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The Pennsylvania State University
The Graduate School
Program in School Psychology

THE EFFECTS OF CLASSWIDE PEER TUTORING ON THE ACADEMIC ACHIEVEMENT AND CLASSROOM DEPORTMENT OF CHILDREN WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER

A Thesis in
School Psychology
by
Carol Matheson

Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Doctor of Philosophy

August 1997

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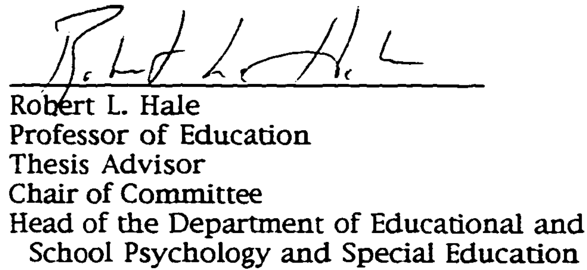
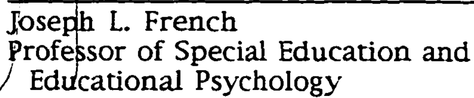


June 17, 1997

Robert L. Hale
Professor of Education
Thesis Advisor
Chair of Committee
Head of the Department of Educational and
School Psychology and Special Education



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Professor of Special Education and
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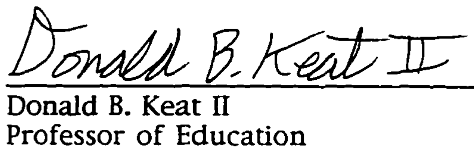

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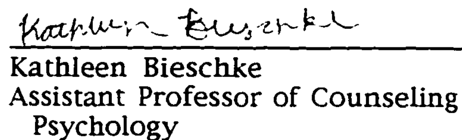
Donald B. Keat II
Professor of Education



June 17, 1997

Kathleen Bieschke
Assistant Professor of Counseling
Psychology

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ABSTRACT

The purpose of this study was to examine the effects of the ClassWide Peer Tutoring (CWPT) program on the academic achievement in spelling and off-task and fidgeting behaviors of children with Attention Deficit Hyperactivity Disorder (ADHD). Participants were comprised of 3, fourth-grade males who met the criteria for ADHD, Combined Type. Data were collected utilizing a multiple probe design across subjects. Evaluative instruments which were administered included: curriculum based measures (CBM) in spelling, weekly classroom spelling tests, and structured observations.

The results indicated significant gains for all students with regard to performance on classroom spelling tests. This improvement in spelling achievement was not evident on the CBM for any of the subjects, however. Additionally, all subjects demonstrated a significant decrease in their off-task and fidgeting behaviors which corresponded to the implementation of CWPT. Thus, the results of the study indicate that CWPT should be viewed as a viable intervention to be used with children of this population.

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CHAPTER ONE
INTRODUCTION

BACKGROUND

Attention Deficit Hyperactivity Disorder

Attention Deficit Hyperactivity Disorder (ADHD) is a behavioral syndrome characterized by developmentally inappropriate patterns of inattention and/or hyperactivity and impulsivity (American Psychiatric Association, 1994). The disorder is estimated to occur in approximately 3-5 % of the school-aged population (American Psychiatric Association, 1994; Barkley, 1990) and occurs more often in males than females with ratios ranging from 3:1 to 6:1 (Barkley, 1990; DuPaul & Stoner, 1994). There are several associated features and disorders that are often comorbid with this condition. Individuals with ADHD tend to have a higher rate of occurrence of Oppositional Defiant Disorder and Conduct Disorder than the typical population (American Psychiatric Association, 1994). Additionally, DuPaul & Stoner (1994) stated that the three most frequent correlates of ADHD are academic underachievement, noncompliance and aggressiveness, and poor peer relationships. These characteristics of ADHD can lead to multiple difficulties for children in school settings.

Barkley (1990) noted that as many as 80% of children with ADHD exhibit academic or learning difficulties and the majority of students with this disorder obtain lower academic grades than expected across one or more subject areas (DuPaul & Stoner, 1994). Additionally, approximately 40% of ADHD children are placed in remedial programs for students with learning disabilities or behavioral disorders (DuPaul & Stoner, 1994). Prospective follow-up studies indicated that these learning

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difficulties are manifested by higher rates of grade retention and dropping out of school relative to peers (Barkley, Fisher, Edelbrock, & Smallish, 1990). These academic difficulties may be partially explained by the child's high rates of off-task behavior during instruction and independent work periods (DuPaul & Henningson, 1993). Consequently, the children respond less frequently during academic instruction and complete less independent work than their classmates (Pfiffner & Barkley, 1990). In addition to academic problems in the classroom, ADHD children often exhibit a variety of behavioral problems.

The high correlation between hyperactivity and aggression has been well documented in the literature (DuPaul & Stoner, 1994; Loney & Milich, 1982). These behaviors are manifested by defiance or noncompliance with authority figures, poor temper control, argumentativeness, and verbal hostility (Loney & Milich, 1982). The DSM-IV noted that other problematic behaviors exhibited by these children include low frustration tolerance, bossiness, and mood lability (American Psychiatric Association, 1994). Thus, it is important for educators to determine effective and efficient methods to alleviate these children's academic and behavioral difficulties.

Several interventions have been employed to ameliorate ADHD children's learning and behavior problems in school settings. The primary therapy used to treat ADHD is the prescription of stimulant medication such as Methylphenidate (Ritalin) (DuPaul & Stoner, 1994; Whalen & Henker, 1991) with approximately 750,000 children receiving this treatment (Safer & Krager, 1988). However, this approach has limitations such as possible side effects and lack of evidence regarding long term effectiveness and, therefore, is more beneficial when combined with behavior modification techniques (DuPaul & Stoner, 1994).

Behavioral treatment is usually the other major modality employed with hyperactive children (Whalen & Henker, 1991) and this approach has a well

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documented history of effectiveness in reducing children's learning and behavior management techniques, a form of behavior management, including token reinforcement, contingency contracting, response cost, and time-out procedures have been found to be effective in reducing the disruptive and off-task behaviors of ADHD children and in increasing their academic productivity (DuPaul & Stoner, 1994; Rapport, Murphy, & Bailey, 1982). Research with hyperactive children has primarily focused on the behavior management techniques mentioned above; however, there has been relatively little research regarding instructional, curricular, or classroom environment manipulations which could enhance the learning and academic performance of these children. One such possible intervention is that of peer tutoring.

Peer Tutoring

Peer tutoring has been successfully applied across many academic areas with students of varying cognitive and academic abilities (DuPaul & Henningson, 1993; Greenwood, Carta, & Maheady, 1991; Kohler & Strain, 1990). It has also proven successful in improving the academic performance and behavior control of students with behavior disorders (DuPaul & Henningson, 1993). In addition to the positive effects peer tutoring can have on student's behavior and performance, it has many advantages over traditional behavior management techniques employed in the classroom.

Peer tutoring has advantages for both teachers and students. First, peer tutoring allows teachers to use their time and effort in a more effective and efficient manner than other behavioral management techniques (DuPaul & Henningson, 1993; DuPaul & Stoner, 1994; Greenwood, Carta, & Hall, 1988; Kohler & Strain, 1990). The teacher is able to use students to provide individualized instruction and feedback

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which consequently provides the teacher with more time to structure the learning of the entire classroom. Greenwood et al. (1988) noted that there are also several benefits for students involved in peer tutoring. These include: improvement of relations between students with and without disabilities, an increase in peer affiliation and social interactions, and an improved self-concept. Related to academic improvement, peer tutoring has been shown to produce academic gains equivalent to, and even greater than, conventional procedures involving lecture and student discussion (DuPaul & Stoner, 1994; Greenwood et al., 1991). The ClassWide Peer Tutoring Program (CWPT) developed at the Juniper Gardens Children's Project (Delquadri, Greenwood, Whorton, Carta, & Hall, 1986) is considered the most successful peer tutoring program available (Byrd, 1990; Scruggs & Richter, 1988). Perhaps most importantly, several properties (i.e., active responding, immediate feedback, instruction at an individual pace) which are inherent to the peer tutoring procedures in CWPT have been found to enhance the attention span and academic performance of students with ADHD.

Research has shown that specific interventions can often be utilized to improve the ADHD child's academic performance. ADHD children should: engage in tasks that require active responding (Zentall & Meyer, 1987), be provided with immediate and individual performance feedback, and be instructed at their own pace of learning (Pfiffner & Barkley, 1990). These children should also be provided one-to-one instruction in order to maximize their attention span. While these are successful instructional procedures for all children, they are especially necessary for children with attention deficits. These types of interventions are often difficult, if not impossible, to consistently incorporate into the regular classroom setting. Because these instructional strategies are an integral part of peer tutoring, this procedure could be used as a viable alternative to traditional classroom practices.

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Thus, it appears that CWPT could be an adjunt and/or alternative strategy to use with ADHD children. Only one study to date, however, has examined the effects of CWPT on the attention level and academic skills of hyperactive children (DuPaul & Henningson, 1993). The results showed improvement in both attention and math skills; however, the experiment was limited in that it was conducted with only one student.

PURPOSE OF STUDY

Based on the needs of ADHD children and the positive effects and benefits demonstrated by peer tutoring on children with a variety of difficulties, research should be conducted to examine the results of peer tutoring on children with ADHD. Therefore, this study examined the effects of ClassWide Peer Tutoring on the academic performance and behavioral difficulties of ADHD children. The sample was comprised of 3 fourth grade boys who were classified as having ADHD, Combined Type. The effects of the intervention were examined in relation to the subject's achievement in spelling and that individual's classroom behavior (i.e., off-task behavior and fidgeting). Spelling achievement was assessed utilizing a curriculum based measure and weekly pretests and posttests, while classroom behavior was assessed utilizing a structured observational procedure. Data was gathered and analyzed utilizing a multiple probe design across subjects.

STATEMENT OF RESEARCH QUESTIONS

The following questions were addressed in this study.

1. Does the implementation of ClassWide Peer Tutoring effect the subject's

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achievement in spelling?

Ha: The subject's achievement in spelling will remain stable until the implementation of CWPT, at which time the subject's spelling achievement will increase.

2. Does the implementation of CWPT effect the subject's off-task and fidgeting behaviors in the classroom?

Ha: The subject's classroom behavior will remain stable until the implementation of CWPT, at which time the subject's off-task and fidgeting behaviors will decrease.

3. Will the off-task and fidgeting behaviors be exhibited at similar rates depending on whether the student is the tutor or the tutee?

Ha: There will not be a notable difference between classroom deportment during tutor and tutee conditions.

4.. Will the effect of CWPT generalize across subjects?

Ha: All subjects involved in the study will show an increase in spelling achievement and a decrease in off-task and fidgeting behaviors corresponding to the implementation of CWPT.

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CHAPTER TWO
REVIEW OF LITERATURE

When examining the effects of peer tutoring on the academic performance and behavior problems of ADHD children, several issues must be addressed. First, several aspects of Attention Deficit Hyperactivity Disorder are discussed including its history, primary characteristics, associated characteristics, and interventions. The standardization properties of the various instruments utilized in this study are also presented.

ATTENTION DEFICIT HYPERACTIVITY DISORDER

History

Since the 1900s when children were referred for deficiencies in attention, impulse control, and the regulation of activity in response to situational demands, a variety of diagnostic labels have been given to children exhibiting these characteristics. This disorder has been referred to as "minimal brain damage", "minimal brain dysfunction", "hyperkinesis", "hyperactive child syndrome", "Attention Deficit Disorder (with or without Hyperactivity)" (Barkley, 1989), and most recently it has been labeled "Attention Deficit/Hyperactivity Disorder" (ADHD) in the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 1994). The relabeling of this disorder reflects the shifting emphasis on the primacy of certain symptoms within the disorder.

George Still, in 1902, was the first person to conceptualize this disorder based on children in his clinical practice which he described as aggressive, defiant, highly

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emotional, excessively active, and as having poor attention (Barkley, 1989; Barkley, 1990). Still posited that these children had serious deficiencies in the "volitional inhibition" of behavior and conceptualized the symptoms as arising from various types of "defects in moral control" (cited in Barkley, 1989; Barkley, 1990). Further, he believed that these deficits were a result of hereditary transmission in some children, while other children acquired the disorder as a result of central nervous system damage peri- or postnatally (Barkley, 1989; Barkley, 1990). Even with Still's promising early work, there was little research into this area until after World War II.

After World War II, the work of Strauss, Lehtinen, and colleagues became very influential in this field. They posited that this restless and inattentive behavior was the primary component of this disorder and was *de facto* evidence of brain damage in children (Barkley, 1989; Strauss & Lehtinen, 1947). Therefore, they concluded that all children who exhibited hyperactivity, inattention and impulsivity must have brain damage, even if relevant history was lacking. Consequently the term "minimal brain damage" was used to refer to these children (Barkley, 1989; Barkley, 1990). This philosophy continued into the 1960s.

Researchers in the late 1950s and 1960s began questioning the concept of unitary brain damage as the etiology of this disorder (Barkley, 1990). During this time the link between brain damage and hyperactivity became less apparent and the disorder was labeled "minimal brain dysfunction" (Barkley, 1989; Barkley, 1990). Eventually, the link between neurological damage and this disorder was eliminated from the diagnostic criteria and it was referred to as "hyperactive child syndrome" or, in the DSM-II, as "Hyperkinetic Reaction of Childhood" (American Psychiatric Association, 1968; Barkley, 1989; Barkley, 1990). Excessive motor activity as the primary component of this disorder was still being emphasized (Barkley, 1989).

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Researchers were recognizing that hyperactivity was a behavioral syndrome that could have a biological base, but could also occur without organic pathology (Barkley, 1990). The belief that brain damage was the major cause of the disorder, however, remained dominant until the 1970s.

The early 1970s was characterized by broadening the definition of hyperactive child syndrome to include impulsivity, short attention span, low frustration tolerance, distractibility, and aggressiveness (Barkley, 1990; Marwit & Stenner, 1972; Safer & Allen, 1976). During this time, although brain damage was no longer considered the etiology of the disorder, it was thought to be based in defects in brain mechanisms (Barkley, 1990). Additionally, throughout the decade there was a growing belief that hyperactivity was caused by aspects of the environment such as an allergic reaction to food additives such as dyes, preservatives, and salicylates (Feingold, 1975), refined sugar in the diet, the increased "societal tempo" of the culture, and poor child rearing (Barkley, 1990). The concept of an individual's diet influencing their hyperactivity level was so pervasive that legislation was passed requiring that school foods did not contain these substances (Barkley, 1990). Eventually, these hypotheses proved unfounded and were not considered valid, but researchers did posit that although the environment did not cause hyperactivity, it was influential in regulating the course and outcome of these children. By the mid-1970s, the role of hyperactivity in this disorder was seen as equivalent, or even secondary, to that of problems with attention and impulsivity (Barkley, 1989). Douglas (1972) argued that the difficulties exhibited by these children were primarily related to deficits in sustained attention and impulse control rather than hyperactivity. Douglas' historic work in this field resulted in her theory of hyperactivity which stated that four major deficits could account for the symptoms of ADHD: (1) deficits in the investment, organization, and maintenance of attention and

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effort; (2) inability to inhibit impulsive responding; (3) inability to modulate arousal levels to meet situational demands; and (4) an unusually strong inclination to seek immediate reinforcement (Douglas, 1983). This theory remained the paradigm in the field of hyperactivity until the 1980s (Barkley, 1990).

Douglas' work was so influential that it contributed to the relabeling of this disorder as Attention Deficit Disorder (with or without Hyperactivity) in the Diagnostic and Statistical Manual of Mental Disorders - Third Edition (DSM-III) in the 1980s (American Psychiatric Association, 1980; Barkley, 1989; Barkley, 1990). The definition, according to the DSM-III, regulated the symptom of hyperactivity as an unnecessary or a related characteristic of these children, rather than as the primary component (American Psychiatric Association, 1980). This definition was also significant because it created subtypes of ADD, based on the presence or absence of hyperactivity (American Psychiatric Association, 1980; Barkley, 1990). This situation was related to the fact that hyperactivity was not specific to this condition, but could be found in other psychiatric disorders (Rutter, 1989). Thus, hyperactivity was not a necessary component to classify children with ADD.

The role of hyperactivity as the central feature of the disorder, equal in importance to impulsivity and poor attention, reemerged in the Diagnostic and Statistical Manual of Mental Disorders - Third Edition - Revised which changed ADD to Attention Deficit Hyperactivity Disorder (ADHD) (American Psychiatric Association, 1987; Barkley, 1989). Further, the subtyping scheme of "with or without hyperactivity" was eliminated because it was unclear whether children with this disorder and without hyperactivity represented a true subtype of this disorder, or whether they were a separate diagnostic entity altogether (American Psychiatric Association, 1987; Barkley, 1989). By the end of the 1980s, most researchers viewed the etiology of ADHD as being biological or hereditary in nature (Barkley, 1990).

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However, its severity, comorbidity, and outcome were considered to be significantly affected by environmental, particularly familial, factors. As more research was conducted and results emerged, the DSM-III-R was revised to the most current version, the DSM-IV (1994).

The fourth edition of the DSM reflects the most recent conceptualization of ADHD and, although the label for the disorder remains the same, there are some notable changes from previous diagnostic criteria. Previously, practitioners classified children with ADHD based on criteria from a single list of 14 items. However, the DSM-IV utilizes two different symptom lists - one for inattention and one for hyperactivity/impulsivity (American Psychiatric Association, 1994). Subtypes of the disorder were again utilized: ADHD, Combined Type; ADHD, Predominantly Inattentive Type; or ADHD, Predominantly Hyperactive-Impulsive Type (American Psychiatric Association, 1994; DuPaul & Stoner, 1994). The subtyping was based on empirical work which demonstrated that some children demonstrate clinically significant problems with inattention, but are not impulsive or hyperactive (Barkley, DuPaul, & McMurray, 1990; DuPaul & Stoner, 1994). The most recent view of ADHD and its primary characteristics and associated features are discussed in more detail below.

In summary, at the beginning of the 1900s ADHD was viewed as a biologically based disorder effecting the control of behavior by morals and volitional inhibition. Over the past 90 years, the view of ADHD and its primary symptoms has repeatedly undergone transformation resulting in the conceptualization of ADHD as a biologically based disorder which is regulated by environmental factors and characterized primarily by inattention, and/or hyperactivity, and impulsivity.

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Characteristics

The DSM-IV (American Psychiatric Association, 1994) delineates the diagnostic criteria that are necessary for the diagnosis of Attention Deficit Hyperactivity Disorder and these criteria are presented in Table 1.

Table 1

DSM - IV DIAGNOSTIC CRITERIA FOR ATTENTION-DEFICIT/HYPERACTIVITY DISORDER

A. Either (1) or (2)

(1) six (or more) of the following symptoms of **inattention** have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level.

