), Parental Belief in Fate/Chance (.75), and Parental Control of Child's Behavior (.65). The total scale as it will be used in the present study was found to have a reliability coefficient of .92. A second study resulted in similar reliability coefficient values with the exception of Parental Efficacy (.44). However, elimination of one item (#21) from the subscale increased the alpha coefficient to .62. Therefore, the authors recommend that future researchers omit this
item. A moderate correlation (.33) between the PLOC and Rotter's I-E Scale indicates that these two measures tap related, but not identical, locus of control constructs. This is to be expected given the more specific focus of the PLOC. Discriminant validity of the overall PLOC scale and its subscales has been established; it is capable of discriminating between parents experiencing difficulty in parenting and those who are not (Campis, Lyman, & Prentice-Dunn, 1986; Mouton & Tuma, 1988).

**Children's Nowicki-Strickland Internal-External Scale (CNSIE)**

The CNSIE (Nowicki & Strickland, 1973) is one of a series of parallel forms developed by Nowicki and Strickland to assess general locus of control orientation across multiple developmental ages (see Appendix D). The CNSIE, developed for use with elementary and secondary school populations, is a paper and pencil measure consisting of 40 items. The 40 yes or no questions are scored in the external direction with a higher score indicating a more external locus of control orientation. Split-half reliabilities were reported as .63 for grades 3, 4, and 5, .68 for grades 6, 7, and 8, .74 for grades 9, 10, and 11, and .81 for grade 12. Test-retest reliabilities range from .76 over a period of six weeks (Deysach, Keller, Ross, & Hiers, 1975) to .52 after one year (Prawat, Grissom, & Parish, 1979). In terms of convergent validity, Nowicki and
Strickland (1973) report moderate relationships between the CNSIE scale and other measures of locus of control. Also, CNSIE scores were not related to social desirability (Nowicki & Strickland, 1973).

**Parenting Stress Index (PSI)**

The PSI (Abidin 1990; Loyd & Abidin, 1985) is an assessment measure used to investigate the stress a parent experiences as a function of certain child, parent, and situational characteristics (see Appendix E). The current version, Form 6, consists of 101 items which the parents rate on a 5-point Likert-type scale ranging from “Strongly Agree” (1) to “Strongly Disagree” (5). Nineteen additional major life events items may or may not be administered.

The PSI measures two major domains reflecting stress in the parent child relationship. The first domain represents child characteristics and includes six subscales that constitute the total child domain score. These subscales are Adaptability, Acceptability, Demandingness, Mood, Distractibility and Activity, and Reinforcement. High scores on the Child Characteristics domain (≥122) depict children whose qualities make it difficult for parents to succeed in their parenting roles. More specifically, high scores on the Child Characteristics domain subscales indicate the following: Child Adaptability - children who find it difficult to adjust to changes and transitions; Child Acceptability - children whose intellectual, physical,
and/or emotional characteristics do not match the parents' expectations; Child Demandingness - children who make many intrusions and demands on their parents; Child Mood - children whose affective functioning shows evidence of dysfunction; Child Distractibility/Hyperactivity - children who exhibit ADHD type behaviors and require active parental management and sustained vigilance; Reinforces Parent - children who are not a source of positive reinforcement for their parents (Abidin, 1990).

The second domain represents parent characteristics and includes seven subscales which constitute the total parent domain score. These subscales are Depression, Parental Attachment, Restrictions of Role, Parental Sense of Competence, Social Isolation, Relationship with Spouse, and Parental Health. In general high scores on the Parental Characteristics domain (>153) suggest that the sources of stress and potential dysfunction of the parent-child system may be related to dimensions of the parent's functioning. More specifically, high scores on the Parent Characteristics domain subscales indicate the following: Depression - parents who exhibit signs of depression and whose emotional availability to the child may be impaired; Parental Attachment - parents who do not feel a sense of emotional closeness to the child or are unable to accurately read and understand the child's feelings and/or needs; Restrictions of Role - parents who experience the parental role as restricting their freedom and frustrating them in attempts
to maintain their own identity; Parental Sense of Competence - parents who do not feel they are capable in rearing their child; Social Isolation - parents who are socially isolated from their peers, relatives, and other emotional support systems; Relationship with Spouse - parents who lack the emotional and active support of the other parent in the area of child management; and Parental Health - parents with multiple health problems (Abidin, 1990).

A high total score (≥260) strongly indicates significant stress within the parent-child system and parents who obtain raw scores at or above 267 should be offered a referral for professional consultation. A low total score (≤175) may indicate one of three possibilities; defensive responding, dishonest responding, or disengaged parents. There is a 15 item defensive responding scale to aid in detecting this pattern of endorsement. Parents who respond in this manner are either reluctant to admit they are having problems or their stress levels are deflated due to minimal investment and involvement with their child. The normal range for the total score (180-250) is from approximately the 15th to the 80th percentile (Abidin, 1990). A high score (≥17) on the Life Stress scale suggests that an individual is experiencing stressful situational circumstances which are most likely beyond his/her control. In effect, high Life Stress scores tend to intensify the total stress that the parent is experiencing.
Item analysis (Loyd & Abidin, 1985) resulted in alpha reliability coefficients that ranged in magnitude from .62 to .70 for the subscales of the Child Domain, and from .55 to .80 for the subscales of the Parent Domain. The reliability coefficients for the Child Characteristics Domain and the Parent Characteristics Domain were .89 and .93, respectively. The reliability coefficient for the total stress score, which will be used as the dependent variable in the present study, is .95. These coefficients are sufficiently large to indicate a high degree of internal consistency. Test-retest reliability is also well established. Spearman rank-order coefficients of .817 and .706 were reported for the Child Domain and Parent Domain, respectively, across a three week interval (Abidin, 1990).

Procedure

During the course of evaluating all new referrals of hyperactivity to a private practice psychologist's office, determination of acceptance for inclusion in this study was made. Specifically, once a child was referred, the psychologist and/or the researcher (a 5th year psychology graduate student who was working with the psychologist) held a pre-conference with the child's parents. During this session, information about the child's presenting problem(s) and background was gathered. If the child in question was a 6-12 year old male, and if the information gathered suggested that ADHD was a possible diagnosis, then the purpose and procedure of the study were explained to the parents of that child. They were asked to sign a consent form (see Appendix B) confirming their participation as well as that of their child. The parents were then given packets containing the Conners Parent Rating Scale-Revised (CPRS-R), the Parental Locus of Control Scale (PLOC), the Parenting Stress Index (PSI) (see Appendices C, D, and E, respectively), and other measures deemed necessary for the clinical evaluation with instructions to complete and return them during the course of their son's evaluation.

As part of the regular clinical evaluation, each child participated in four testing sessions, with no more than one session occurring daily. Each testing session was approximately forty-five minutes to one hour in duration.
Two of these four sessions were used to administer the Wechsler Intelligence Scale for Children-Revised (WISC-R). The Kaufman Test of Educational Achievement (KTEA), which was not used in the current study, was administered during the third session.

The Children's Nowicki-Strickland Internal-External Scale (CNSIE; see Appendix F) was administered during the fourth session along with the typically administered Children's Depression Inventory, the Revised Children's Manifest Anxiety Scale, and Rotter's Incomplete Sentences. Except for the addition of the PSI, PLOC, and CNSIE, no other deviation from the normal assessment/treatment procedure was imposed on the children selected for inclusion in this study.

After the testing sessions were completed and the assessment measures returned and scored, each boy was rated as to the presence or absence of each of the fourteen behaviors listed in the DSM-III-R as indicative of ADHD (see Appendix A). The private practice psychologist and the researcher rated each boy independently using all available sources of information. If the criterion of eight out of fourteen symptoms was not met in either the psychologist's or the researcher's rating, that child was excluded from the study, although their clinical evaluation continued as it normally would. Because a more conservative diagnosis was desired, 75% agreement between raters on the specific items endorsed was required for inclusion in the study. Seventy-
two boys were excluded because the criterion of eight out of fourteen symptoms by each rater and 75% agreement between raters on specific items was not met. Inter-rater reliability was determined by calculating the Pearson product-moment correlation between the rating given by each rater. The resulting $r = .80$ indicates high agreement between the raters. Regardless of decisions concerning inclusion in this study, the results of all measures completed by the parents and child were reviewed with the parents following the evaluation and appropriate treatment recommendations were made.

**Results**

**Preliminary Analyses**

Descriptive statistics including the mean, standard deviation, minimum and maximum values, and number of subjects were obtained for the dependent and independent variables. These statistics are presented in Table 2.