Inattention

(a) often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities

(b) often has difficulty sustaining attention in tasks or play activities

(c) often does not seem to listen when spoken to directly

(d) often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions)

(e) often has difficulty organizing tasks and activities

(f) often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework)

(g) often loses things necessary for tasks or activities (e.g., toys, school assignments, pencils, books, or tools)

(h) is often easily distracted by extraneous stimuli

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Table 1 (continued)

(i) is often forgetful in daily activities

(2) six (or more) of the following symptoms of hyperactivity-impulsivity have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:

Hyperactivity

(a) often fidgets with hands or feet or squirms in seat

(b) often leaves seat in classroom or in other situations in which remaining seated is expected

(c) often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness)

(d) often has difficulty playing or engaging in leisure activities quietly

(e) is often "on the go" or often acts as if "driven by a motor"

(f) often talks excessively

Impulsivity

(g) often blurts out answers before questions have been completed

(h) often has difficulty awaiting turn

(i) often interrupts or intrudes on others (e.g., butts into conversations or games)

B. Some hyperactive-impulsive or inattentive symptoms that caused impairment were present before age 7 years.

C. Some impairment from the symptoms is present in two or more settings (e.g., at school [or work] and at home).

D. There must be clear evidence of clinically significant impairment in social, academic, or occupational functioning.

E. The symptoms do not occur exclusively during the course of a Pervasive Developmental Disorder, Schizophrenia, or other Psychotic Disorder and are not better accounted for by another mental disorder (e.g., Mood Disorder, Anxiety Disorder, Dissociative Disorder, or a Personality Disorder)

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Table 1 (continued)

Code based on type:

314.01 **Attention-Deficit/Hyperactivity Disorder, Combined Type:** if both criteria A1 and A2 are met for the past 6 months

314.00 **Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type:** if Criterion A1 is met but Criterion A2 is not met for the past 6 months

314.01 **Attention Deficit/Hyperactivity Disorder/Predominantly Hyperactive-Impulsive Type:** if Criterion A2 is met but Criterion A1 is not met for the past six months

---

Thus, ADHD children have chronic difficulties in the areas of inattention, hyperactivity, and/or impulsivity which are displayed early in development, to a degree that is inappropriate for their age, and across a variety of situations. This criteria also indicates that children can have clinically significant difficulties with attention but not hyperactivity/ impulsivity and vice versa. There is an abundance of research characterizing the inattentive, hyperactive, and impulsive behaviors of these children which must be considered when utilizing the above mentioned diagnostic criteria.

Inattention Although the term "attention" seems relatively unidimensional, it is in reality a multidimensional construct which can refer to problems with alertness, arousal, selectivity, and sustained attention (Hale & Lewis, 1979). According to the DSM-IV, deficits in attention manifest themselves in academic, occupational, or social situations and in a variety of ways, including: messy schoolwork which is completed without thought, switching tasks without completing

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any one activity, disorganization, frequent shifts in conversation, not listening to others, or not following rules of games or activities (American Psychiatric Association, 1994). Research suggests that ADHD children have their greatest difficulty in sustaining attention during tasks which require vigilance (Barkley, 1989; Douglas, 1983). Although difficulties with attention are more obvious during tasks which are dull, boring, or repetitive (DuPaul & Stoner, 1994), this inattention can also be observed during play activities. During free-play sessions, ADHD children often exhibit shorter durations of play with toys and frequent shifts in play across various toys in relation to their peers (Barkley & Ullman, 1975; Barkley, 1989).

Hyperactivity Hyperactivity in ADHD children refers to their failure to regulate activity to setting or task demands (Barkley, 1989). This definition is based on the fact that although ADHD children have been found to be more active, restless, and fidgety than normal children (Barkley & Cunningham, 1979), this poor sustained attention is subject to situational variation. Additionally, this hyperactive behavior separates ADHD children and non-ADHD children because it is present across a variety of settings rather than being situation specific (Taylor, 1986). These hyperactive behaviors may differ depending on the age and the developmental level of the child.

This condition is most difficult to diagnose in toddlers and preschoolers because of the tendency of children this age to exhibit similar behaviors; however, hyperactive children vary from normally active young children on several dimensions. Toddlers and preschoolers with this disorder are described as being constantly on the go, darting back and forth, and not being able to participate in sedentary group activities (American Psychiatric Association, 1994). Additionally, these children are more likely to encounter accidental injuries as a result of their

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hyperactive behaviors (Barkley, 1990). Once a child reaches school age, similar behaviors such as not being able to remain seated, talking excessively, and fidgeting are still exhibited but with less frequency or intensity than toddlers and preschoolers (American Psychiatric Association, 1994). Finally, once the ADHD individual has reached adolescence and adulthood, the hyperactivity often manifests itself in feelings of restlessness and difficulty engaging in quiet sedentary activities (American Psychiatric Association, 1994).

Impulsivity Similar to the other core deficits of ADHD, the construct of impulsivity is multidimensional in nature and manifests itself in varying ways in these children. Impulsivity has been defined as: a pattern of rapid, inaccurate responding to tasks (Brown & Quay, 1977); poor sustained inhibition of responding (Gordon, 1979); poor delay of gratification (Rapport, Tucker, DuPaul, Merlo, & Stoner, 1986); and/or impaired adherence to commands to regulate or inhibit behavior in social contexts (Kendall & Wilcox, 1979). Many of these behaviors are exhibited in such a way as to reflect problems with attention and many researchers posit that impulsivity is not a separate impairment of behavioral disturbance in these children, but is the same construct of hyperactivity (Barkley, 1989). This view is based on factor analytic studies which fail to differentiate the impulsivity and hyperactivity dimensions (Barkley, 1989). The DSM-IV reflects this view by combining the hyperactive/impulsive characteristics into one category. When considering the manifestation of these primary symptoms, it is important to remember that an individual seldom displays the same level of dysfunction in all settings.

All of the primary symptoms of ADHD show significant fluctuations across various settings, situations, and tasks (American Psychiatric Association, 1994; Barkley, 1989; Barkley, 1990). There are several aspects of the environment which

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can influence the manifestation of symptoms. First, the degree of structure in an ADHD child's environment has been shown to effect their behavior. That is, if the environment is very structured (i.e., there are high demands on ADHD children to restrict their behaviors) then the ADHD child's behavior will be more deviant from that of normal children (Barkley, 1989; Barkley, 1990). ADHD children also exhibit more difficulties in familiar versus novel or unfamiliar surroundings (American Psychiatric Association, 1994; Barkley, 1989; Barkley, 1990; Zentall, 1985). There are also aspects related to the task which will mediate the child's behavior. ADHD children respond more frequently when instructions are repeated frequently (Barkley, 1989; Barkley, 1990; Douglas, 1983). They also tend to exhibit sustained attention if the task is novel (American Psychiatric Association, 1994; Barkley, 1989; Barkley, 1990), if it involves a high rate of immediate reinforcement (American Psychiatric Association, 1994; Barkley, 1989; Barkley, 1990), if it is interesting (American Psychiatric Association, 1994), and if it involves colorful and highly stimulating material (Zentall, 1985). Overall, the symptoms typically worsen if the task requires sustained attention or mental effort or lacks intrinsic appeal (American Psychiatric Association, 1994; Barkley, 1990). This includes listening to classroom teachers, doing class assignments, and reading lengthy material (American Psychiatric Association, 1994). This situational variation suggests that the symptoms are deviant from normal children when the environment or task exceeds the child's capacity to sustain attention, regulate activity, and restrain impulses (Barkley, 1990). In addition to the core deficits of inattention, hyperactivity, and impulsivity, there are several associated characteristics of this disorder.

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Associated Characteristics

Problems with inattention, hyperactivity, and impulsivity predispose children to other difficulties that are, in some cases, more severe than the core deficits of ADHD. Individuals with ADHD often exhibit low frustration tolerance, temper outbursts, aggressive behavior, bossiness, stubbornness, excessive and frequent insistence that requests be met, mood lability, rejection by peers, poor self-esteem, and academic failure (American Psychiatric Association, 1994; Barkley, 1987; Barkley, 1990; DuPaul & Stoner, 1994; Pelham & Hinshaw, 1992). There may also be a higher prevalence of Mood Disorders, Anxiety Disorders, Learning Disorders, and Communication Disorders in these individuals (American Psychiatric Association, 1994). Although not specified in the DSM-IV, many researchers also stress deficits in rule-governed behavior (adherence to rules and instructions) as another primary deficit in ADHD children (American Psychiatric Association, 1987; Barkley, 1987; Barkley, 1989; Barkley, 1990; Kendall & Braswell, 1985).

In summary, ADHD children often exhibit multiple difficulties including problems associated with inattention, hyperactivity, and impulsivity and associated social, emotional, academic, and behavioral problems. DuPaul & Stoner (1994) noted that two of the difficulties most often correlated with ADHD are academic underachievement and behavioral difficulties and these are the areas which were addressed during this study.

Academic Difficulties The core characteristics of ADHD often lead to a myriad of difficulties for children at school. Specifically, children's attention difficulties contribute to their not completing independent seatwork; poor test performance; deficient study skills, disorganized notebooks, desks, and written reports; and a lack of attention to teacher lectures and group discussions (DuPaul &

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Stoner, 1994). Their hyperactive and impulsive behaviors manifest themselves by disrupting classroom activities, calling out without permission, inappropriately talking with classmates, rocking in chairs, and leaving their seats without permission. Not surprisingly, 80% percent of children with ADHD have been found to exhibit academic performance problems (Barkley, 1990; Cantwell & Baker, 1991) and 20-30% of these children are classified as learning disabled (DuPaul & Stoner, 1994). Additionally, children with this disorder are typically behind peers in intellectual development based on scores on standardized intelligence measures on which they score an average of 7 to 15 points below control groups (Barkley, 1990; Barkley, et al., 1990). However, these lower scores may be partially accounted for by difficulties in test taking behavior resulting from inattention, impulsivity, and hyperactivity. These chronic achievement difficulties increase many ADHD children's risk for poor scholastic outcome. This situation can be seen in that 1/3 of children with ADHD have been retained at least once before reaching high school and the high school dropout rate is higher among students with this disorder relative to the general population (Barkley, DuPaul et al., 1990). Although the relationship between ADHD and poor academic outcome is well documented, the causal mechanism behind the academic underachievement is unclear.

Research has not determined whether ADHD causes academic difficulties or whether ADHD type behaviors are manifestations of academic problems; however, studies indicate that ADHD-related behaviors have negative effects on academic achievement (Barkley, 1977; Barkley, 1990; DuPaul & Stoner, 1994; Rapport, DuPaul, Stoner, & Jones, 1986). The core deficits of ADHD (i.e., inattention, hyperactivity, impulsivity) can disrupt the child's ability to acquire academic skills and/or to demonstrate their knowledge in a consistent manner in several ways. First, student's attention may be diverted from instruction due to their high activity level and this,

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in turn, minimizes the child's acquisition of academic information (Keogh, 1971). Second, Keogh (1971) also noted that the ADHD child's impulsivity may lead that individual to make decisions without thinking through the task, which therefore minimizes the student's performance on independent tasks. Thus, due to their ADHD related behaviors, these children may fail to acquire academic information and/or to adequately perform academic tasks. Additionally, DuPaul & Stoner (1994) noted that children with ADHD often exhibit significantly lower rates of on-task behavior during instruction and independent work periods than their peers. This leaves them with fewer opportunities to respond during academic instruction and they complete less independent work than their peers. Because of these difficulties, it is important that ADHD children receive academic intervention.

Academic products and performance (e.g., work completion and accuracy) are often targeted as the preferred area of intervention in contrast to specific task related behaviors (e.g., attention to task or staying in one's seat). There are several reasons posited as to the benefit of this approach. First, this intervention encourages teacher monitoring of student outcomes (DuPaul & Stoner, 1994) and therefore holds teachers accountable. Second, rather than solely focusing on helping children "remain seated" and pay attention, academic intervention helps children learn skills necessary for independent learning and generating the academic products (DuPaul & Stoner, 1994). Third, focusing on active academic responding does not violate the "Dead-man test for behavior" which states that if "a dead boy could do it, it wasn't behavior" (DuPaul & Stoner, 1994; Lindsley, 1991). Interventions targeting specific tasks behaviors such as "sitting still" and "not calling out" violate this rule. Finally, although ADHD children need academic remediation, it cannot be denied that they also require interventions targeting their inattentive and disruptive behaviors. Focusing on academic responding addresses both of these issues because it is

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incompatible with inattentive and disruptive behavior (Pfiffner & O'Leary, 1993).

In summary, ADHD children exhibit academic difficulties and underachievement at higher rates than their normal peers. These difficulties are related to behaviors associated with their inattention, hyperactivity, and impulsivity and result in higher rates of retention, school dropout, and poorer scholastic outcomes than their normal counterparts. Obviously, academic intervention for ADHD children is essential. Intervention in this area is not only necessary for the aforementioned reasons, but also because it can remediate both academic achievement and behavior difficulties associated with this disorder. This study targeted not only academic difficulties, but also classroom deportment because ADHD-related characteristics also manifest themselves in a myriad of behavior problems.

Behavioral Difficulties ADHD children exhibit numerous behavioral difficulties relative to their normal peers such as aggressiveness and conduct problems, oppositional and defiant behavior, and antisocial behavior (Barkley, 1990). There is a well documented correlation between hyperactivity and aggression in the literature and ADHD children often exhibit behaviors related to aggression which include: defiance or noncompliance with authority figures, poor temper control, argumentativeness, and verbal hostility (Barkley, 1990; DuPaul & Stoner, 1994; Loney & Milich, 1982). These problems (i.e., noncompliance, temper control) comprise the psychiatric category of Oppositional Defiant Disorder (ODD) and ODD is the most common comorbid condition associated with ADHD (American Psychiatric Association, 1994; DuPaul & Stoner, 1994). Approximately 40% of children and 65% of teenagers with ADHD are diagnosed with ODD (Barkley, DuPaul, et al., 1990; Barkley, Fisher, Edelbrock, & Smallish, 1990). Additionally, 21% - 45% of ADHD children and 44% - 50% of ADHD adolescents are diagnosed with Conduct Disorder (CD) (Barkley,

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1990; Szatmari, Offord, & Boyle, 1989). Behavior difficulties often escalate once the child reaches secondary school with 25% of ADHD adolescents engaging in many serious antisocial behaviors such as lying (Barkley, 1990), stealing, physical aggression, and truancy (Barkley, 1990; Barkley, Fisher, et al., 1990). Additionally, as stated previously, ADHD children often exhibit frustration tolerance, bossiness, stubbornness, excessive and frequent insistence that requests by met, and mood lability (American Psychiatric Association, 1994). Academic and behavioral difficulties are so common that Barkley (1990) noted that ADHD children who do not develop some comorbid psychiatric (ODD or CD) condition or academic difficulties (LD or underachievement) are in the minority.

Thus, ADHD children exhibit a multitude of behavioral difficulties that if not addressed early in development can lead to serious problems such as aggressiveness and conduct problems, oppositional and defiant behavior, and antisocial behavior. In understanding the rationale behind using peer tutoring to remediate the academic and behavioral difficulties of ADHD children, the literature regarding various interventions utilized for this disorder must be reviewed.

Interventions

Children with ADHD usually experience the most difficulty in the classroom setting in such areas as academic performance, scholastic achievement, and classroom deportment. There have been several interventions utilized in the classroom to remediate these difficulties and many offer promising results. Within the realm of this study, it is important to understand the successful and critical components as well as the limitations of these strategies so that the rationale and benefits of peer tutoring can be clearly understood. The most widely employed interventions used within the academic setting with ADHD children include:

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medication therapy, behavioral management techniques, cognitive-behavioral interventions, general classroom interventions, and a combination of these approaches.

Medication Therapy The prescription of psychostimulant medication (i.e., Ritalin, Dexedrine, Cylert) is the most frequent treatment for ADHD children (Barkley, 1990; DuPaul & Stoner, 1994; Pfiffner & O'Leary, 1993) with 750,000 children prescribed this medication annually (DuPaul & Stoner, 1994; Safer & Krager, 1988). Additionally, the effects of stimulant medications on ADHD children has undergone more research than any other treatment modality for any childhood disorder (Barkley, 1990). For children who do not respond to stimulant medication, other medications such as antidepressants (i.e., Norpramin, Tofranil), monomamine oxidase inhibitors (MAOIs), and clonidine offer promising alternatives, but the research on these medications has only been conducted with small samples and often has methodological flaws (DuPaul & Stoner, 1994). The effects of stimulant medication has been positive in improving the functioning of ADHD children in several areas.

Stimulant medication is so widely employed because of its high rate of effectiveness. Between 70-80% of ADHD children treated with this medication respond positively to one or more doses (DuPaul & Stoner, 1994). Psychotropic medication has been shown to have positive effects on children's behavioral control and attention, cognitive and academic performance, and social relationships. The use of this medication increases the ADHD child's ability to sustain attention (Barkley, DuPaul, & McMurray, 1991), inhibits their impulsive responding (DuPaul & Stoner, 1994), decreases disruptive motor activity (Cunningham & Barkley, 1979), and improves displays of aggression and classroom behavior (DuPaul & Stoner, 1994). Related to academic performance, stimulant medication often increases attention to

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teacher lectures, completion of independent seat work, and test scores (DuPaul & Stoner, 1994; Pelham, Vodde-Hamilton, Murphy, Greenstein, & Vallano, 1991). Academic productivity and accuracy have also been shown to increase with medication (Barkley, 1989). Finally, stimulant medication has been found to significantly improve the quality of social interactions of ADHD children with their parents, teachers, and peers. This outcome is partially a consequence of the psychotropic medication reducing the ADHD child's aggressiveness, increasing their compliance with the commands of authority figures, and helping the ADHD child behave more appropriately (Barkley, 1989; Barkley, 1990; DuPaul & Stoner, 1994). Although there are obviously positive benefits to the use of stimulant medication, it also has limitations.

There are factors associated with psychotropic medications which limit their overall effectiveness. First, although research has demonstrated short-term enhancement of several aspects of the ADHD child's functioning, it has not been proven to have long-term efficacy (DuPaul & Stoner, 1994; Pfiffner & O'Leary, 1993). Additionally, the potential side-effects of such drugs prevent them from being utilized with all children. These side effects include appetite reduction, insomnia, increased irritability, headaches, and, in rare cases, motor or vocal tics (Barkley, 1989; Barkley, 1990). Additionally, a long-term effect includes suppression of height and weight gain, but this seems to diminish after discontinuation of treatment and there is little alteration in eventual adult height or weight (Barkley, 1990; DuPaul & Stoner, 1994). Another limitation of stimulant medication is that although the child's academic and social functioning may improve, it is still not considered to be in the normative range (Pfiffner & O'Leary, 1993). Because of these limitations, a type of multimodal treatment approach is recommended for ADHD children (Barkley, 1989; DuPaul & Stoner, 1994). One of the primary components of this approach is behavior

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modification and the use of both stimulant medication and behavior modification have been found to be the most effective approach to treating children with this disorder in the classroom (DuPaul & Stoner, 1994; Pfiffner & O'Leary, 1993).

Behavior Management Procedures Behavioral interventions have a long and well documented history of effectiveness in ameliorating children's learning and behavior problems in school settings (Sulzer-Azaroff & Mayer, 1991). Behavior change strategies, including classroom-based contingency management procedures, have been shown to be effective in reducing ADHD children's hyperactivity, aggression (Fiore, Becker, & Nero, 1993), disruptive and off-task behavior, and in increasing their academic productivity (Barkley, 1989; DuPaul, Guevremont, & Barkley, 1992; DuPaul & Stoner, 1994; Kerr & Nelson, 1989), on-task behavior, task completion, compliance, impulse control, and social skills (DuPaul et al., 1992; Fiore et al., 1993). Behavioral interventions which have most often been utilized with ADHD children include: token reinforcement programs, response cost, and time-out.

Token Reinforcement Programs Although most children will show an improvement in behavior through the use of contingent social praise and attention, ADHD children require secondary generalized reinforcers such as token economies to bring about consistent improvement (Barkley, 1989; Barkley, 1990; DuPaul & Stoner, 1994; Fiore et al., 1993). The effectiveness of token economies in improving performance in academic and behavioral domains with hyperactive children has been well documented. The use of this intervention strategy has been found to significantly reduce disruptive behaviors (Ayllon & Roberts, 1974; Coleman, 1970; Pfiffner & O'Leary, 1993) and levels of hyperactivity (Fiore et al., 1993), and increase attending behaviors (Rapport, 1987; Patterson, 1965) and academic performance

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(Alloyn & Roberts, 1974; Barkley, 1990; Robinson, Newby, & Ganzell, 1981; Pfiffner & O'Leary, 1993). Token economies can be utilized in a variety of ways to improve the targeted behavior.