Preliminary correlations were calculated to determine which of the independent variables (i.e., impulsivity/hyperactivity, inattention, aggression, parental locus of control orientation, child locus of control orientation, and Full Scale IQ) were significantly correlated with the dependent variable, parental stress. These correlations are listed in Table 3.
<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Minimum Value</th>
<th>Maximum Value</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mother's rating of:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hyperactivity/impulsivity</td>
<td>7.10</td>
<td>3.23</td>
<td>0</td>
<td>12</td>
<td>60</td>
</tr>
<tr>
<td>Inattention</td>
<td>7.82</td>
<td>2.89</td>
<td>1</td>
<td>12</td>
<td>60</td>
</tr>
<tr>
<td>Aggression</td>
<td>9.03</td>
<td>5.96</td>
<td>0</td>
<td>24</td>
<td>60</td>
</tr>
<tr>
<td><strong>Mother's total PLOC score</strong></td>
<td>128.13</td>
<td>14.82</td>
<td>97</td>
<td>175</td>
<td>60</td>
</tr>
<tr>
<td><strong>Mother's total PSI score</strong></td>
<td>265.58</td>
<td>42.61</td>
<td>194</td>
<td>398</td>
<td>60</td>
</tr>
<tr>
<td><strong>Father's rating of:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hyperactivity/impulsivity</td>
<td>6.03</td>
<td>2.79</td>
<td>1</td>
<td>11</td>
<td>58</td>
</tr>
<tr>
<td>Aggression</td>
<td>7.52</td>
<td>4.88</td>
<td>0</td>
<td>21</td>
<td>58</td>
</tr>
<tr>
<td>Inattention</td>
<td>6.71</td>
<td>2.57</td>
<td>1</td>
<td>12</td>
<td>58</td>
</tr>
<tr>
<td><strong>Father's total PLOC score</strong></td>
<td>121.64</td>
<td>12.28</td>
<td>93</td>
<td>171</td>
<td>58</td>
</tr>
<tr>
<td><strong>Father's total PSI score</strong></td>
<td>250.84</td>
<td>36.59</td>
<td>158</td>
<td>332</td>
<td>58</td>
</tr>
<tr>
<td><strong>Child's LOC score</strong></td>
<td>17.25</td>
<td>4.02</td>
<td>6</td>
<td>25</td>
<td>60</td>
</tr>
<tr>
<td><strong>Full Scale IQ score</strong></td>
<td>119.77</td>
<td>19.11</td>
<td>70</td>
<td>150</td>
<td>60</td>
</tr>
</tbody>
</table>

PLCC = Parental Locus of Control
LOC = Locus of Control
PSI = Parenting Stress Index
Table 3
Correlation Matrix: Dependent and Independent Variables

<table>
<thead>
<tr>
<th></th>
<th>Total Parental Stress Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mother's</td>
</tr>
<tr>
<td>Mother's rating of:</td>
<td></td>
</tr>
<tr>
<td>Hyperactivity/impulsivity</td>
<td>.5035**</td>
</tr>
<tr>
<td>Aggression</td>
<td>.5424**</td>
</tr>
<tr>
<td>Inattention</td>
<td>.3767**</td>
</tr>
<tr>
<td>Mother's total PLOC score</td>
<td>.6268**</td>
</tr>
<tr>
<td>Father's rating of:</td>
<td></td>
</tr>
<tr>
<td>Hyperactivity/impulsivity</td>
<td>.2005</td>
</tr>
<tr>
<td>Aggression</td>
<td>.0724</td>
</tr>
<tr>
<td>Inattention</td>
<td></td>
</tr>
<tr>
<td>Father's total PLOC score</td>
<td></td>
</tr>
<tr>
<td>Child's LOC score</td>
<td></td>
</tr>
<tr>
<td>Full Scale IQ score</td>
<td></td>
</tr>
</tbody>
</table>

** - Significance level .01
PLOC = Parental Locus of Control
LOC = Locus of Control

As hypothesized in H1, impulsivity/hyperactivity, inattention, and aggression, as symptoms of ADHD, were each positively related to the expression of parental stress for both mothers and fathers. Also, as proposed in H2a, parental locus of control was significantly correlated with parental stress for both parents. The final hypothesis that can be addressed using the correlation matrix (H2e) was not supported. Specifically, the child’s locus of control
orientation was not significantly related to parental stress for either parent.