There are many variations of token economies that can be applied, but the specific strategy chosen will depend on the unique needs of the child targeted for intervention. Generally, token economies involve the distribution of tokens, rewards (e.g., poker chips, stickers), or points which are contingent upon targeted behavior or behaviors (Barkley, 1990). The student typically accumulates tokens or points throughout the day and then can exchange them for privileges (e.g., extra recess time, food, computer time). This program can be either individual or group based (i.e., all class members earn rewards based on the behavior of one or more of their classmates). These two approaches (individual vs. group) appear to be equally effective, but may be most useful in different situations (Barkley, 1990). When implementing token economies, there are several aspects which should be given careful consideration to ensure program success.

The most important things to consider when establishing token economies are the reinforcers and the manner in which they are distributed. First, the reinforcement must be motivating for the child. This quality can be accomplished by asking children which rewards they would like to earn or by observation of the child during free time (Barkley, 1990; DuPaul & Stoner, 1994; Kerr & Nelson, 1989). Additionally, DuPaul & Stoner (1994) noted that ADHD children tend to choose smaller, more immediate rewards over larger, delayed rewards. Kerr & Nelson (1989) suggested that when determining which reinforcers to use the teacher/educator should not: use tokens that can be obtained outside the classroom, use the best reinforcers at the beginning, or let students "stockpile" tokens. They also noted that is important to let the student know why a reinforcer is being given, give some free

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tokens at the beginning of the program, gradually reduce tokens so that more work is done for each reinforcer, review all rules frequently, and to gradually withdraw material reinforcers and replace them with social reinforcement (Kerr & Nelson, 1989). Also, it is important to determine a variety of rewards motivating to the child because reinforcers should be varied and rotated frequently to prevent reinforcer satiation (Barkley, 1990; DuPaul & Stoner, 1994). Students should be reminded of possible rewards prior to beginning a task to provide incentive (DuPaul & Stoner, 1994; Rapport, 1987). Additionally, the administration of the tokens should be continuous (DuPaul & Stoner, 1994; Douglas & Parry, 1983) and be provided frequently (Barkley, 1990) and immediately rather than being delayed and provided intermittently (DuPaul & Stoner, 1994; Rapport et al., 1986). Initially, rewards should be provided for approximations to the target behavior to ensure the child's success (Barkley, 1990). Although these token reinforcement programs have proven to be effective in improving several aspects of a child's functioning, there are limitations that should be considered.

First, as with any intervention, not all children will show maximal improvement as a result of these programs and with those children who do respond positively, little evidence exists that treatment gains persist once the programs are terminated (Pfiffner & O'Leary, 1993). Additionally, research has not documented that generalization of behavioral control occurs in other settings where no behavioral interventions are in effect (Barkley, 1989; Pelham & Hinshaw, 1992). Token economies also require a large amount of teacher time, effort, and material resources and this may discourage teachers from implementing these programs (Pelham & Hinshaw, 1992; Pfiffner & O'Leary, 1993). Token economies, as with all contingency management strategies, should not consist solely of positive reinforcement procedures but should also incorporate response cost techniques.

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Response Cost Generally, response cost procedures involves the concurrent application of reinforcement for appropriate behavior and a loss of a positive reinforcer, or penalty, following inappropriate behavior (DuPaul et al., 1992). Lost reinforcers typically include privileges, activities, or tokens (Pfiffner & O'Leary, 1993); however, the specific item being removed will vary according to the preferences and desires of individual children. The concurrent use of token reinforcement and response cost has been shown to increase the levels of on-task behavior, seatwork productivity, and academic accuracy of children with ADHD (DuPaul et al., 1992; DuPaul & Stoner, 1994; Fiore et al., 1993; Rapport et al., 1982) and to be more effective than the use of token economies in isolation (Barkley, 1989). Additionally, response cost has been documented to be more effective than stimulant medication regarding on-task related behavior (Rapport et al., 1982), to be more effective than reward procedures alone (Pfiffner & O'Leary, 1993), and to result in maintained treatment levels when faded (Pelham & Hinshaw, 1992; Sullivan & O'Leary, 1990). When employing this procedure, several aspects of the intervention should be considered to ensure program success.

Similar to the use of tokens or reinforcement, the loss of privileges and the manner in which this is accomplished should be considered. First, when using rewards and response cost concurrently, the opportunity to earn tokens should be greater than the possibility of losing them (Barkley, 1990). Additionally, appropriate behaviors should be targeted frequently because this should reduce the need for frequent costs since the behaviors being targeted are incompatible with inappropriate behaviors (Barkley, 1990). Similar to token economies, care should be taken not to set unreasonably stringent standards that lead to excessive point or privilege loss (Barkley, 1990; Pfiffner & O'Leary, 1993).

In summary, contingency management methods can produce immediate,

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short-term improvement in several aspects of the ADHD child's functioning in the classroom. The effectiveness of these programs is based on the distribution of secondary or tangible reinforcers rather than the use of attention or other social reinforcers. Additionally, the use of token reinforcement systems combined with response cost procedures have proven to be more effective than other behavioral interventions. However, the techniques are limited in that the gains are unlikely to be maintained once treatment has been withdrawn or to generalize to other settings where no treatment is in effect. Another intervention for ADHD children which incorporates behavioral techniques is that of cognitive-behavioral interventions.

Cognitive-Behavioral Interventions Originally, cognitive-behavioral interventions were developed to help hyperactive children approach academic tasks and social interactions in a less impulsive, unorganized, and unreflective manner (Barkley, 1990; Pfiffner & O'Leary, 1993) by promoting self-controlled behavior via enhancement of mediational and problem-solving strategies (Pelham & Hinshaw, 1992). Generally, these interventions incorporate an analysis of the tasks to be performed, or the social problem to be addressed, and teach the student the strategy through modeling, self-instruction, and self-evaluation (Kerr & Nelson, 1989). In recent years, several cognitive-behavioral strategies have become increasingly popular for use with ADHD children, including behavioral self-control techniques (i.e., self-monitoring and self-reinforcement) and self-instruction.

Self-Monitoring and Self-Reinforcement Behavioral self-control techniques, such as self-monitoring and self-reinforcement, require children to monitor their own behavior and reward themselves (usually with tokens or points) intermittently based on those evaluations (Barkley, 1989; Pfiffner & O'Leary, 1993).

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The child is then given reinforcement based on the number of tokens or points accumulated. Thus, the procedure is similar to token economy programs except that the reinforcement is self-administered rather than being awarded by a teacher or adult. Although these two techniques can be used separately, studies have shown that they are most effective when used together concurrently. The use of both of these strategies has been found to increase on-task behavior, academic accuracy, and peer interactions, and decrease hyperactivity in ADHD children (Barkley, 1989; DuPaul & Stoner, 1994). Self-monitoring and self-reinforcement techniques can also be implemented towards the end of token reinforcement programs to maintain gains once adult reinforcement has been withdrawn (DuPaul & Stoner, 1994; Pfiffner & O'Leary, 1993) and can also be used in combination with self-instruction to promote self-control in ADHD children.

Self-Instruction Meichenbaum and Goodman (1971) developed a self-instructional program for hyperactive children which is often utilized in cognitive-behavioral programs. Generally, this program involved several steps. First, an adult modeled self-directed instructions for the child when performing a task. The self-instructional process included defining the task or problem, planning strategies, evaluating performance, self-reinforcing (i.e., positive self-statements), and correcting errors. After the task was modeled, the child performed the task himself under verbal direction of the trainer, then performed the task using overt self-instructions, and finally utilizing covert self-instructions (Barkley, 1990; DuPaul & Stoner, 1994; Meichenbaum & Goodman, 1971; Pfiffner & O'Leary, 1993). Research has shown that this procedure is minimally successful when used in isolation (DuPaul & Stoner, 1994; Shapiro & Cole, 1994) and should therefore be combined with either self or external reinforcement to achieve and maintain treatment effects (Barkley, 1989).

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In addition to minimal effectiveness when used in isolation, there are other limitations which should be considered when using these cognitive/behavioral interventions.

There have been conflicting results regarding the effectiveness of cognitive-behavioral interventions. Several studies have documented the positive effects of cognitive-behavioral interventions on decreasing disruptive behavior (Shapiro & Cole, 1994), improving on-task behavior (Shapiro & Cole, 1994), appropriate classroom behavior (Barkley, 1990), academic performance (Cameron & Robinson, 1980; Douglas, Parry, Marton, & Garson, 1976; Shapiro & Cole, 1994), and cooperative peer contacts (Barkley, 1990; Whalen, Henker, & Hinshaw, 1985). Several studies have shown that the overall effects of these strategies on academic performance (Abikoff & Gittelman, 1985) and behavior (Pelham & Hinshaw, 1992) are not, however, as strong, durable, or generalizable as was once believed (Barkley, 1989; Barkley, 1990; Whalen et al., 1985). This outcome can be seen in that treatment gains typically are not maintained once the procedures are withdrawn (Barkley, 1989; Barkley, 1990; Pelham & Hinshaw, 1992) and, similar to behavior management techniques, the gains do not generalize to settings in which the intervention has not been implemented (Barkley, 1990; Rapport, 1987). However, generalization effects have been shown in self-management procedures that were trained or prompted to be used in the alternative setting or with the alternative behavior (Shapiro & Cole, 1994). In addition to these findings, cognitive-behavioral interventions have not been shown to be more effective than traditional behavioral programs (Barkley, 1990). This approach is also limited in that it requires an excessive amount of time and resources to implement, trained teachers are necessary to teach the procedure, its use is somewhat dependent on the cognitive level of the child, and teachers must supervise children's self-monitoring to ensure accuracy (Barkley, 1990; Pfiffner &

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O'Leary, 1993).

In summary, although cognitive-behavioral interventions offer promising results, the current findings leave the use of these techniques with ADHD individuals questionable. The poor results may be due to the brevity of the training and to little or no overlap between the skills taught during training and the requirements of the classroom (Pfiffner & O'Leary, 1993). There are also several general interventions that should be incorporated into the classroom setting and used in conjunction with the strategies described previously.

General Interventions Educators should also employ general interventions found to improve the academic performance and classroom behavior of ADHD children. Although these general interventions are important when working with ADHD children, they have not been found to be effective when used in isolation but rather should be incorporated into an overall classroom management program.

Teacher Attention The use of praise and positive teacher attention (i.e., smiles, nods, pats on the back) combined with ignoring the child (i.e., contingent withdrawal of all attention) is one of the most basic management techniques a teacher can utilize and is more effective than either attention or ignoring used in isolation (Barkley, 1990; Kerr & Nelson, 1989; Rosen, O'Leary, Joyce, Conway, & Pfiffner, 1984). The use of praise and ignoring has been found to reduce disruptiveness and increase on-task behavior (Pfiffner & O'Leary, 1993). When using praise the teacher should: specify the appropriate behavior being reinforced, deliver it in a genuine fashion, and use it as soon as possible following the appropriate behavior (Barkley, 1990). Ignoring is usually most effective with minor

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motor and nonattending behaviors intended to gain teacher attention (Kerr & Nelson, 1989). Additionally, ignoring is often ineffective with aggressive or destructive behaviors and has limited results when used without praise with ADHD children. The use of praise and ignoring can be utilized in many manners. For example, appropriate behavior such as sitting in the seat, which is incompatible with ignored behavior such as wandering around the class, should be consistently praised. This technique can also be employed by ignoring disruptive students and praising students who are working quietly (Barkley, 1990).

Reprimands The verbal reprimand is probably the most commonly used negative consequence employed in the classroom and has been found to be necessary when working with hyperactive children (Abramowitz, O'Leary, & Rosen, 1987; DuPaul & Stoner, 1994; Pfiffner & O'Leary, 1993; Rosen et al., 1984). The effectiveness of reprimands is dependent on delivery of the reprimands. These negative consequences are most effective when they are specific regarding the teacher's concerns and wishes and consistently delivered immediately following the occurrence of problem behaviors (Abramowitz et al., 1987; Pfiffner & O'Leary, 1993). The reprimands should also be unemotional, brief, delivered in close proximity to the child, and backed up with time-out or loss of a privilege for repeated noncompliance (Pfiffner & O'Leary, 1993). Abramowitz et al. (1987) found that reprimands were effective in reducing off-task behavior that involved interactions with peers but were not effective for non-interactive off-task behaviors such as daydreaming.

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Academic Tasks There are a variety of ways in which academic tasks can be altered to enhance the performance of ADHD children. First, task instructions should be divided into a few steps when presented to these students and then should be repeated back to the teacher to demonstrate understanding (DuPaul & Stoner, 1994). The instructions should also be presented through more visible and external modes of presentation than is required for the management of normal children (Barkley, 1990). Additionally, because of their hyperactivity and inattention, these children are often incapable of completing work which requires sustained attention. Thus, in some cases, the overall amount of work required of these students should be reduced (DuPaul & Stoner, 1994). Once the child has mastered independent completion of the work, the amount of work expected can be increased gradually. These tasks should also be novel and provide high interest levels through the use of increased stimulation (e.g., color, shape, texture) (Barkley, 1990) and require an active as opposed to a passive response (Zentall & Meyer, 1987) because this seems to reduce activity level, enhance attention, and improve overall performance. Varying the presentation format and task materials though the use of different modalities has also been shown to help maintain the interest and motivation of ADHD children (Barkley, 1990). Finally, in relation to tasks and academic material, classroom instructions should be supplemented with direct instruction of important academic skills (Barkley, 1990). Teachers and parents should provide frequent and specific feedback to these children to optimize their performance (DuPaul & Stoner, 1994). During academic work, students should be provided with positive and negative consequences based on their performance and behavior.

Thus, there are a variety of interventions (i.e., medication, behavior management techniques, cognitive-behavioral interventions, and general classroom strategies) which have been shown to be effective in ameliorating different aspects

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of an ADHD child's functioning. The most frequently used treatment protocol involves a combination of therapies including psychostimulant medication in conjunction with contingency management, behavior therapy, or cognitive therapy (Rapport, 1987). It is difficult to determine the degree of efficacy of this multimodal intervention given that no single predictor (i.e., socioeconomic status, intelligence, amount of peer difficulties, or level of aggression and conduct problems) has proven useful in predicting later outcome (Barkley, 1990). However, this multiple treatment protocol is beneficial given that when these treatments are used in isolation, they are not fully comprehensive to address the multifaceted difficulties typically presented by children with this disorder. Specifically, these approaches focus primarily on behavioral improvement, which might consequently lead to behavioral improvement. They do not, however, provide instructional alternatives targeting remediation of academic deficits. As has been described in detail, these children experience a wide variety of academic problems and one technique which can address this concern is that of classwide peer tutoring.

PEER TUTORING

Children teaching other children has been advocated as an effective means to quality education for centuries but has only gained renewed interest in recent years (Scruggs, Mastropieri, & Richter, 1985). Research has shown that peer-mediated academic tutoring has been successfully applied across many academic areas with children of varying exceptionalities and academic abilities (DuPaul & Henningson, 1993; Gerber & Kauffman, 1981; Greenwood et al., 1991; Kohler & Strain, 1990). Additionally, the approach has been found to be beneficial for both tutors and tutees (Allen & Feldman, 1976; Cohen, Kulik, & Kulik, 1982; Devin-Sheehan, Feldman, &

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Allen, 1976; Endsley, 1980; Hogan & Prater, 1993; Scruggs et al., 1985). Kohler & Strain (1990) noted that ". . . for some children, in some settings, and for some behaviors, peers may represent the most powerful source of reinforcement available, even more powerful than teachers or other adults."

Peer tutoring procedures are those in which peers are used to provide direct instruction to target peers and are used to teach academic skills, develop social behaviors, improve classroom discipline, and enhance peer relations (Greenwood et al., 1988). Incidentally, these are all areas which are in need of intervention with most ADHD children. Peer tutoring has proven to be beneficial when working with diverse populations and with a multitude of difficulties.

The effectiveness of peer tutoring with a variety of exceptionalities and in numerous academic and social areas has been well documented in the literature. Several longitudinal studies involving pupil assisted instruction such as the Ontario-Montclair Program, the Pacoima Tutorial Community Project, the Homework-Helpers Program, and Youth Tutoring Youth have shown superior learner gains in reading, math, and language for low-achieving children and teenagers when compared to control groups (Devin-Sheehan et al., 1976; Young, 1981). Gerber & Kauffman (1981) noted that peer tutoring has been used successfully with preschoolers, developmentally delayed toddlers, economically disadvantaged students, mentally retarded children, profoundly retarded adolescents, learning disabled children and speech impaired students; however they did not delineate the specific areas of functioning which were addressed. However, other studies have found peer tutoring to be effective in improving reading and mathematics performance (Young, 1981), academic skills, social interactions, and classroom behavior of normal students (Cohen et al., 1982; Kohler & Strain, 1990) and behaviorally disordered students (DuPaul & Henningson, 1993; Hogan & Prater, 1993; Scruggs et al., 1985).

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Behaviorally disordered students have been found to exhibit: increased reading and math achievement (Scruggs et al., 1985), improved academic performance (Maher, 1982; Maher, 1984), fewer disciplinary problems (Maher, 1982), and more on-task behaviors accompanied by fewer off-task behaviors (McHale, Olley, Marcus, & Simeonsson, 1981) with the implementation of peer tutoring. Peer tutoring has been found to be at least as effective (Gerber & Kauffman, 1981), if not more effective than, teacher instruction or small group instruction with several populations (DuPaul & Henningson, 1993; Gerber & Kauffman, 1981; Greenwood et al., 1991). These populations include autistic children (Greenwood et al., 1988), elementary special-education students (Gerber & Kauffman, 1981), and inner-city children (Greenwood, Dinwiddie, Terry, Wade, Stanley, Thibadeau, & Delquadri, 1984). Finally, peer tutoring can be successful for improving performance in any cognitive, affective, psychomotor (Endsley, 1980), or academic area (e.g., social studies, math, spelling, reading) as long as the material is organized in a programmed format or in some other clear hierarchical and sequential arrangement which can be easily followed by the tutor (Gerber & Kauffman, 1981). Thus, peer tutoring can be effective when used with a wide diversity of children and within several areas of functioning, but it provides additional advantages to the ADHD population.

There are several aspects of peer tutoring which support its use with all children but which will be most beneficial to ADHD children. Research has shown that academic outcomes are improved when active student responding is encouraged and peer tutoring provides this opportunity (Byrd, 1990; DuPaul & Henningson, 1993; Greenwood et al., 1984). Increased academic responding in peer tutoring is due to the increased rate of task presentation, tutors calling for and prompting responses, and the use of immediate error corrections (Greenwood et al., 1984). Active responding is particularly critical for ADHD children because it helps to channel potentially

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disruptive behaviors into constructive responses (DuPaul & Henningson, 1993; Zentall & Meyer, 1987). Peer tutoring also incorporates contingencies and rules which have been linked to improvement in on-task and work behaviors (Greenwood et al., 1984). This immediate feedback will be beneficial to this population because they exhibit higher rates of responding when performance feedback is immediate and administered individually, rather than delayed and delivered in a group setting (Barkley, 1990; DuPaul & Henningson, 1993; DuPaul & Stoner, 1994). DuPaul & Henningson (1993) also noted that peer tutoring is effective because it allows children to work on academic tasks which are well matched to their abilities and instructed at their pace of learning, and students with attention problems are most likely to succeed in this type of environment. ADHD children have been found to be more successful when they are provided opportunities for active responding, given frequent and immediate performance feedback, and are presented academic content at an individualized pace. These are the conditions which peer tutoring provides (DuPaul & Henningson, 1993). Additionally, traditional interventions with these children target classroom deportment rather than academic performance (Rapport, 1987), but peer tutoring will address the academic needs of ADHD children by presenting instruction in a different manner. This is beneficial because improving academic performance will also encourage behaviors which are incompatible with disruptive, hyperactive behaviors. That is, if the student is attending to, and concentrating on, his/her work, then most likely he/she is not engaging in hyperactive or inattentive behaviors. In addition to its effectiveness, other characteristics of peer tutoring support its use in the classroom.