**Primary Analyses**

Moderated multiple regression analyses were then performed to assess the variance accounted for by each independent variable (H1, H2a, and H2e) and to investigate the hypotheses pertaining to the interaction between parental locus of control orientation and the severity of specific ADHD symptoms in the presentation of parental stress (H2b, H2c, and H2d). Separate analyses were performed using first mother then father reported data. The Total Stress score from the parental stress measure (PSI) served as the dependent variable, while the Impulsive-Hyperactive, Inattention, and Aggression factor scores of the CPRS-R, the Total Scale score from the PLOC, the Total Scale score from the CNSIE, the Full Scale IQ score, and, in some analyses, interaction terms served as independent or predictor variables. The significance level for predictor variables to be entered was set at the 95% confidence level ($\alpha = .05$). In each analysis, the Full Scale IQ score (FSIQ) was forced to enter the equation as the first predictor variable in order to control for the proportion of variance accounted for by intelligence.

**Results Using Mothers’ Data.** Addressing those hypotheses predicting a main effect of ADHD symptoms (H1), mother’s parental locus of control (H2a), and child’s locus
of control (H2e) on mother's parental stress, the multiple regression analysis revealed that the mother's Parental Locus of Control total score was a significant predictor of mother's total PSI score, $t(1,58) = 4.35, p < .005$. A second significant predictor of mother's total PSI score was mother's score on the Aggression factor of the CPRS-R, $t(1,58) = 2.91, p < .005$. Although the Full Scale IQ score was forced to enter the equation, it was not a significant predictor $t(1,58) = -.28, p > .05$. Nor were any other variables significant predictors of mother's total parental stress score. These findings support hypothesis H2a and, in part, H1; however, hypothesis H2e was not supported. The regression equation derived from this analysis was:

$$\text{Mother's total PSI score} = -.06 \times \text{(FSIQ)} + 1.38 \times \text{(Mother's total PLOC score)} + 2.28 \times \text{(mother's score on Aggression factor of CPRS-R)} + 75.05.$$ This model accounted for 47.31% of the variance (Adjusted $R^2 = .4449$).

In order to address hypothesis H2b (that the relationship between a child's aggressiveness and mother's parental stress will depend on the parental locus of control orientation), a moderated multiple regression analysis was conducted with the mother's total PSI score as the dependent variable, and the Full Scale IQ score, the mother's total PLOC score, the Aggression factor score of the CPRS-R, and an interaction term (mother's total PLOC score by the Aggression factor score of the CPRS-R) as the independent variables. The analysis found that the mother's Parental
Locus of Control total score was a significant predictor of mother's total PSI score, $t(1,58) = 4.35, p < .005$. A second significant predictor of mother's total PSI score was mother's score on the Aggression factor of the CPRS-R, $t(1,58) = 2.91, p < .005$. Hypothesis H2b was not supported given that the interaction term was not a significant predictor. The equation derived from this analysis was:

$$\text{Mother's total PSI score} = -0.06 \times (\text{FSIQ}) + 1.38 \times (\text{Mother's total PLOC score}) + 2.28 \times (\text{mother's score on Aggression factor of CPRS-R}) + 75.05.$$  

This model accounted for 47.31% of the variance (Adjusted $R^2 = .4449$).

Hypothesis H2c (that the relationship between a child's impulsivity/hyperactivity and mother's parental stress will be moderated by the mother's parental locus of control orientation) was addressed by conducting a moderated multiple regression analysis with the mother's total PSI score as the dependent variable, and the Full Scale IQ score, the mother's total PLOC score, the Impulsive-Hyperactive factor score of the CPRS-R, and an interaction term (mother's total PLOC score by the Impulsive-Hyperactive factor score of the CPRS-R) as the independent variables. The analysis found that the mother's Parental Locus of Control total score was a significant predictor of mother's total PSI score, $t(1,58) = 3.44, p < .005$. A second significant predictor of mother's total PSI score was the interaction term, $t(1,58) = 2.86, p < .05$. The inclusion of the interaction term as a significant predictor supports
hypothesis H2c. However, neither the Full Scale IQ score nor the Impulsive-Hyperactive factor score of the CPRS-R was a significant predictor. The regression equation derived from this analysis was: Mother's total PSI score = -.14 (FSIQ) + 1.21 (Mother's total PLOC score) + 0.03 (interaction between mother's total PLOC score and the Impulsive-Hyperactive factor score of the CPRS-R) + 97.34. This model accounted for 47.09% of the variance (Adjusted $R^2 = .4426$).