Peer tutoring provides several positive benefits over other widely used teacher-mediated intervention strategies. First, while other intervention programs often target an individual child, peer tutoring programs have been found to benefit

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both the tutor and the tutee (Allen & Feldman, 1976; Cohen, Kulik, & Kulik, 1982; Devin-Sheehan, Feldman, & Allen, 1976; Endsley, 1980; Hogan & Prater, 1993; Scruggs et al., 1985). Although not addressed in this study, peer tutoring has been found to improve the tutor's self-esteem and his/her attitude towards school and teachers. Additionally, tutoring possesses a higher degree of efficiency in terms of teacher time and effort (DuPaul & Henningson, 1993; DuPaul & Stoner, 1994; Kohler & Strain, 1990; Lippitt, 1976) and monetary costs compared to teacher mediated strategies such as contingency management techniques (Barkley, 1990; DuPaul & Henningson, 1993; DuPaul & Stoner, 1994; Greenwood et al., 1988; Kohler & Strain, 1990) and teacher-mediated academic tutoring (DuPaul & Henningson, 1993). Compared to typical classrooms which require one teacher to monitor, provide tutorial instruction, and implement consequences to many different students simultaneously, peer tutoring allows the teacher to use students in the classroom to fill some of these roles. Teachers are also likely to implement the program more frequently and efficiently than other procedures due to its efficiency (Pelham & Hinshaw, 1992) and students and teachers have reported a high level of satisfaction with peer tutoring (DuPaul & Stoner, 1994; Greenwood et al., 1991). Third, peer relations and affiliations have been found to improve within the classroom (Greenwood et al., 1988), including between students with and without disabilities. Additionally, peer procedures may also facilitate generalized teaching and cooperation among students in other settings (Greenwood et al., 1988; Kohler & Greenwood, 1986). Gerber & Kauffman (1981) reported an experiment which indicated that direct reinforcement of tutoring (i.e., tangible and social rewards contingent upon performance) could promote and maintain tutoring and other helping behaviors among school-aged children in classrooms. This outcome is an important benefit because, as mentioned previously, other interventions often are not effective in maintaining improvement once the

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intervention is withdrawn or in settings where the intervention is not in place. Educators have also posited that tutoring can be a valuable tool in facilitating mainstreaming (Hogan & Prater, 1993; Scruggs et al., 1985) which would be beneficial for all students with disabilities. Although there are numerous advantages when using this procedure, there are some concerns which were considered in this study.

The use of peer procedures adds a level of potential risk and ethical concern compared to strictly adult-mediated behavior change programs. When using this intervention it must be determined that the tutor is competent to correctly carry out this procedure and that it is implemented accurately (Barkley, 1990; Greenwood et al., 1988; Greenwood, 1981). This problem can be addressed by determining that the tutors are knowledgeable in the content being taught or have been sufficiently instructed in this area and by having peer sessions monitored by an adult (Greenwood et al., 1988). Also, there is evidence that young children are capable of providing social initiations, models, instructions, correction, feedback, and praise in a highly contingent and accurate manner (Kerr & Strain, 1982; Kohler & Strain, 1990). Additionally, students should be informed of their role and expectations during the peer tutoring process (Greenwood et al., 1988). Included in this informed consent is: explaining the nature of the tutoring role and its relationship to the classroom; the opportunity to reject the tutoring role; informing students of the responses required of them, when they are to occur, and when they are to terminate; explaining that their performance will be monitored, evaluated, and rewarded; and obtaining parental consent (Greenwood, 1981; Greenwood et al., 1988). Greenwood et al. (1988) noted that when using peer procedures student progress should be assessed on a daily and weekly manner to ensure that the intervention is effective. Finally, peer tutoring should be incorporated into the existing class structure, rather than being viewed as an alternative to teacher led instruction (Gerber & Kauffman, 1981;

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Young, 1981). There are several types of peer tutoring interventions which can be implemented, but only systematic peer tutoring will be addressed since that is the model employed in this study.

Systematic Peer Tutoring

The purpose and goals of systematic, or structured peer tutoring, fall into three general areas including: 1) the teaching of academic skills, 2) the development of social behaviors and classroom discipline, and 3) the enhancement of peer relations. This strategy differs from other peer procedures because the tutoring process is structured and systematic and is employed over a sustained period of time, rather than being incidental and spontaneous (Greenwood et al., 1988). The importance of this type of strategy can be seen in that some researchers posit that although research indicates that peer tutoring is beneficial to students, it is only beneficial if it well-structured, cognitively oriented (Cohen et al., 1982), specified and controlled (Endsley, 1980). That is, the peer tutoring program must incorporate specific methods based on effective learning models and must be systematically monitored by the teacher. Studies have reported stronger effects when tutorial programs were structured rather than non-structured (Cohen et al., 1982; Harrison, 1976; Young, 1981). Generally, systematic tutoring involves: (a) providing instructions and models to generate correct responses from a target intervention; (b) monitoring the tutee's responses; (c) evaluating these responses according to a criteria; (d) recording the occurrence of these responses; and (e) administering immediate feedback, consequences and/or reinforcements contingent on the individual's response (Greenwood et al., 1988; Kohler & Strain, 1990). These procedures are consistent with generally accepted principles of effective instruction such as opportunity to respond, rapid pacing, feedback and immediate error

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correction, and content coverage with mastery (Greenwood et al., 1988). Systematic tutoring programs train tutors and teachers in these procedures and also evaluate the success of the program through a variety of assessment modalities. A program based on this type of tutoring which has been proven effective (Byrd, 1990) is ClassWide Peer Tutoring (CWPT) developed at Juniper Gardens Children's Project. This program was implemented in this study with the permission of the authors of the CWPT manual.

ClassWide Peer Tutoring

The CWPT program is considered by many to be the most successful peer tutoring program available (Byrd, 1990; Scruggs & Richter, 1988). This program has four major characteristics: (a) different teams compete on a weekly basis, (b) teaching procedures are highly structured, (c) points are earned and student performance is displayed publicly, and (d) students obtain direct practice in functional academic skills (Byrd, 1990). The use of this procedure incorporates traditional instructional procedures which have been found to be effective including opportunity to respond, functionality of key academic skills areas, and behavioral principles which facilitate responding (Delquadri et al., 1986). However, CWPT also differs from traditional instructional models in several ways: 1) the use of peers to supervise responding and practice, 2) the use of a game format in terms of using points and competing teams, and 3) the use of a weekly evaluation plan to ensure gain in both individual and class programs (Carta, Greenwood, Dinwiddie, Kohler, & Delquadri, 1987). The tutoring process is systematic in that both tutor and tutee roles are highly structured to ensure that tutees receive rapid response trials in a consistent format and that tutors apply a standard error-correction procedure (Greenwood, Terry, Arreaga-Mayer, & Finney, 1992). Several studies have

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documented the effectiveness of the CWPT program utilizing both single-subject and experimental-control group designs.

The CWPT program has been found to have positive effects on elementary aged (Greenwood et al., 1984), learning-disabled, educable mentally retarded, behavior disordered, autistic, and hearing impaired students (Delquadri et al., 1986) in the areas of reading, mathematics, and spelling (Byrd, 1990; Cook, Heron, & Heward, 1983; Delquadri et al., 1986; Greenwood et al., 1984). Typically, children can be expected to increase their academic behaviors from 20% to 70% with the implementation of CWPT (Delquadri et al., 1986). A study by Elliott, Hughes, & Delquadri (1984) demonstrated that active student responding, including read aloud, read silent, talk academic, and writing improved from 28% during the regular reading class to 78% when classwide peer tutoring procedures were implemented (cited in Delquadri et al., 1986). Studies conducted by Hall, Delquadri, Greenwood, & Thurston (1982) and by Delquadri, Greenwood, Stretton, & Hall (1983) demonstrated positive effects of CWPT on the spelling performance of third-grade children. The results indicated that even students in the class who averaged more than eight errors per week could perform as well as other students when spelling was taught using CWPT. Additionally, tutoring was demonstrated to be more effective in reducing spelling test errors than teacher procedures, including group instruction, spelling text, and workbooks. Similar effects have been replicated with LD students. Corresponding to the implementation of CWPT, LD students typically doubled their rates of words read correctly per minute and exhibited decline in their reading error rate (Delquadri et al., 1986).

Particularly relevant to this study is an experiment conducted by DuPaul & Henningson (1993). This study utilized an ABAB reversal experimental design to examine the effects of the CWPT program on a second grade male who had been diagnosed with ADHD. Classroom behavior and mathematics performance were the

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targeted behaviors. The study found that classwide peer tutoring resulted in the subject achieving significant improvements in on-task behavior, activity level, and academic performance (DuPaul & Henningson, 1993; DuPaul & Stoner, 1994). Specifically, baseline data indicated that the subject was on-task for only 39% of the observation intervals; however, on-task behavior increased to 89% with the implementation of CWPT (DuPaul & Henningson, 1993). Additionally, the subject exhibited high rates of fidgeting behavior (31%) during baseline observation, but only 4% with the implementation of tutoring. When the baseline conditions were reinstated, on-task behavior decreased to 70% and fidgeting behavior increased to 23%. Finally, with the reimplementation of CWPT, on-task behavior was observed 90% of the time and fidgeting behaviors were exhibited 3.8%. Thus, by the end of the CWPT program, on-task behaviors had more than doubled and fidgeting behaviors were markedly reduced.

The subject's performance on CBM math probes during the experiment was variable. At the beginning of the study the subject had an average of 5 digits correct on CBM math probes and increased this average to 13.3 digits correct.

Training Students in CWPT The first step in using this intervention is to train students in peer tutoring procedures. Training students in classwide peer tutoring procedures involves several steps. Students in a classroom are trained in three or four 20 minute training sessions which cover several topics (DuPaul & Henningson, 1993; DuPaul & Stoner, 1994; Greenwood, Delquadri et al., 1988). These topics include: rationale for and overview of peer tutoring, practice of tutoring procedures, and methods to determine progress (i.e., awarding points). The sessions also involve descriptions of how to present academic material to the tutee, modeling of the behaviors by the teacher and selected students, and structured rehearsal of the

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tutoring techniques by the entire class. During the training phase, the consultant meets with the teachers on a regular basis to discuss the progress and problems of implementing the procedure (DuPaul & Stoner, 1994).

Process of Peer Tutoring Once the training sessions have been completed, students in the classroom are randomly paired with one another for an academic subject at a time and these pairs are assigned to one of two competing teams (DuPaul & Henningson, 1993; DuPaul & Stoner, 1994; Greenwood, Delquadri, et al., 1988; Greenwood et al., 1992). The student who is serving as the tutor is provided with a script of academic material which is related to the current academic content of instruction in the classroom (DuPaul & Henningson, 1993; DuPaul & Stoner, 1994; Greenwood, Delquadri, et al., 1988; Greenwood et al., 1992). Items are dictated to the tutee who responds orally to the presented item, using a blank piece of paper when necessary. For each correct, initial response the tutor awards the student two points. If the tutee responds incorrectly, the tutor provides the correct answer and offers the tutee the opportunity to practice the correct response. The tutee earns one point if he/she practices the correct response three times, but earns zero points if the he/she is unable to answer correctly three times (Carta et al., 1987; DuPaul & Henningson, 1993; DuPaul & Stoner, 1994; Greenwood, Delquadri, et al., 1988; Greenwood et al., 1992). The script is presented as many times as possible within ten minutes. Finally, the students switch roles for ten minutes. During the tutoring sessions, the teacher monitors the behavior of tutoring pairs throughout the classroom and provides needed assistance. Bonus points are awarded to tutorial pairs on a random interval basis if proper instructional procedures and behavior control are exhibited (Carta et al., 1987; DuPaul & Henningson, 1993; DuPaul & Stoner, 1994; Greenwood, Delquadri, et al., 1988; Greenwood et al., 1992). When the twenty minute

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tutorial session is concluded, each pair of students orally reports the number of points earned during the tutoring session and these points are recorded by the teacher. Based on point totals, a winning team is determined daily and weekly (Greenwood et al., 1992). At the end of each week, the team with the most points is declared the "winner", but all students are praised for their efforts (DuPaul & Henningson, 1993; DuPaul & Stoner, 1994; Greenwood, Delquadri, et al., 1988; Greenwood et al., 1992). Additionally, back-up contingencies such as privileges and rewards can be used if they are needed for extra incentive. Several procedures are employed to document the student's progress during tutoring.

Monitoring Progress Throughout the program a variety of measures are used to determine progress associated with peer tutoring. The various measures include: tallying of peer tutoring points on an individual student basis, conducting curriculum based measurement probes several times per week (DuPaul & Stoner, 1994), and administering pre-tests (Carta et al., 1987; DuPaul & Stoner, 1994). Typically, teachers administer tests each Friday in place of the tutorial session on the academic content covered during tutoring (Carta et al., 1987). The data obtained from these measures can be graphed for individual students and used to determine if changes are needed in either instruction or content.

Summary The use of peer tutoring for students with ADHD represents a clear connection between theory and practice as it changes the manner in which instruction is provided. As mentioned previously, ADHD children sustain their attention and complete academic material more successfully when instruction is provided in a one-to-one situation, is modified to the individual's academic ability level, and delivered at the student's pace (Barkley, 1990; DuPaul & Henningson, 1993;

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DuPaul & Stoner, 1994). These children also require opportunities to actively respond, frequent prompts, and immediate feedback regarding their performance. These are precisely the conditions under which instruction is presented within the CWPT model. Additionally, peer tutoring has been found to be an empirically validated means of improving academic performance, classroom behavior, and social interactions with children exhibiting a wide variety of cognitive abilities and exceptionalities. Thus, peer tutoring can be beneficial in improving ADHD children's academic performance as well as their classroom deportment. When examining the effectiveness of peer tutoring on these variables, the assessment methods which will be utilized must be examined.

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ASSESSMENT METHODS

There were several methods and instruments utilized throughout this experiment to evaluate the effect of peer tutoring on both academic performance and classroom behavior of the target population. These measures and the rationale supporting their use are described below.

Behavior Assessment System for Children

The Behavior Assessment System for Children (BASC) is a multimethod, multidimensional approach to evaluating children's behaviors and self-perception (Reynolds & Kamphaus, 1992). The instrument can be used with children ages four to eighteen and is divided into three age groups: preschool (4-5), child (6-11), and adolescent (12-18). There are several scales available in this system: self-report scale, teacher and parent rating scale, structured development history, and observation forms; however, only the teacher and parent rating scales for children are discussed since those are the forms utilized in this experiment. These forms were administered before the implementation of peer tutoring to help determine if the child met the criteria for ADHD as established in this study.

The Teacher Rating Scale (TRS) and Parent Rating Scale (PRS) are complementary measures of the child's behavior in school, home, and community settings (Reynolds & Kamphaus, 1992). The measures are divided into composite domains and individual scales. The Externalizing Composite includes the Aggression, Conduct Problems, and Hyperactivity scales. The Internalizing Composite consists of the Anxiety, Depression, and Somatization scales. The individual's adaptive skills are assessed in the Adaptability, Leadership, Social Skills, and Study Skills (on the TRS)

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scales. On the TRS, the Attention and Learning Problems scales comprise the School Problems Composite. Finally, although not included in a composite score, atypical and withdrawn behaviors are also rated. The Behavioral Symptoms Index (BSI) represents the individual's overall level of problem behaviors. The scales utilized in this study were the Hyperactivity and Attention scales because they were designed to be useful for diagnosing ADHD according to DSM-III-R criteria and have been found to correlate highly with this disorder. Although the Externalizing Problems Composite and the Aggression and Conduct Problems scales also correlate with ADHD, they were not used in the classification of this population to exclude the identification of children who also have a comorbid disorder (i.e., Oppositional Defiant Disorder, Conduct Disorder).

The scores on the BASC can be interpreted based on general norms or clinical norms. The clinical norms are comprised of individuals who had been diagnosed with an emotional or behavioral problem and were being served in school or clinical settings (Reynolds & Kamphaus, 1992). The sample was also comprised of children in the general norm sample who had been diagnosed with emotional or behavioral problems. Children in this study will be compared to individuals in the clinical norms because the authors of the manual noted that general norms are useful for evaluating an individual's overall level of problems; however, clinical norms should be utilized when the examiner wants to determine subcategories of the population (i.e., ADHD, Depression, Social Maladjustment). The authors noted that ratings for these populations are typically higher than the general population so that ceiling effects are often encountered if the general norms are utilized. The manual provides evidence indicating adequate standardization, reliability, and validity.

The clinical norms were based on a sample of 1,505 individuals. This sample was not demographically controlled since children diagnosed with emotional and

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behavioral problems are not a random subset of the general population. The sample included African-American and Hispanic individuals, but these groups are underrepresented in comparison to the general population. Additionally, children diagnosed with learning disabilities, speech and language disorders, and mental retardation were not included in the sample if there was not a co-occurring emotional or behavioral problem.

Reliability for the TRS and PRS - Child Form (6-11) are discussed with regard to the clinical norms based on the Hyperactivity and Attention Problems scale since these are the areas of concern in this study. Internal consistency was supported with coefficient alphas of .87 and .77 for the Attention Scale and .92 and .83 for the Hyperactivity Scale on the TRS and PRS, respectively (Reynolds & Kamphaus, 1992). Test-retest coefficients, based on zero to two month intervals, for the General norms was found to be .92 and .92 on the Attention Scale and .92 and .84 on the Hyperactivity Scale on the TRS and PRS, respectively.

The authors of the BASC manual noted that the validity of the BASC was supported in three ways: 1) empirical support for grouping scales into composites provided by factor analysis; 2) the pattern of correlations of the TRS and PRS scales and composites with scores obtained on other related measures; and 3) the differentiating profiles of groups of children with particular diagnoses (Reynolds & Kamphaus, 1992).

Validity evidence was also provided by correlating the BASC with other social/emotional measures. The BASC TRS was correlated with the Child Behavior Checklist - Teacher Form (CBCL), the Revised Behavior Problem (RBPC) Checklist, the Conners Teacher Rating Scale (CTRS), the Burks Behavior Rating Scale (BBRS), and the Behavior Rating Profile (BRP) (Reynolds & Kamphaus, 1992). Overall, the BASC had high correlations with scales measuring externalizing behaviors, including

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attention, and school problem behaviors on the CBCL, RBPC, and BBRS; however, correlations with the CTRS and BRP were considered moderate and did not provide a discrete pattern of correlations.

The PRS was correlated with the CBCL - Parent Form (CBCL), the Personality Inventory for Children - Revised (PIC-R), the Conners Parent Rating Scale (CPRS), and the Behavior Rating Profile (BRP). The correlations between the PRS and the CBCL and the externalizing scales of the CPRS were considered to be high ($r = .71 - .84$), while the correlations with the PIC-R and the BRP were moderate. Overall, on both the TRS and PRS correlations with externalizing behaviors were found to be the most consistent.