Similarly, hypothesis H2d (that the relationship between a child's inattentiveness and mother's parental stress will depend on the mother's parental locus on control orientation) was addressed by conducting a moderated multiple regression analysis with the mother's total PSI score as the dependent variable, and the Full Scale IQ score, the mother's total PLOC score, the Inattention factor score of the CPRS-R, and an interaction term (mother's total PLOC score by the Inattention factor score of the CPRS-R) as the independent variables. The analysis found that the mother's Parental Locus of Control total score was the only significant predictor of mother's total PSI score, $\chi^2(1,58) = 6.06, p < .005$. Thus, hypothesis H2d was not supported. The regression equation derived from this analysis was: Mother's total PSI score = -.06 (FSIQ) + 1.81 (Mother's total PLOC score) + 40.72. This model accounted for 39.36% of the variance (Adjusted $R^2 = .3724$).
**Results Using Fathers’ Data.** The hypotheses predicting a main effect of ADHD symptoms (H1), father’s parental locus of control (H2a), and child’s locus of control (H2e) on father’s parental stress, were subsequently addressed using data collected from fathers. This multiple regression analysis revealed that the father’s Parental Locus of Control total score was a significant predictor of father’s total PSI score, $t(1,58) = 5.50$, $p < .005$. A second significant predictor of fathers total PSI score was father’s score on the Inattention factor of the CPRS-R, $t(1,58) = 2.71$, $p < .05$. Although the Full Scale IQ score was forced to enter the equation, it was not a significant predictor $t(1,58) = 1.28$, $p > .05$. Nor were any other variables significant predictors of father’s total parental stress score. These findings support hypothesis H2a and, in part, hypothesis H1; however, hypothesis H2e was not supported. The regression equation derived from this analysis was: Father’s total PSI score = $0.24$ (FSIQ) + $1.65$ (Father’s total PLOC score) + $4.00$ (father’s score on Inattention factor of CPRS-R) + $-6.35$. This model accounted for 46.32% of the variance (Adjusted $R^2 = 0.4344$).

To specifically address hypothesis H2b (that the relationship between a child’s aggressiveness and father’s parental stress will depend on the father’s parental locus of control orientation), a moderated multiple regression analysis was conducted with the father’s total PSI score as the dependent variable, and the Full Scale IQ score,
father's total PLOC score, the Aggression factor score of the CPRS-R, and an interaction term (father's total PLOC score by the Aggression factor score of the CPRS-R) as the independent variables. The analysis found that the father's Parental Locus of Control total score was a significant predictor of father's total PSI score, \( t(1,58) = 4.66, p < .005 \). A second significant predictor of father's total PSI score was father's score on the Aggression factor of the CPRS-R, \( t(1,58) = 2.57, p < .05 \). Neither the Full Scale IQ score nor the interaction term was a significant predictor and hypothesis H2b was not supported. The regression equation derived from this analysis was: Father's total PSI score = \(.07 \) (FSIQ) + \(1.51 \) (father's total PLOC score) + \(2.10 \) (father's score on Aggression factor of CPRS-R) + \(42.85 \). This model accounted for 45.65% of the variance (Adjusted \( R^2 = .4274 \)).

To address hypothesis H2c (that the relationship between a child's impulsivity/hyperactivity and father's parental stress will be moderated by the father's parental locus of control orientation), a moderated multiple regression analysis was conducted with the father's total PSI score as the dependent variable, and the Full Scale IQ score, the father's total PLOC score, the Impulsive-Hyperactive factor score of the CPRS-R, and an interaction term (father's total PLOC score by the Impulsive-Hyperactive factor score of the CPRS-R) as the independent variables. The analysis found that the father's Parental Locus of
Control total score was the only significant predictor of father's total PSI score, $t(1,58) = 6.03, p < .005$. Hypothesis H2c was not supported given that the interaction term was not found to be a significant predictor of parental stress. The regression equation derived from this analysis was: Father's total PSI score = .12 (FSIQ) + 1.85 (father's total PLOC score) + 10.28. This model accounted for 39.25% of the variance (Adjusted $R^2 = .3712$).

Finally, hypothesis H2d (that the relationship between a child's inattentiveness and father's parental stress will depend on the father's parental locus on control orientation) was addressed by conducting a moderated multiple regression analysis with the father's total PSI score as the dependent variable, and the Full Scale IQ score, the father's total PLOC score, the Inattention factor score of the CPRS-R, and an interaction term (father's total PLOC score by the Inattention factor score of the CPRS-R) as the independent variables. The analysis found that the father's Parental Locus of Control total score was a significant predictor of father's total PSI score, $t(1,58) = 5.50, p < .005$. A second significant predictor of father's total PSI score was father's score on the Inattention factor of the CPRS-R, $t(1,58) = 2.71, p < .05$. Neither the Full Scale IQ score nor the interaction term was a significant predictor indicating that hypothesis H2d was not supported. The regression equation derived from this analysis was: Father's total PSI score = .24 (FSIQ) + 1.65 (father's total
PLOC score) + 4.00 (father’s score on Inattention factor of CPRS-R) + -6.35. This model accounted for 46.32% of the variance (Adjusted $R^2 = .4344$).