ADHD Rating Scale

The ADHD Rating Scale is useful for providing a direct rating of the essential symptoms of the disorder based on the DSM-III-R from both parents and teachers for children ages 6-12 (Barkley, 1990; DuPaul, 1991; DuPaul & Stoner, 1994). This measure was administered as one component used to determine if the child met the criteria for ADHD. The informant was required to rank the occurrence of a child's behavior according to a four point scale (0 = not at all, 1 = just a little, 2 = pretty much, 3 = very much) (Barkley, 1991; DuPaul, 1991). Three scores are calculated for the scale: Total Score, Inattention-Hyperactivity, and Impulsivity-Hyperactivity (Barkley, 1990; Barkley, 1991). The adequate reliability and validity of this measure supports its use in this study.

Several types of evidence indicating sufficient reliability and validity for the ADHD Rating Scale have been documented. Coefficient alphas for parent ratings were as follows: ADHD Total Score, .94; Inattention/Hyperactivity, .93; and Impulsivity/Hyperactivity, .90 (DuPaul, 1991). Similar results were found for teacher

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ratings: ADHD Total Score, .96; Inattention/Hyperactivity, .95; Impulsivity/Hyperactivity, .94.

Test-retest data were collected utilizing teacher ratings at two week intervals and on parental ratings at four week intervals. Pearson Product Moment Correlation Coefficients for teacher ratings were .96, .95, and .95 for the ADHD Total Score, the Inattention/Hyperactivity, and the Impulsivity/Hyperactivity Scales, respectively, (DuPaul, 1991). The correlations for the parent ratings were found to be .94 for the ADHD Total Score, .94 for the Inattention/Hyperactivity Scale, and .90 for the Impulsivity/Hyperactivity Scale.

The ADHD Rating Scale was also compared to several criterion measures to provide evidence of its criterion related validity. This scale had the highest Pearson Product Moment Correlations with the Abbreviated Conners Teacher Rating Scale (ACTRS) with correlations ranging from .56-.63 for parent ratings and from .80-.90 for teacher ratings (DuPaul, 1991). Additionally, typically the higher the ADHD Total Score, the lower the level of academic efficiency (r=-.39-.50), academic achievement based on the Comprehensive Test of Basic Skills (r=.26-.40), and on-task frequency (r=.29-.57). Scores on the Impulsivity/Hyperactivity factor were less strongly correlated with criterion measures than the total ADHD score or the Inattention/Hyperactivity score for both parent and teacher ratings. Additionally, the scale has been found to differentiate between ADHD, learning disabled and normal children, between children with Attention Deficit Disorder with Hyperactivity and those with ADD without hyperactivity, and to be sensitive to stimulant drug effects (Barkley, 1990).

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Curriculum Based Measurement

Curriculum Based Measurement (CBM) is a set of specific measurement procedures that can be applied to quantify student performance in reading, written expression, spelling, and arithmetic. CBM can be employed as a tool for teachers to routinely monitor student progress and instructional effectiveness (Deno, 1985; Shapiro & Derr, 1990). Within the realm of this study, CBM was administered before, during, and after the implementation of CWPT to assess the child's academic achievement in spelling. Generally, CBM is implemented by administering standardized, frequent, short probes designed from the student's curriculum. These probes are administered on a frequent basis and the student's progress is charted. CBM procedures have been found to be reliable and valid in the areas of reading, spelling, mathematics, and writing for use with children between the ages of 9 and 11, which are the ages of the subjects included in this study. However, only the procedures and technical adequacy of spelling utilizing the correct-letter-sequence scoring criteria is discussed here since that is the academic area and scoring procedure which was utilized in this study.

Spelling probes can be administered either individually or in groups (Shinn, 1993). Generally, words are dictated to students at a predetermined rate for two minutes. For students in grade 1-3, words are dictated at 10 second intervals, whereas words are dictated at 7 second intervals for grades 4-8 (Shinn, 1989; Shinn, 1993). Depending on the student's grade level, between twelve and seventeen words are dictated. Using these procedures has been found to produce adequate technical properties.

The results of a variety of studies on CBM procedures in spelling have revealed adequate psychometric properties. When utilizing the number of correct-letter-sequences as the scoring metric, test-retest coefficients were found to range from

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.83-.93 (Marston, 1989). When parallel forms are used, the coefficients ranged from .80-.97 Additionally, interscorer reliability coefficients were .91 (Marston, 1989).

There have also been studies supporting the validity of this measure and the use of correct-letter-sequence scoring. Curriculum based measures of spelling have been compared to several criterion related measures, including: Test of Written Spelling (TOWS), Peabody Individual Achievement Test (PIAT), and the Stanford Achievement Spelling subtest. The median correlations between these measures ranged from .82-.93 (Deno, Mirkin, Lowry, Kuenne, 1980; Marston, 1989). Besides criterion validity, various forms of construct validity have also been demonstrated. Studies by Shinn and Marston (1985), Deno (1985), and Shinn, Ysselydyke, Deno, and Tindal (1986) have provided evidence for curriculum based measures of spelling's discriminant validity. CBM spelling measures were found to reliably discriminate between students placed in mildly handicapped, Chapter I, and regular education programs and between learning disabled and low achieving students. Construct validity was also supported in studies which demonstrated that performance on CBM measures improved as students progressed through the curriculum and received more instruction.

CBM was employed in this study rather than a standardized achievement measure for several reasons. First, it is often questioned whether or not published norm-referenced tests adequately measure learner outcome (Marston, 1989). Although students actually may be improving, the design of standardized tests precludes the demonstration of learning. Marston, Fuchs, and Deno (1986) demonstrated that over a sixteen week period students improved significantly on a curriculum based reading measure and teacher judgment, but this growth was not evidenced on published measures of reading comprehension and vocabulary. Thus, CBM measures are sensitive to growth in student performance over a relatively short

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duration of time (Shapiro & Derr, 1990). Second, CBM was utilized because, unlike standardized achievement tests, it ensures that students are tested on their curriculum (Marston, 1989). Third, because of its short duration, CBM can be administered frequently by the teachers and there are not practice effects (Marston, 1989). Also, the model utilizes a time-series data analysis, allowing conclusions to be drawn regarding the relation between changes in a student's program (i.e., CWPT) and the changes in the individual's progress (Shapiro & Derr, 1990). An advantage to this type of analysis is that it allows student performance and treatment effects to be observed while the intervention is in progress.

ADHD OBSERVATION

Behavioral observations are considered by the majority of professionals to be an integral component when working with ADHD children (Barkley, 1988, 1990; DuPaul & Stoner, 1994). Observational techniques have been found to reliably discriminate between ADHD and non-ADHD children (DuPaul & Stoner, 1994; Platzman, Stoy, Brown, Coles, Smith, & Falek, 1992) when targeting off-task behavior, gross motor activity, and vocalizations. The child should be observed across settings and on several occasions to establish the frequency and/or duration of behaviors (DuPaul & Stoner, 1994). Additionally, the ADHD child's behaviors should be compared to that of his/her classmates.

A number of behavior observation coding systems have been developed to determine the occurrence of ADHD behaviors. The system employed in this study was a modified form of Barkley's Restricted Academic Situation Coding Sheet (Barkley, 1990; Barkley, 1991). The observation was utilized for two purposes. First, it served as one component used to identify children who met the criteria for ADHD. During the initial phase, the observations were conducted on three occasions for 20 minutes

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at 30 second intervals and targeted both ADHD children and control children (Barkley, 1990). The observation focused on off-task behaviors, fidgeting, vocalizing, playing with objects, and out of seat behavior. Targeting these behaviors is consistent with studies demonstrating that behaviors which most clearly distinguish ADHD children from comparison groups are attention, activity, and vocalizations (Platzman et al., 1992). Additionally, it is consistent with recommendations of observing the ADHD child in various settings and in comparison to other children. Second, observations were conducted before, during, and after the implementation of CWPT as a measure of the effect of the intervention on the child's classroom behavior. The behaviors which were targeted during this phase included off-task behavior and fidgeting.

Kaufman Brief Intelligence Test

The Kaufman Brief Intelligence Test (K-BIT) is an individually administered measure of verbal and nonverbal intelligence and can be used with individuals ranging in age from 4 to 90 (Kaufman & Kaufman, 1990). The K-BIT was administered in this study to obtain an estimate of the subject's intellectual functioning. The measure yields three composite scores: Vocabulary, Matrices, and the K-BIT Composite, or IQ standard score. These composites are represented through standard scores with a mean of 100 and a standard deviation of 15. The use of this measure is supported by its standardization and evidence for reliability and validity.

The K-BIT was standardized on 2,022 children and adults ranging in age from four to ninety (Kaufman & Kaufman, 1990). The sample was stratified according to the most recent US Census figures (either projected 1990 data or 1985 figures) on the variables of socioeconomic status, race or ethnic group, gender, and geographic

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region.

The K-BIT manual provides evidence for the measures' reliability. Split-half reliability correlation coefficients were found to have a mean of .91, .85, and .93 for the Vocabulary Composite, Matrices Composite, and IQ Standard Score, respectively. Test-retest correlation coefficient means, with approximately a twenty-one day interval, were .94, .85, and .94, respectively.

Content validity evidence was demonstrated by selecting subtests based on major comprehensive intelligence tests. Additionally, a Rasch Wright analysis was used to choose items on the measure. Reportedly, the construct validity for the K-BIT is based on the age-differentiation criteria. The authors noted that logically, mean raw scores for children should increase with higher chronological age, while mean raw scores for adolescents and adults should follow an established pattern of growth and decline. This expected pattern was established on the standardization sample. Additionally, the K-BIT also showed moderate to high correlations with widely used and accepted intelligence tests, brief intellectual measures, and achievement tests (i.e., Kaufman Assessment Battery for Children, Wechsler Intelligence Scale for Children - Revised, Wechsler Adolescent Intelligence Scale - Revised, Test of Nonverbal Intelligence, Slosson Intelligence Test, Kaufman Test of Educational Achievement - brief and comprehensive forms, and the Wide Range Achievement Test - Revised.

SUMMARY

As can be seen from the extensive literature regarding ADHD, this condition has received significant attention within the last several decades. There is still a lack of interventions, however, which effectively address the multiple difficulties ADHD

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children experience including not only the "core-deficits" of ADHD but also aggression, conduct problems, poor social skills, and academic underachievement. Additionally, the primary interventions which are used to treat ADHD children typically focus on classroom deportment, rather than academic modifications. Therefore, the purpose of this study is to examine the effects of a classwide peer tutoring program on both the behavior and academic achievement of the subject's.

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CHAPTER THREE
METHODS

In this chapter the research design of the study will be addressed. Participant characteristics, instrument descriptions, procedures used to collect data, and data analysis techniques will be discussed.

PARTICIPANTS

The study contained a sample of 3 fourth-grade males (one African American and two Caucasian) in different classes who attended North Belt Elementary in Humble, Texas. The students were all 10-years of age. All the subjects were determined to have ADHD, Combined Type. ADHD Combined Type, rather than Predominantly Hyperactive-Impulsive or Predominantly Inattentive Types, was utilized because hyperactivity combined with inattention has been found to be the more prevalent condition. Students were considered to have this disorder based on the following criteria: 1) DSM-IV criteria for ADHD, Combined Type; 2) maternal and teacher ratings on the Hyperactivity and Attention scales on the BASC which were beyond the 95th percentile (i.e., T score $\geq$ 68); 3) significant teacher ratings on the total score of the ADHD Rating Scale (i.e., a score greater than 1.5 standard deviations above the mean); and 4) direct observation of a high frequency of off-task, fidgeting, vocalizing, playing with objects, and out of seat behaviors when compared to other peers.

Additionally, all the children in the sample were determined to have cognitive abilities within the low average to high average range (Standard Score (SS) = 85-115) as estimated by the K-BIT. The subject's spelling achievement measured within the

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frustrational range (i.e., 0-70% mastery) according to curriculum based measures in spelling. Children included in the study were not taking stimulant medication, nor had they done so in the past. Additionally, the sample did not include individuals diagnosed with a learning disability or other special education classification.

All participants gave their assent for inclusion in the study. The experiment was described to the various classrooms and assent was obtained from all the students rather than only those who were chosen to participate in the experiment. This was done so that the students did not realize who was involved in the study.

INSTRUMENTATION

Behavior Assessment System for Children

The parent and teacher rating scales of the Behavior Assessment System for Children (BASC) are complementary questionnaires completed by parents and teachers which are used to evaluate the behaviors of children ages four to eighteen (Reynolds & Kamphaus, 1992). The teacher report scale for children (TRS-C) and the parent report scale for children (PRS-C) were utilized in this study. The TRS-C contains 148 questions, while the PRS-C contains 138 questions. The items are descriptors of behaviors which the respondent rates on a four-point scale ranging from "never" to "almost always." The questionnaires, which take approximately 10 to 20 minutes to complete, are norm-referenced and have demonstrated adequate statistical properties. T scores and national percentile ranks are derived scores which are available for the quantitative interpretation of the BASC.

The Attention Problems and Hyperactivity Scales of the PRS-C and TRS-C were utilized as a measure of the child's level of hyperactive and/or inattentive behaviors to determine the individual's qualification for the study. These scales were designed

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to correspond with a diagnosis of ADHD according to the DSM-III-R criteria (Reynolds & Kamphaus, 1992). The PRS contains 7 questions corresponding to the Attention Problems scale and 10 questions included in the Hyperactivity Scale. The TRS contains 8 and 13 questions, respectively.

ADHD Rating Scale

The ADHD Rating scale is a screening method used to assess the fourteen symptoms of ADHD based on the diagnostic criteria in the DSM-III-R (Barkley, 1990, 1991). The scale was designed to be completed by parents and/or teachers and can be utilized with children ages 6-12 (DuPaul & Stoner, 1994). The scale lists behaviors which the respondent rates on a four point Likert scale. The ratings are considered significant if the scores are greater than 1.5 standard deviations above the mean for the age and sex of the child (Barkley, 1991). The mean and standard deviation for ten-year old males on the Total Score are 11.82 and 10.46, respectively. Three scores are calculated for the scale: Total Score, Inattention-Hyperactivity, and Impulsivity-Hyperactivity (Barkley, 1990, 1991). The Total Score was utilized in this study since that score has been demonstrated to have the most adequate statistical properties. This scale was administered to teachers as a screening measure to determine possible subjects.

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Restricted Academic Situation Observations

A modified form of Barkley's Restricted Academic Situation Coding System was utilized to assess children's behaviors in the classroom (Barkley, 1991; DuPaul & Henningson, 1993; DuPaul & Stoner, 1994). Observations were employed to determine eligible subjects for the study and to monitor the subject's progress. In the initial phase when potential subjects were being identified, the observations were conducted for 20 minutes on three occasions in separate settings. In addition to observing the target child, a peer was also observed to determine the significance of the ADHD child's behaviors when compared to that child's peers (Barkley, 1991). The following behaviors were recorded using a 30-second partial interval coding system: off-task, fidgeting, vocalizing, playing with objects, and out-of-seat behaviors (Barkley, 1991). A child was considered "off-task" if "that individual interrupted his/her attention to the task to engage in some other behavior" (Barkley, 1991). Attention was defined as visually looking at the task materials. The operational definition of fidgeting was "any repetitive, purposeless motion of the body which occurred at least twice in succession and showed no purpose." Vocalizing was endorsed if the child engaged in any vocal noise or verbalization. The child was considered to be "playing with objects" if that individual touched anything besides his/her table, chair, work, or pencil. Finally, "out-of-seat" behavior was defined as "any time the child's buttocks break contact with the flat surface of the seat" (Barkley, 1991). A tape recorder with an earphone was used to determine the beginning and end of each observation interval.

Once the child was included in the study, observations were conducted for 15 minutes during spelling instruction. The student's off-task and fidgeting behaviors (described above) were coded. The 30-second partial interval coding system and tape recorder were again employed.

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The observations were completed by a paraprofessional employed at North Belt Elementary. The individual had been trained by the author to use the modified Restricted Academic Situation observation system. Training consisted of four hours of observing and coding students in various classroom with the experimenter. The paraprofessional began independent observations once a criterion of 80% reliability with the author was established on five separate occasions. Additionally, interobserver reliability checks were conducted during 20% of the observations by the author. Overall reliability was 94% throughout the study.

Curriculum Based Measurement

Curriculum Based Measurement (CBM) is a set of specific measurement procedures that was applied to quantify student performance in spelling. The spellings probes were administered before, during, and after the implementation of CWPT and designed from the student's curriculum. The probes were administered based on directions by Shinn (1989) and scored using the correct-letter-sequence scoring system. Because curriculum based measures in spelling can be administered either to individuals or in groups, these measures were conducted with the entire classroom to protect the subject's confidentiality and so the targeted children did not realize they were being observed. These measures were administered following the same schedule as the observation. That is, five times a week during the initial implementation of CWPT and following with three times a week during probe conditions. The students were administered 17 words for 2 minutes at 7 second intervals (Shinn, 1989). Three probes were administered during each session. The median of the child's correct letter sequences during each administration was used to determine amount of progress.

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Test Grades

In addition to standardized curriculum probes, the grades earned on weekly spelling pretests and posttests were also utilized to document progress. The rationale behind the use of these grades is based on the fact that curriculum based measures in spelling contain words from the yearly curriculum. Thus, the students are administered words which they might not have seen or practiced. Utilizing test grades based on words which students have practiced and studied provides an indication of the subject's current spelling performance in the classroom rather than the person's ability to spell unfamiliar words.

Kaufman Brief Intelligence Test

The Kaufman Brief Intelligence Test (K-BIT) is a brief, individually administered measure used to assess an individual's verbal and nonverbal intelligence. The test can be used with ages 4-90 (Kaufman & Kaufman, 1990). The test is divided into two areas: Vocabulary and Matrices. The Vocabulary section includes the Expressive Vocabulary and Definitions subtests. The Expressive Vocabulary subtest contains 45 items and requires the subject to provide the name of a pictured object. The Definitions subtest, which contains 37 items, presents the person with two clues (a phrase description and partial spelling) and requires the person to provide the correct word that fits these clues. The Matrices subtest is a nonverbal measure composed of 48 multiple-choice items involving visual stimuli. The stimuli is meaningful (i.e., including people and objects) and abstract (design and symbols). On all subtests, teaching items are included and the items are arranged in order of increasing difficulty and, unless the subject reaches the last item, not all items are given to any individual. The Vocabulary and Matrices subtests are combined to yield an overall Composite, or IQ standard score. The K-BIT yields

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standard scores, IQ standard scores, percentile ranks, stanines, and normal curve equivalents. In this study, the IQ standard score was utilized to determine that the child's intellectual functioning was within the low average to high average range (e.g., 85-115).

ClassWide Peer Tutoring

The ClassWide Peer Tutoring procedures were implemented in all three classrooms following the guidelines in the ClassWide Peer Tutoring Training Manual (Carta et al., 1987). The tutoring occurred on Mondays through Thursdays during the time typically scheduled for spelling lessons. Pretests on the following weeks words and weekly spellings tests were administered on Fridays instead of tutoring sessions. The sessions typically took between 30-35 minutes. The spelling words included in tutoring were chosen from the yearly curriculum. The teachers designed the content lists by dividing the yearly content material into weekly lists of 10-20 items per list.

The classroom teachers, with the author of this study present, trained their individual classes in the process of peer tutoring before tutoring commenced. Training occurred in four separate phases: 1) learning about tutoring, 2) moving to a partner, 3) carrying out the actual tutoring procedures, and 4) reporting points. The first training session explained the purpose of peer tutoring to the students and the concept of being on a team. The second session was designed to teach the students how to move to their respective partners. This process was accomplished by teaching them to read the Move/Stay chart which indicated the tutoring dyads. Session Three involved explaining the rules for tutoring and how to implement the process. First, the teacher explained the procedure to the class, then there was a demonstration between the teacher and a student, then two students demonstrated the tutoring

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procedure, and finally, the whole class practiced while the teacher provided feedback. Finally, Session Four taught students how to report their points. The classrooms were divided into teams, with teams changing each week so that students maintained their interest level. Students were randomly paired for tutoring, as recommended by the CWPT manual.

There were specific procedures adhered to during the process. In each pair, one student was the tutor for ten minutes and the other student was the tutee. At the end of ten minutes, this was reversed and the students switched roles. If there were an odd number of students, then a triad was formed. The triad consisted of two tutees working with one tutor. The tutor dictated items from the spelling tutoring list, one at a time. If the tutee wrote the correct response, that student earned two points. When the tutee responded incorrectly, the tutor modeled the correct answer by saying it outloud and the tutee practiced the correct response three times by saying the word as it was written. The tutor awarded one point if the tutee practiced the correct response three times, or gave the tutee zero points if the word was not written correctly three times. Once the tutee finished responding, the tutor administered the next item. If the tutee goes through the entire spelling list before ten minutes are completed, then the person begins the list again. The pair did this for ten minutes until they were informed to switch roles. When both students had been the tutor and tutee, they reported their respective points to the teacher. So that the children had the same amount of practice on the tutoring list, the tutors began administering words from the bottom of the list on alternate days of tutoring.

Students could earn additional points during the tutoring procedure by following the correct strategies. Bonus points were given when the teacher observed the tutor or tutee engaging in appropriate tutoring procedures such as watching the tutee write words, correcting tutee's mistakes, moving quickly and

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quietly, writing quickly, or putting their pencil down when the timer rang. The purpose of utilizing these points was to ensure quality of the tutoring process and the team with the most points earned a prize at the end of the week. The prize provided in all classrooms was a choice of snacks.

DATA COLLECTION

The initial step in the data collection was to identify children who met the criteria for ADHD, Combined Type. To do this, the participating teachers suggested two to four children in their classrooms who exhibited ADHD characteristics and were having difficulty in spelling. The teachers completed the ADHD Rating Scale and the BASC for the respective children, observations were conducted, and curriculum based measures in spelling and the K-BIT were administered. Based on the results of these measures, one child in each classroom was tentatively chosen for the study. Then, the respective parents were administered the BASC and, assuming their results also met qualifying criteria, they signed an informed consent agreement. The qualifying results of the individual subjects are presented in Appendix B.

Once included in the study, data collection instruments included curriculum based measures in spelling and classroom observations. The CWPT program was conducted by the classroom teachers and supervised by the author of this study. The author administered the questionnaires and rating scales, teachers administered the CBM probes, and a trained paraprofessional conducted the observations. Subjects remained anonymous by the use of identification codes. The specific procedures employed to collect the data are described in more detail below.

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DATA ANALYSIS

The data in this study were gathered and analyzed based on a single-subject multiple probe design. The design was conducted across subjects targeting three behaviors: off-task, fidgeting, and academic performance. The independent variable in this study was CWPT while the dependent variables were: 1) the percentage of observation intervals that off-task and fidgeting behaviors were coded, and 2) the median number of correct letter sequences on three probes of a curriculum based measure in spelling. Thus, the purpose of the study was to determine the effect of CWPT on an individual's off-task and fidgeting behaviors, as well as, the person's academic performance in spelling. There were three subjects incorporated into the study (Subject 1, Subject 2, Subject 3).

Within the multiple probe design, the independent variable (i.e., CWPT) was systematically and sequentially introduced to one subject at a time (Tawney & Gast, 1984). The probes were not conducted on a continuous basis, as in multiple baseline designs, but rather probe sessions were conducted on the targeted behaviors and skills. Based on recommendations by Tawney & Gast (1984), three baseline probes were conducted. These probes were utilized to evaluate whether the subject's academic performance and/or behaviors were stable before the implementation of CWPT. The results were analyzed to determine the relationship between CWPT and the subject's spelling achievement and/or classroom deportment. If the subject's baseline measures on these variables remained stable across probe trials prior to intervention and the behaviors improved only after the independent variable was applied, then a functional relationship would be indicated. Because the subjects were in different classrooms, this further ensured that change in their academic performance or classroom behavior was the result of the implementation of CWPT

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rather than a change within a specific classroom.

At the onset of the study, three baseline probes were conducted on all three subjects during their spelling instruction every other day (i.e., Monday, Wednesday, Friday). The first probe consisted of recording the targeted child's off-task and fidgeting behaviors utilizing a thirty-second interval for fifteen minutes. The second probe consisted of analyzing the median number of correct-letter-sequences obtained across three spelling probes. After the three baseline probes were administered, CWPT was implemented in the classroom of Subject 1. During this time, observations and curriculum measures were conducted with Subject 1 on a continuous basis, rather than every other day as during the probe sessions. After Subject 1's spelling performance and classroom deportment (i.e., off-task and fidgeting behaviors) reached a plateau, three more probe sessions (i.e., three spelling probes and observations) were conducted with all the subjects. Following this probe condition, CWPT was introduced to Subject 2's classroom. Again, observations and curriculum measures were obtained on this subject daily for five days at which time the student's targeted skills and behaviors were considered stable. Then, another probe condition was conducted on all subjects. CWPT was then introduced and measures were taken continuously on Subject 3. Finally, once his performance had plateaued, probe sessions were conducted on all individuals. Thus, sequences of instruction and probe designs were implemented until all the subjects had been introduced to CWPT. The results of the study are presented in the following chapter.

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CHAPTER 4
RESULTS

This chapter will present the results of the study. The data for individual subjects are presented in the order of the research questions posited in Chapter 1.

SUBJECT 1

Spelling Achievement

The effects of CWPT on the subject's spelling achievement was assessed through two methods: 1) administration of curriculum based measures in spelling, and 2) scores on weekly classroom spelling pretests and posttests before and after the implementation of CWPT.

Curriculum Based Measures The curriculum based probes were scored utilizing the correct-letter-sequences (CLS) scoring technique and the median CLS was considered an indicator of the individual's spelling achievement. Figure 1 depicts the median CLS scored on the spelling probes by Subject 1 during the probe and CWPT conditions throughout the study. It should be noted that on the CBM, there was the potential to obtain approximately 125 corrrect-letter-sequences. Thus, these graphs do not represent the percentage of words spelled correctly.

In relation to Figure 1, probe conditions (i.e., Probe 1, Probe 2) represent intervals during which all three subjects were administered CBM and were also observed. The CWPT columns represent the time periods during which CWPT was implemented in the various classrooms. For example, CWPT 1 was implemented with

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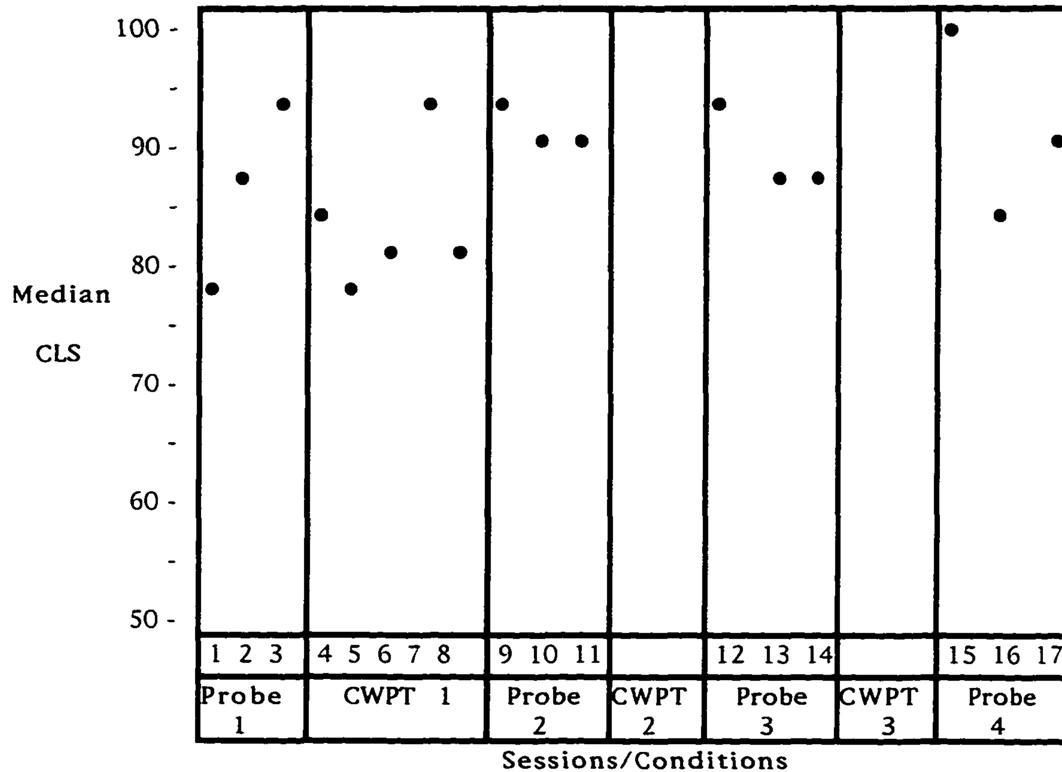

Figure 1
Median CLS of Subject 1

Subject 1 and during this phase he was the only subject for whom data was collected.

Overall, the median CLS for Subject 1 was constant and stable throughout the experiment and there was not a substantial change upon implementation of CWPT. During the first probe session, the average of the subject's CLS was 87. This average decreased to 83 during the initial implementation of CWPT, but increased to 91, 89, and 91 during the remaining probe sessions, respectively. The raw data for all subject's are presented in Appendix C.

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Test Scores In addition to the CBM, the subject's test grades prior to CWPT and upon initiation of the study were examined. The grades were based on a possible 100 points. During the six weeks prior to this study, Subject 1's average spelling test grade was 73. Pretests were also administered every Friday on the words which would be used in tutoring the following week. Subject 1's average pretest score was 22. The subject's average test grades, based on words which were practiced during tutoring, rose to 89. Thus, although curriculum based probes were not indicative of an increase in spelling achievement, grades on classroom tests, based on words studied during tutoring, suggested that the subjects spelling achievement increased 16%, from 73 to 89.

ADHD Behaviors

Observations Observations utilizing a modified version of Barkley's Restricted Academic Situation Coding scale were conducted throughout the experiment. The subjects off-task and fidgeting behaviors were coded utilizing a 30 second partial interval coding system. Figure 2 depicts the percentage of time Subject 1 engaged in the above-mentioned behaviors.

Upon implementation of CWPT, the subject evidenced a sharp decrease in ADHD related behaviors. Prior to the implementation of CWPT, Subject 1 was off-task an average of 90% of the time and engaged in fidgeting behaviors 98% of the time. During the first week CWPT was implemented, the subject's off-task and fidgeting behaviors decreased to an average of 9% and 13%, respectively. The subject was observed exhibiting off-task and fidgeting behaviors 9% and 17%, 8% and 11%, and 10% and 7% of the time in the remaining weeks, respectively. Therefore, the subject's off-task behaviors decreased approximately 81%, while his fidgeting

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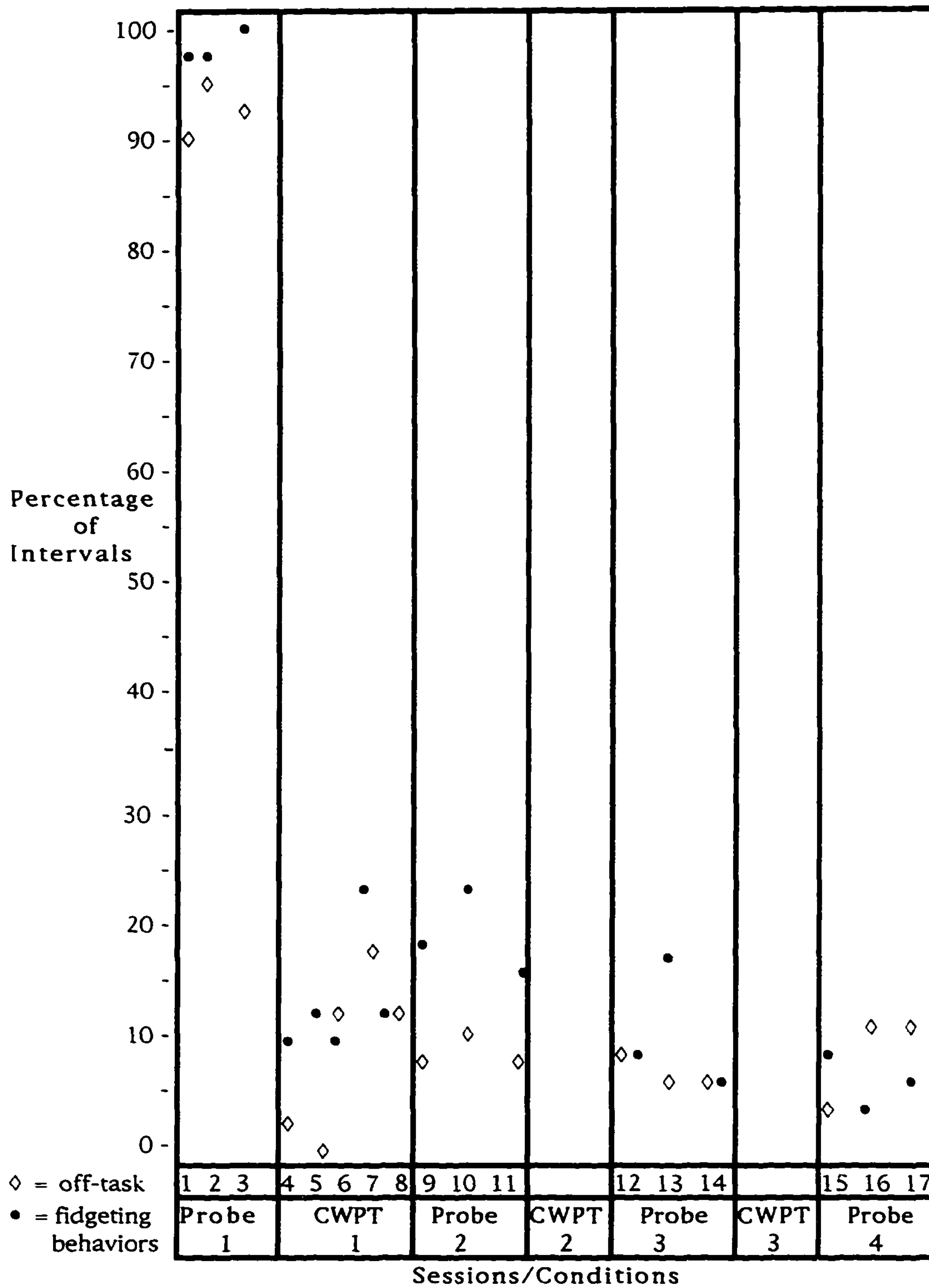

Figure 2
Observations of Off-Task and Fidgeting Behaviors of Subject 1

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behaviors decreased by 86%. Additionally, the lower rate of ADHD behaviors were stable throughout the six weeks of the study.

The percentage of time engaged in off-task and fidgeting behaviors was also analyzed according to whether the subject was the tutor or the tutee. These results are presented in Figure 3. Overall, Subject 1 was off-task an average of 9% of the time as the tutor, compared to off-task behavior an average of 7% of the time as the tutee. Fidgeting behaviors were exhibited an average of 14% of the time as the tutor, compared to 10% of the time as the tutee. Thus, there was minimal difference between the subject's deportment as either the tutor or tutee; however, the subject did exhibit higher rates of fidgeting behaviors compared to off-task behaviors in both circumstances.

SUBJECT 2

Spelling Achievement

Curriculum Based Measures Figure 4 represents the median CLS scored on the spelling probes by Subject 2 throughout the study. Overall, the median CLS for Subject 2 did not vary significantly throughout the study. During the first and second probe sessions, the average of the subject's median CLS were 93 and 91, respectively. During the initial implementation of CWPT, this average decreased slightly to 86. Subject 2's remaining probe sessions yielded average median CLS's of 93 and 94, respectively. Again, similar to Subject 1, the student's scores on spelling probes was stable regardless of the implementation of tutoring.

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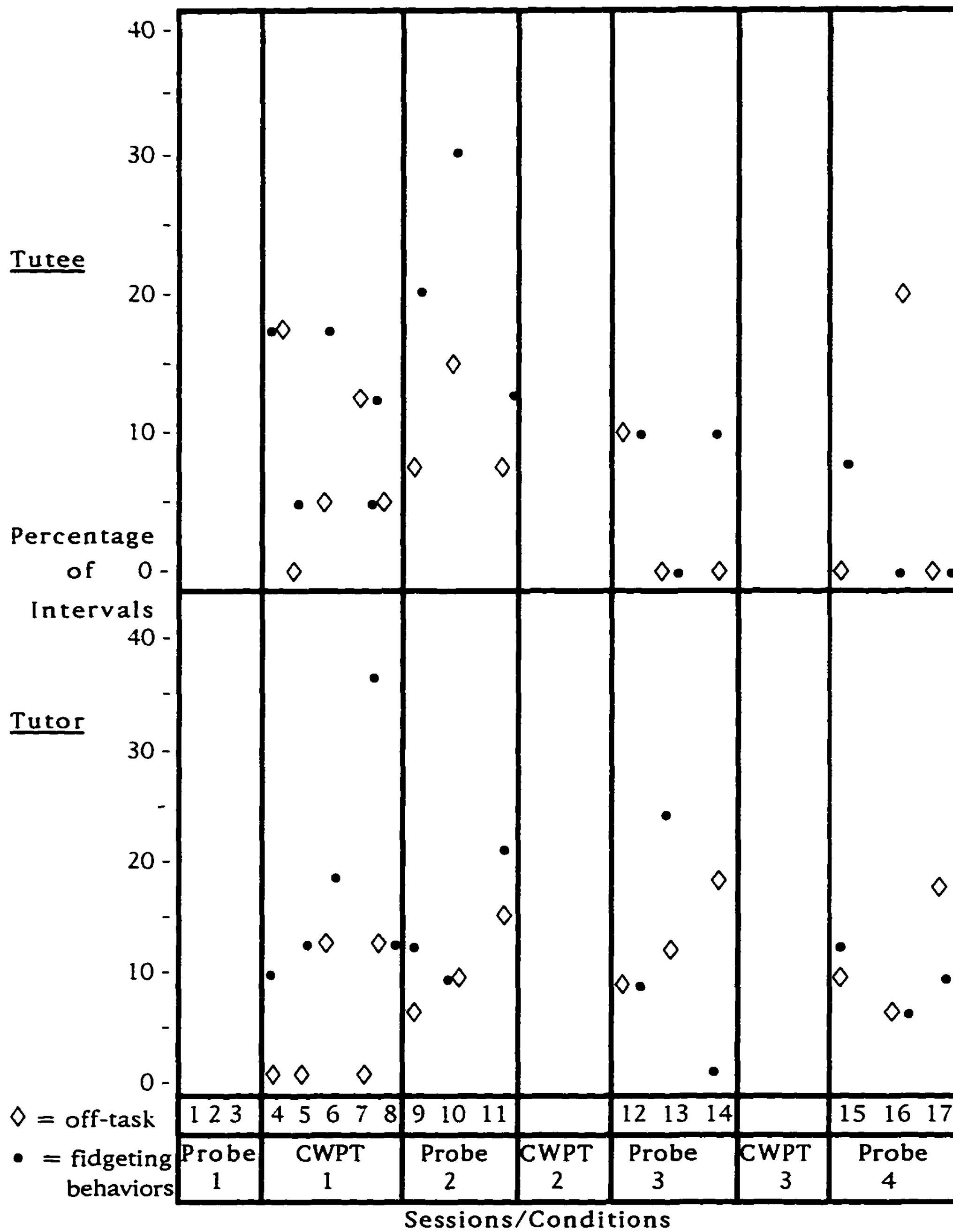