In summary, three of the six hypotheses were supported using the data obtained from mothers, while two of the six hypotheses were supported using the data collected from fathers.
Discussion

Previous research has demonstrated that ADHD children as a whole are at risk for a wide-range of problems, especially in their interactions with others (i.e., parents, siblings, and peers) (Barkley, Karlsson, Strzelecki, & Murphey, 1984; Pelham & Bender, 1982; Raymond, 1990). However, earlier studies have failed to recognize the heterogeneity inherent within the ADHD population when selecting subjects. Specifically, researchers typically have relied on cut off scores or ambiguously defined criteria to define diagnostic groups. Numerous authors have noted that these methods are likely to include those children who possess the most overt symptomatology such as hyperactive or externalizing behaviors, while children whose major difficulties revolve around attentional problems without concomitant hyperactivity, are likely to be excluded from research. The present study was designed to determine the relationship between specific symptoms of ADHD (inattention and impulsivity/hyperactivity) and the degree of stress experienced by their parents. In addition, most researchers have failed to consider the importance of co-occurring problems with aggression in ADHD children. Therefore, this study also investigated the relationship between aggressive symptomatology in boys with ADHD and parental stress.
While each of the ADHD symptom clusters (inattention, and impulsivity/hyperactivity) and aggression are positively related to the expression of parental stress (H1), specific patterns of relationships emerged. For mothers, the presence of aggressive symptomatology in their sons was most predictive of higher levels of parental stress. For fathers, increased levels of parental stress were most highly associated with symptoms of inattention. This is an interesting difference but one that is intuitively appealing and has several plausible explanations. Clinicians frequently report that fathers have a higher tolerance for aggressive, acting out behavior, frequently dismissing it as “boys being boys”. The literature suggests that this may result from fathers spending less total time with their sons and being less involved in the day to day disciplinary interactions. There is also support for the hypothesis that boys act out less when they are with their fathers (Tallmadge & Barkley, 1983; Barkley, 1981a) which results in the fathers having less exposure to this kind of behavior.

The significant relationship between symptoms of inattention and parental stress in fathers is, perhaps, more surprising. A possible explanation is that fathers find the child’s inability to attend, inability to follow through with tasks, and tendency to daydream frustrating and difficult to manage. There has been little research in the area of parental stress in fathers of ADHD children, and the finding of a significant predictor different from that found
with mothers indicates that fathers perceive and respond to
different child behaviors in a unique way. In the past,
when research has included fathers, these differences may
not have emerged due to the heterogeneity problem previously
discussed. Specifically, children experiencing
predominantly attentional difficulties without concomitant
hyperactivity were likely to be excluded from diagnostic
groups determined by cutoff scores. The remaining children
typically exhibit more symptoms of aggression and
impulsivity/hyperactivity which appear to be less
significant as predictors of parental stress for fathers.
Thus, one of the primary indicators of parental stress in
fathers may have been overlooked.

The impulsivity/hyperactivity symptom cluster was not a
significant predictor of parental stress for either parent
despite a high positive correlation in both cases. This
suggests that the impulsivity/hyperactivity symptom cluster
may overlap to a high degree with the other ADHD symptom
clusters, especially aggression. Given that this is true,
it is noteworthy that the aggressive symptom cluster was
more predictive of parental stress in mothers than was the
impulsivity/hyperactivity symptom cluster. This finding is
consistent with the recent literature emphasizing the
importance of considering aggressive symptomatology in the
assessment and treatment of ADHD.

Parental stress also is related to numerous parent,
child, and environmental variables, which act to moderate
the degree of distress experienced. One such variable is locus of control orientation which previously has been shown to affect both parent and child functioning. In perhaps the most important finding of the current study, parental locus of control orientation was found to be the most significant predictor of parental stress for both mothers and fathers (H2a). Specifically, it was found that a parent's perception that he/she has little influence or effective control over his/her child's behavior (an external parental locus of control orientation) is highly related to increased levels of parental stress.