Figure 3
Observations of Off-Task and Fidgeting Behaviors of Subject 1 as Tutor and Tutee

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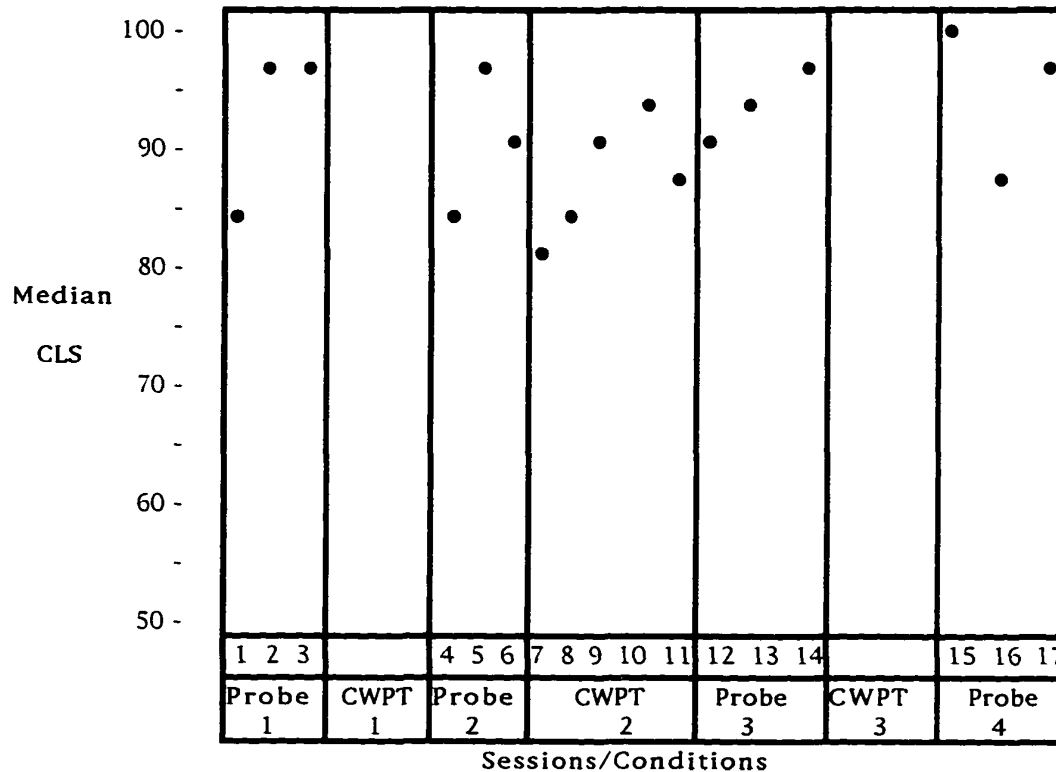

Figure 4
Median CLS of Subject 2

Test Scores Subject 2's test scores prior to CWPT averaged 85, based on a possible 100 points. The subject's test grades on the pretests utilized during the study averaged 70, while his average test grades on words practiced during tutoring increased to 100. This represents a 15% increase in his test grades before and after CWPT.

ADHD Behaviors

Observations Subject 2's off-task and fidgeting behaviors were also coded utilizing a 30 second partial interval coding scale. Figure 5 depicts the percentage of

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time Subject 2 engaged in these behaviors. During the two probe sessions prior to CWPT, Subject 2 exhibited a high rate of the targeted behaviors; however, the off-task behaviors were not demonstrated in a truly stable pattern in that there were fluctuations in this behavior by as much as 20%. However, when CWPT was introduced, a notable decrease occurred and this decrease was stable throughout the study.

Subject 2 exhibited a meaningful decline in off-task and fidgeting behaviors corresponding with the implementation of CWPT. Prior to CWPT, the subject exhibited off-task behaviors an average of 64% and 46% of the time on two probe sessions, respectively. Fidgeting behaviors were demonstrated an average of 80% and 70% during the two probe sessions. During the initial implementation of tutoring, the subject's off-task behaviors decreased to an average of 9% and fidgeting behaviors decreased to an average of 11%. Off-task behaviors continued to occur at lower rates during the final probe sessions with an average of 13% and 13%, respectively. Fidgeting behaviors were demonstrated an average of 12% and 5% of the time during the remaining probe sessions. Thus, overall off-task and fidgeting behaviors decreased by approximately 43% and 66%, respectively.

The percentage of time engaged in off-task and fidgeting behaviors was also analyzed according to whether the student was the tutor or tutee. These results are presented in Figure 6. On some of the conditions, data are not presented for either the tutee or the tutor. During these instances, the subject was working in a triad and was either the tutee or the tutor for the entire 20 minutes. Additionally, data are not

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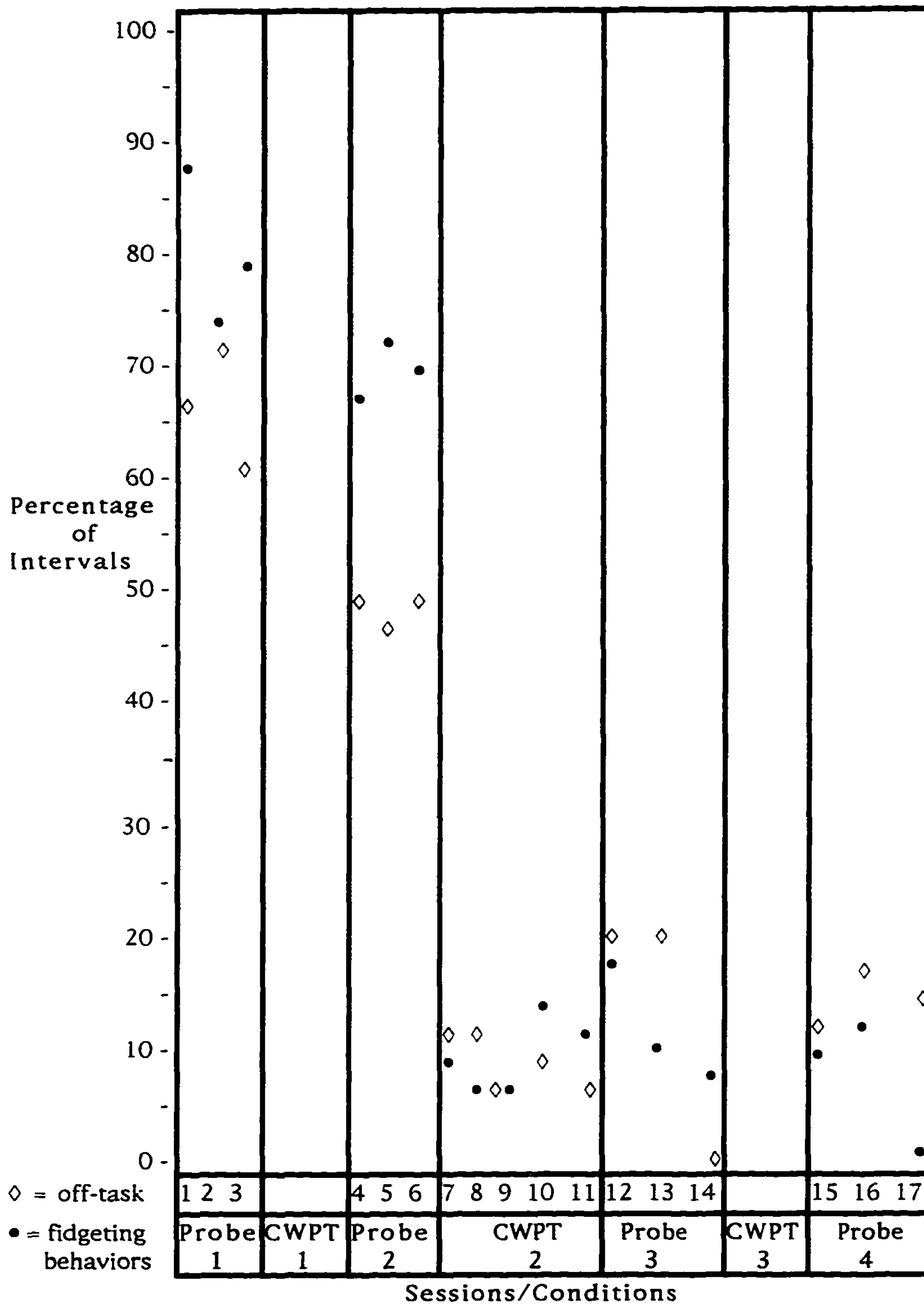

Figure 5
Observations of Off-Task and Fidgeting Behaviors of Subject 2

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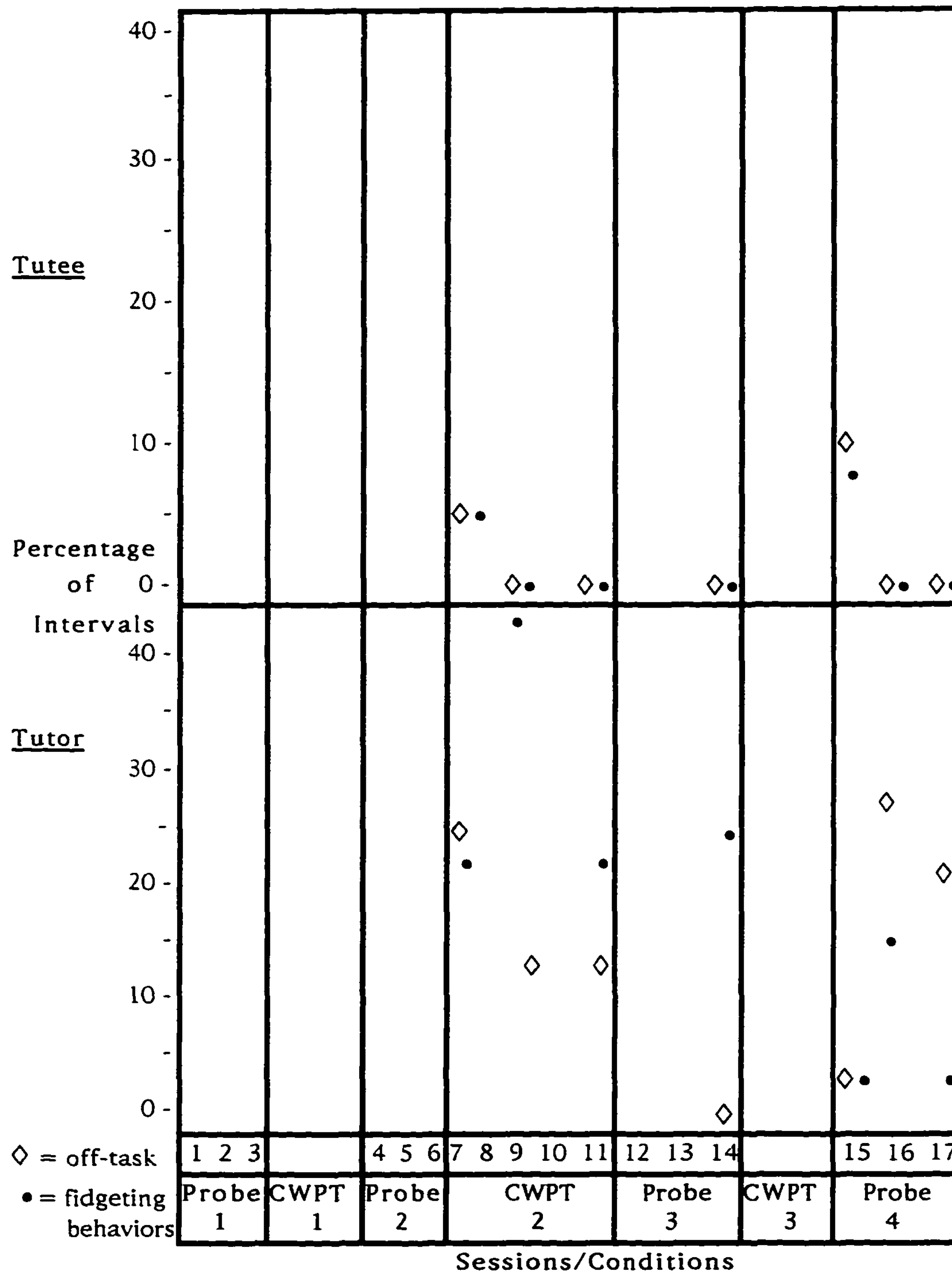

Figure 6
Observations of Off-Task and Fidgeting Behaviors of Subject 2 as Tutor and Tutee

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presented prior to the implementation of CWPT as the subject was not involved in tutoring in those conditions.

Overall, Subject 2 was off-task an average of 12% and engaged in fidgeting behaviors 17% of the time while he was the tutor. When in the tutee position, the subject exhibited off-task and fidgeting behaviors an average of 2% and 1% of the time, respectively. Thus, Subject 2 exhibited significantly fewer ADHD behaviors when engaged as the tutee verses the tutor. There was not a substantial difference in his off-task compared to his fidgeting behaviors regardless of the position.

SUBJECT 3

Spelling Achievement

Curriculum Based Measures Figure 7 presents the median CLS scored on the spelling probes by Subject 3 during all phases of the study. The median CLS did not indicate wide variation in the subject's spelling achievement. In the probe sessions prior to the implementation of peer tutoring, the average of the subject's CLS was 85, 86, and 92, respectively. The average during the implementation of CWPT was 82. Finally, during the last probe session, the average of the subject's median CLS was 87.

Test Scores The subject's six test grades prior to the implementation of peer tutoring averaged 79 out of a possible 100 points. Although Subject 3 was only given two pretests and weekly tests after the implementation of CWPT, an increase in scores was demonstrated. On the two pretests, Subject 3 earned an average of 30 and on the

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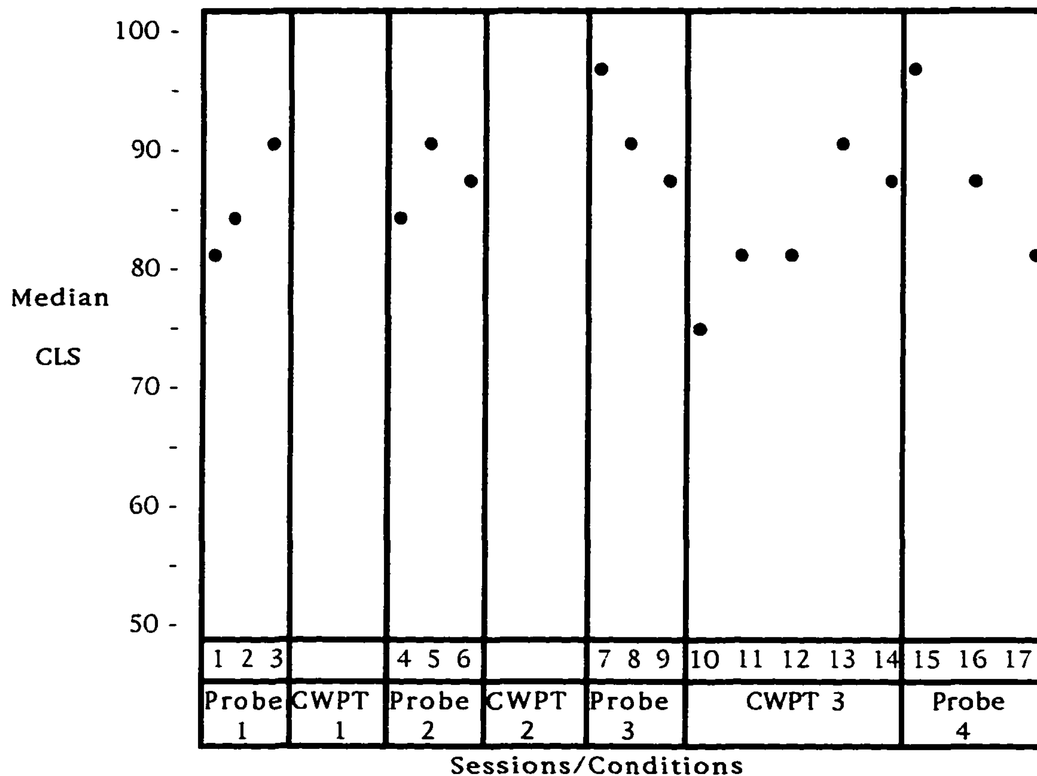

Figure 7
Median CLS of Subject 3

two weekly tests based on words used in tutoring, he earned 100s. This represents a 21% increase compared to previous functioning on classroom spelling tests which was not evident on his CBM scores.

ADHD Behaviors

Observations Subject 3's off-task and fidgeting behaviors observed throughout the experiment are presented in Figure 8. At the beginning of the study, before CWPT had been implemented, Subject 3 evidenced a high rate of off-task and fidgeting behaviors. In the three probe sessions prior to tutoring, the subject

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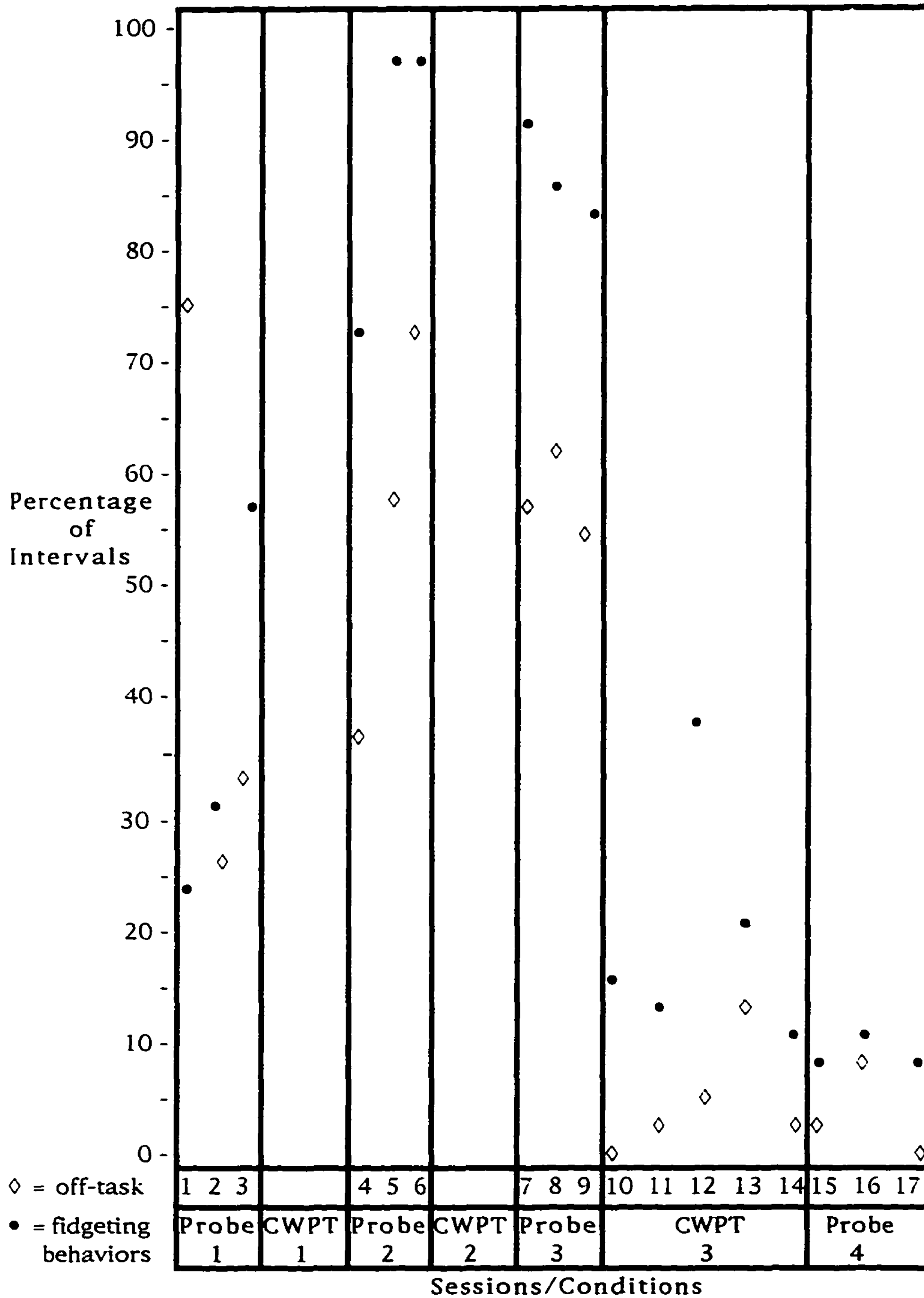

Figure 8
Observations of Off-Task and Fidgeting Behaviors of Subject 3

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demonstrated an average of 44%, 51%, and 56% of off task behaviors and 38%, 84%, and 85% of fidgeting behaviors. Upon implementation of CWPT, Subject 3 demonstrated an average of 5% of off-task behaviors and 9% of fidgeting behaviors. This represents a 45% and 60% decrease in off-task and fidgeting behaviors, respectively. Finally, this decrease was still evident during the last probe session during which the subject exhibited off-task behavior 3% of the time and fidgeting behaviors an average of 8% of the time. Thus, the subject's ADHD-related behaviors were stable until the implementation of CWPT, at which time there was a significant decline.