This finding is especially important because it identifies parental locus of control as a possible point of intervention in attempts to improve parent-ADHD child interactions, and subsequently reduce parental stress. A clearer understanding of the relationship between parental locus of control and parental stress assists the clinician in several ways. First, if a parent's locus of control orientation is external with regard to his/her parenting role, his/her more general locus of control orientation is likely to be external as well. That is, he/she is likely to perceive positive and/or negative events as being unrelated to his/her own behaviors and, therefore, beyond personal control (Rotter, 1966). Such individuals may be more prone to maladjustment and less adaptive in their own coping mechanisms (DuCette, Wolk, & Soucar, 1972). These individuals also are likely to have low self-efficacy and
may actually underestimate their skills and abilities. Being aware of this relationship enables the clinician to make recommendations that are more suitable, more acceptable, and thus, more likely to be effective. Second, parents with external locus of control orientation may be less receptive to modifying their behavior and/or learning techniques to manage their ADHD children more effectively, since they do not perceive their behaviors as influencing their child. Thus, they may require more education regarding antecedents and consequences of behavior and their role in maintaining or changing a child's behavior.

There was one significant interaction in the current study. This interaction, which occurred between mothers' rating on the Impulsivity-Hyperactivity factor of the CPRS-R and mothers' total score on the Parental Locus of Control scale (H2c), suggests that when very few or no impulsivity/hyperactivity symptoms are present mothers with an external locus of control orientation may experience less parental stress than mothers with an internal locus of control orientation. This finding is consistent with research suggesting that situational variables such as intensity of the circumstance may moderate the adaptive effects of locus of control orientation (Solomon, Mikulincer, & Benbenishty, 1989; Toves, Schill, & Ramanaiah, 1981). That is, for mothers experiencing a low level of difficult behavior, not assuming responsibility for that
behavior or not believing that she can influence that behavior is associated with less perceived parental stress.

However, when the level of difficult behavior is elevated this external parental locus of control orientation is positively related to high levels of parental stress in mothers. It is as if the high level of difficult behavior coupled with a sense of having no ability to control, influence, or manage that behavior is overwhelming to the mother (see Figure 1).

It was expected that an external locus of control orientation in the child would be positively related to parental stress. However, the results of this study do not support this hypothesis (H2e). The only variable that
child's locus of control orientation was correlated with was mother's rating on the Aggression factor of the CPRS-R ($r = .2644, p < .05$). The child's locus of control orientation did not enter as significant predictor in any of the regression analyses. This lack of significance suggests that the child's overt behavior is a much more important predictor of parental stress than is the child's perception as to his responsibility for that behavior.

Another possible explanation was raised by a recent study (Engstrom, 1991) which suggested that a curvilinear relationship might exist between a child's locus of control orientation and the presence of psychiatric disorders. A scattergram was done to assess whether such a relationship existed between child's locus of control orientation and parental stress in the present study. The results did not support a curvilinear relationship in the present study.

**Implications of the Study**

In summary, one of the most important contributions of the current study to the pre-existing body of literature is the identification of differences between fathers and mothers as to which specific ADHD symptom clusters best predict parental stress. Because of the impact these differences between parents could have, they need to be investigated further. Specifically, these differing perceptions (mothers being more concerned about acting out behavior; fathers being more tolerant of acting out behavior
and less tolerant of symptoms of inattention) could potentially lead to disagreement between parents regarding the need for assessment and/or treatment. The resulting delay in seeking services could place the ADHD child at a disadvantage in numerous situations. Furthermore, once engaged in the treatment process, a better understanding of these differences could decrease parents' defensiveness and facilitate their cooperation in managing their ADHD child. Finally, the identification of relationships between specific symptoms and parental stress could aid clinicians in anticipating parental stress, and in developing more effective interventions in those cases where parent-child interactions are dysfunctional. It is hoped that this finding will encourage other researchers to include fathers in their ADHD and parental stress research. Fathers play an important role in the lives of their children, and an understanding of their perceptions, styles of responding, and areas of difficulty is crucial in the development and implementation of effective interventions.

A second important contribution of this study is the identification of parental locus of control orientation as a highly significant predictor of parental stress for both mothers and fathers. The finding of a parent variable that is strongly associated with parental stress provides an additional point of intervention for the clinician working with parents reporting high degrees of stress. However, additional research is needed to better understand the
external parental locus of control orientation (i.e., To whom or what does the parent attribute control?), and to develop and evaluate interventions that will successfully modify an individual’s locus of control orientation.

Another relevant research issue involves parental stress as a mediating variable between parental locus of control and the presence of elevated anxiety in children. Previous research has indicated that children who have two parents with external locus of control orientation exhibit significantly more anxiety than children who have at least one, or both, parents with more internal locus of control orientation (Ollendick, 1979). The exact relationship between parent’s external locus of control and anxiety in their children is not clear. However, one possible hypothesis involves parental stress as a mediating variable in this relationship (i.e., parents’ external locus of control orientation is positively related to parental stress which, in turn, is positively related to increased anxiety in children). Or, perhaps parents with an external locus of control are unable or unwilling to exercise control by setting limits. Consequently, the ambiguity inherent in a situation without clearly defined limits may result in increased anxiety in children and increased stress in the parents. Future research to clarify this relationship would be useful to clinicians involved in the assessment and treatment of children with anxiety disorders.
Limitations of the Study

The findings of this study are somewhat limited in their generalizability because subjects were recruited through a private practice office. The educational level of the parents who participated in the present study was significantly higher than the national average, as was the family income. The percentage of families with two parents living in the home was also remarkable. In order to determine whether the above described relationships between specific symptoms of ADHD, parental locus of control, and parental stress are relevant to ADHD children across socioeconomic strata, future research should include children and parents from more diverse settings. However, the sample parameters do not detract from the utility of these findings with similar private practice populations.

Additionally, as evident from the descriptive statistics, the mean Full Scale IQ of the boys participating in this study was markedly higher than that of the general population. While this has generalizability implications, and is probably best explained as a restriction of range problem, the results strongly indicate that Full Scale IQ was not a significant factor in this study. The lack of significant relationships between Full Scale IQ and the other variables and the failure of FSIQ to enter as a significant predictor in any of the regression analyses indicates that FSIQ could have been omitted from the
analyses without a significant change in the results. However, the standard in the ADHD and parental stress literature has been to control for variability due to intelligence by including it in the analyses. Thus, in order to be consistent with the literature, FSIQ was included. With regard to the possibility of restriction of range, it is unlikely that a wider range of scores would have markedly changed the results.
References


Appendix A

DSM-III-R Criteria for Attention-deficit Hyperactivity Disorder
PLEASE NOTE

Copyrighted materials in this document have not been filmed at the request of the author. They are available for consultation, however, in the author's university library.

Appendix A, 98

University Microfilms International
Appendix B

Consent Form
We are presently engaging in a research project which will add to the current literature on parent-child interactions in the field of psychology. Individually, this data will add to the information we typically gather regarding you and your child. The information necessary for this study will be gathered during the course of the evaluation you have requested for your child. If you decide to participate in this study you will be asked to complete two inventories concerning your experiences as a parent. Your child will be asked a brief series of questions to determine how he/she views everyday events, i.e., positive, negative, determined by fate, or under his control. We will share the results of these measures with you during your post conference and will answer any questions you might have.

Although we would greatly appreciate your assistance, your participation in this study is completely voluntary. You have the right to withdraw from the study at any time. All information gathered in the course of this study will remain completely confidential; neither your name nor that of your child will ever appear in the analysis or results of this study or in any publication which may result from this research project.

If you decide you do not wish to participate in the study, it will in no way effect the current assessment of your child.

I have read and understood this consent form and agree to participate in this research project.

Signature: ___________________ Date: ______________
Appendix C

Conners Parent Rating Scale-Revised
PLEASE NOTE

Copyrighted materials in this document have not been filmed at the request of the author. They are available for consultation, however, in the author's university library.

Appendix C, 102
Appendix D, 104-108
Appendix E, 110
Appendix F, 112-118

University Microfilms International
Appendix D

Parental Locus of Control Scale
Appendix E

Children's Nowicki-Strickland Internal-External Scale
Appendix F

Parenting Stress Index
Vita

Esther Marie (Stein) Winters obtained Bachelor of Science degrees in both psychology and pre-medicine at the University of Dayton, in Dayton, Ohio, in 1986. In the fall of 1986 E. M. Winters entered the Department of Psychology at Louisiana State University in Baton Rouge, Louisiana. She received her Master of Arts degree in psychology in 1988, and is currently pursuing a doctoral degree in psychology, with a major in clinical child psychology and a minor in sociology.
DOCTORAL EXAMINATION AND DISSERTATION REPORT

Candidate: Esther M. Winters

Major Field: Psychology

Title of Dissertation: An Investigation of the Relationship Between Severity of Specific ADHD Symptoms and Parent and Child Locus of Control Orientation in the Expression of Parental Stress

Approved:

Major Professor and Chairman

Dean of the Graduate School

EXAMINING COMMITTEE:

Date of Examination:

June 17, 1992