The behaviors exhibited by Subject 3 as tutor verses tutee were also examined. These results are presented in Figure 9. As mentioned previously, because Subject 3 was the last participant to receive peer tutoring, there were only two conditions during which peer tutoring occurred and, therefore, during which differentiation's could be made between his performance as a tutor or tutee. Overall, Subject 3 was off-task an average of 4% as a tutor, compared to 6% as a tutee. Fidgeting behaviors were demonstrated an average of 10% of the time as tutor and 20% of the time as the tutee.

SUMMARY

The performance of all three subject's was consistent with one another. With relation to the curriculum based measures in spelling, the subject's scores were stable throughout the experiment, neither showing a significant increase or decrease. Spelling tests based on words utilized during the weekly tutoring, however, when compared to test grades before CWPT indicated a notable increase change, ranging from a 16-21%, for all subjects. The subject's all experienced large

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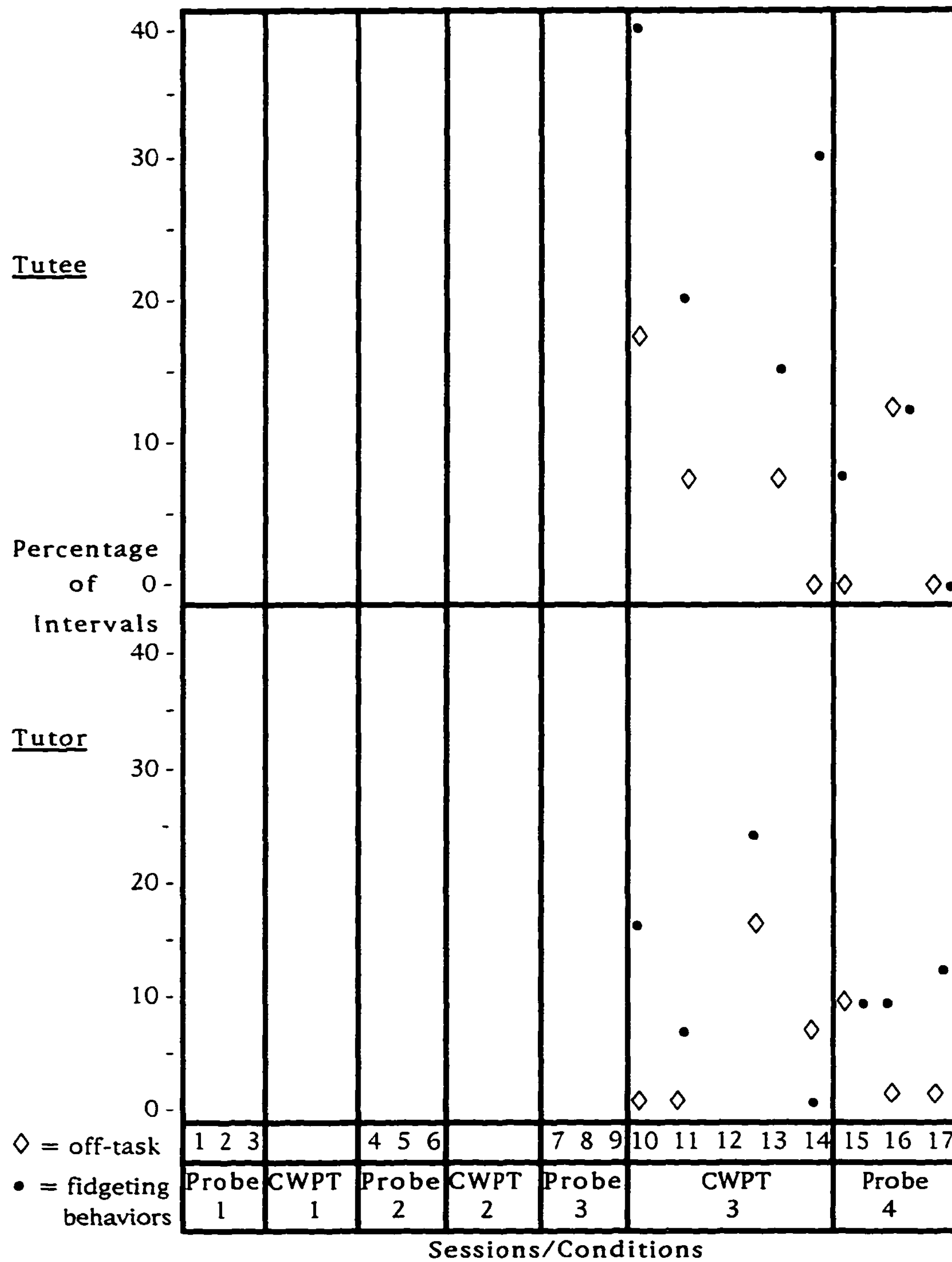

Figure 9
Observations of Off-Task and Fidgeting Behaviors of Subject 3 as Tutor and Tutee

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decreases in their demonstration of off-task and fidgeting behaviors. Off-task behavior decreased between 43-81% and fidgeting behaviors decreased between 60-86%. Their classroom deportment remained stable during the probe sessions and only when CWPT was introduced in their respective classrooms did their behaviors lessen. There was not a clear pattern of behavior differences exhibited by the subjects based on whether they were engaged in the tutee or tutor position.

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CHAPTER 5
SUMMARY, RECOMMENDATIONS, AND CONCLUSIONS

In this chapter a summary of ADHD and it's various effects on children is presented. CWPT is also briefly reviewed in relation to the possible benefits for ADHD children. Then, the results of this study as related to the hypotheses and the implications are presented. Limitations which should be considered relative to the study are also presented. Finally, recommendations for future research are posited.

SUMMARY

ADHD is a frequently diagnosed condition occurring in approximately 3-5% of the school-aged population (American Psychiatric Association, 1994; Barkley, 1990). The core deficits of the condition are developmentally inappropriate patterns of inattention or hyperactivity and impulsivity. It is the frequently occurring comorbid behaviors, however, which often have the most detrimental impact on the individual's functioning. Individuals with ADHD have a higher rate of occurrence of Oppositional Defiant Disorder and Conduct Disorder than the normal population (American Psychiatric Association, 1994) and DuPaul and Stoner (1994) have noted that the most frequent correlates of ADHD are academic underachievement, noncompliance and aggressiveness, and poor peer relationships. There have been a multitude of interventions targeted towards these difficulties.

The primary modifications used to address ADHD are psychostimulant medication; behavioral management including contingency management, token reinforcement, and response cost; and cognitive behavioral interventions. To date, there has not been one intervention which has proven entirely successful in

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treating the multiple difficulties these children present. Additionally, there has been minimal research regarding instructional or classroom environment manipulations to increase the ADHD child's academic performance. CWPT, the program examined in this study, is one intervention which could serve to enhance not only the child's academic performance but also his or her classroom behavior.

The procedures incorporated into the CWPT program are procedures which are particularly beneficial for ADHD children. Basically, the program consists of dividing a classroom into pairs of children who work together on an academic subject. For ten minutes, one child is a tutor who, in the subject of spelling, dictates words to the tutee at an individual pace. The tutee is required to say and write the word. If this is done correctly, then three points are awarded. However, if the tutee spells the word incorrectly, the tutor pronounces the correct spelling and the tutee writes and says the word three times. The tutee earns one point if the word is practiced correctly three times. The dyads continue administering spelling words for ten minutes at which time they switch roles. The dyads work in teams which compete on a weekly basis for rewards. Thus, within CWPT the individuals engage in active responding, are provided with immediate feedback, instruction is given individually, and learning is conducted at an individual pace. These are the ideal conditions for improving academic performance for ADHD children. CWPT should not only enhance the children's academic progress, but also their ADHD-related behaviors. If the child is correctly engaging in the tutoring procedures, he or she cannot also be off-task, fidgeting, talking, getting out of the seat, or playing with objects. The strict procedures adhered to in the tutoring process are incompatible with these behaviors. Consequently, if the child is not engaging in these distracting behaviors, then the individual should be learning and attaining more information.

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The benefits of CWPT are not limited only to ADHD children. The program is practical in terms of teacher time in that it uses peers to provide instruction and feedback. Therefore, the teacher is free to monitor and supervise the entire classroom. Additionally, teachers are able to provide assistance to many children with this program rather than focusing on one child or a specific difficulty. Finally, CWPT can be used in almost any instructional setting or with any academic subject.

The CWPT program has been thoroughly researched with multiple academic subjects and exceptional populations. There has been only one study to date, however, which specifically addressed the impact of the program on ADHD children. This study, by DuPaul and Henningson (1993), examined the effects of CWPT on an individual's academic performance in math and on-task and fidgeting behaviors. The results on the CBM probes were variable, but indicated a slight improvement in math performance. The results did indicate an increase in on-task behaviors and a decrease in fidgeting behaviors.

The purpose of the current study was to examine the effects of CWPT on ADHD children's academic achievement in spelling and their off-task and fidgeting behaviors. The subject's were 3 males in different fourth-grade classrooms. They were identified by the author as exhibiting the characteristics of ADHD, Combined Type. This was established through multiple observations, teacher ratings on the ADHD Rating Scale and the BASC, and parental ratings on the BASC. Additionally, the subject's were functioning within the frustrational range (i.e., 0-70% mastery) on curriculum based measures of spelling. Once included in the study, evaluative instrumentation included observations, curriculum based measures in spelling scored utilizing the correct-letter-sequences criteria, and comparison of grades on weekly spelling tests before and after CWPT. The study was conducted utilizing a multiple probe design across subjects.

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Initially, three baseline probes were conducted on all the subjects during their spelling instruction three times a week. Baseline probes consisted of observations targeting off-task and fidgeting behaviors, and curriculum based measures in spelling. After these probes were administered, CWPT was initiated in the classroom of Subject 1. During the tutoring phase, spelling probes and observations were conducted on a daily basis. Once his spelling achievement and behavior had stabilized, then another probe session was conducted with all subjects. Following this probe condition, CWPT was introduced to Subject 2's classroom and spelling probes and observations were conducted daily. These sequences of instruction and probe designs were implemented until all the subjects had been introduced to CWPT.

DISCUSSION

Academic Achievement

The first hypothesis in this study addressed the relationship between CWPT and the subject's achievement in spelling. The subject's performance on the curriculum based measures of spelling was consistent throughout the experiment. An increase was not observed in any of the subject's scores on these measures corresponding to the implementation of CWPT. Utilizing weekly spelling tests based on words practiced during tutoring when compared to previous grades did, however, indicate a notable increase for all subjects. When compared to average test grades before CWPT, the subject's spelling grades increased by 16%, 15%, and 21% for Subjects 1, 2 and 3, respectively. All of the subjects went from making marks of Cs (i.e., 70-79) on their report cards to As (i.e., 90-100). Curriculum based measures, in this study, were not sensitive to short-term changes in academic performance.

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Thus, the student's test grades provide evidence that CWPT had a notable and positive impact on their academic achievement in spelling. This gain is further supported by the fact that test scores prior to implementing the study were consistent and teachers reported that the subject's grades increased only after the implementation of CWPT.

This discrepancy between performance on curriculum probes and weekly spelling tests can be explained by a couple of factors. First, the curriculum based spelling probes were based on the yearly curriculum and, therefore, the student's were taking tests on words to which they had not been exposed. Thus, it can be viewed as a measure of the ability to phonetically spell unfamiliar words, rather than the ability to memorize or recall spelling words. Although their spelling of unfamiliar words may not have improved, test scores reflect the fact the these children were able to reproduce words which were learned in tutoring. This is significant given that these children were less successful at reproducing words on weekly tests presented in the instructional format used prior to CWPT. CWPT was successful most likely because the academic conditions set forth in the tutoring sessions increased their attention level, concentration, and interest during spelling instruction. Second, when administering CBM, three probes of 17 words are presented during one session. Thus, the student is required to write 51 words which are being dictated every 7 seconds. It would be very difficult for these ADHD children to maintain attention to such an involved task. The weekly spelling tests, by contrast, only contained between 10 and 15 words.

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Classroom Deportment

The second hypothesis in the study focused on the effect of CWPT on the subject's off-task and fidgeting behaviors. The results of the study yielded evidence supporting the premise that CWPT will decrease an ADHD child's off-task and fidgeting behaviors.

All three subjects demonstrated exceedingly high rates of off-task and fidgeting behaviors during probe conditions. Upon implementation of the tutoring, however, the rates of these behaviors declined dramatically. Subject 1's average off-task behavior declined 81% while his fidgeting behaviors declined 86%. The off-task and fidgeting behaviors of Subject 2 declined by 43% and 66%, respectively. Finally, Subject 3's off-task behaviors declined an average of 46% while his fidgeting behaviors declined 60%. Additionally, these lower rates of behavior, once obtained, were stable throughout the experiment. Further evidence supporting the relation between CWPT and the decline in these behaviors is the fact the behaviors were stable for all subjects and did not decline until CWPT was introduced into the individual classrooms.

The dramatic effect of tutoring on these behaviors is related to the structure of the tutoring procedures. Previously, spelling was taught as group instruction and children were required to listen to the teacher's lessons and engage in individual seatwork. These conditions were insufficient for the learning of ADHD children because of the difficulty in sustaining attention in order to profit from the instruction or complete academic seatwork. As mentioned previously, when CWPT is implemented successfully the children are consistently engaged in academic learning for 20 minutes and are provided with: opportunities for active responding, immediate feedback on their performance, the opportunity to correct mistakes, and prompts to attend to the task. This inhibits the demonstration of off-task behaviors,

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increases their attention and participation level and, subsequently, improves their academic achievement.

Tutor verses Tutee Position

This study also examined the differences, if any, between the demonstration of the targeted behaviors when the subject was either the tutor or the tutee. There was not a clear pattern in relation to this question. Neither Subject 1 or Subject 3 evidenced a discrepancy between their behaviors regardless if they were in the tutor or tutee position. Subject 2, however, demonstrated significantly fewer behaviors as the tutee verses the tutor.

It might be presumed that the children would be more attentive when serving as the tutee. In this position they are constantly writing and saying a word and as soon as they have finished writing one word another one is dictated. In the tutoring position, however, the individual has to wait for the tutee to write the word, thus giving him/her unstructured time. The results do not unequivocally support this premise but suggest, rather, that the children are equally on-task in both situations.

Generalization

Finally, the last hypothesis question posited that the improved academic achievement and classroom behavior would generalize across all three subjects. Evidence was provided which supported this premise. All three subjects evidenced meaningful gains in classroom administered spelling tests and exhibited decreased off-task and fidgeting behaviors.

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Summary Thus, ClassWide Peer Tutoring appears to be a viable alternative to instruction for ADHD children. This study presents evidence that CWPT can dramatically reduce an ADHD child's off-task and fidgeting behaviors and also increase his/her performance on classroom administered tests. Additionally, this study provided further documentation to the DuPaul and Henningson study (1993) which yielded similar results in a single-subject study. The present study, as well as DuPaul and Henningson's, indicate that CWPT should be examined more thoroughly with ADHD children as past research has focused on other exceptionalities.

LIMITATIONS

There are also limitations which must be considered in relation to this study. First, a larger sample size which was more representative of the general population would have been beneficial. The fact that the sample was comprised of three individuals in fourth grade limits the generalizability of the findings. A larger sample size would have also allowed for the statistical analysis of the results, rather than a single subject design. Also, the off-task behavior of Subject 2 was not exhibited in a stable pattern prior to the implementation of CWPT, which prevents definitive conclusions as to the effect of CWPT on that variable for that subject. However, the off-task behaviors were exhibited at such an extremely high rate in all probe sessions prior to CWPT, and such a significant decline was evident only after the introduction of tutoring, that there is still support as to the effects of the tutoring program. Also, assent was required from the subjects and, therefore, obtained from the whole class. This might have influenced the children's behavior when the observer was in the classroom since they knew she was in there to observe.

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RECOMMENDATIONS FOR FUTURE RESEARCH

1. Studies are needed which include larger sample sizes and incorporate children with a wide range of ages, races, and backgrounds.
2. The long term effects on academic achievement should be empirically studied.
3. It would be useful to determine if the improvement in off-task behaviors also decreased in other settings in which CWPT was not utilized.
4. Studies should be conducted addressing the effects of CWPT as part of a multimodal intervention plan, rather than a single intervention. This would include children on medication given that is the most common intervention for these children.
5. Previous studies have documented that CWPT increases student's self-esteem and social relationships and this should also be examined in relation to ADHD children.
6. Subject's demonstrated meaningful gains in relation to their spelling achievement on classroom spelling tests but did not, however, demonstrate improvement on curriculum based measures. Additionally, in the DuPaul and Henningson (1993) although behavioral improvement was noted, meaningful gains were not exhibited on the CBM in mathematics. Thus, it would be beneficial to conduct further assessments regarding the appropriateness of CBM with the ADHD population. Was the lack of demonstrated effectiveness due to special characteristics of this population or an inherent flaw with the procedure?

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APPENDIX A

DIRECTIONS FOR ADMINISTERING AND SCORING CURRICULUM BASED MEASURES OF SPELLING

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The spelling measures may be administered to students individually or in groups. Have the words to be dictated selected in advance. Use 10-second intervals for younger students (grades 1-3). Use a 7-second interval between words for older students (grades 4-8).

Say to the student, "*I am going to read some words to you. I want you to write the words on the sheet in front of you. Write the first word on the first line, the second word on the second line, and so on. I'll give you 10 seconds to spell each word. When I say the next word, try to write it, even if you haven't finished the last one. Are there any questions?*"

Say the first word and start timing.

Say each word twice. Use homonyms in a sentence.

Say a new word every 7 or 10 seconds.

Dictate words for two minutes. About 12-13 words should be presented if words are dictated every 10 seconds. About 17-18 words should be presented if words are dictated every seconds. Do not dictate a new word in the last 3 seconds and allow the student to finish the la word.

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APPENDIX B

CRITERION SCORES UTILIZED TO CLASSIFY SUBJECTS

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	Subject 1	Subject 2	Subject 3
Spelling Test	47%	29%	41%
K-BIT Composite	94	90	96
ADHD Rating Scale, Total Score (mean = 14.08, standard deviation=10.40)	34	41	31
BASC T Scores - Teacher			
Hyperactivity	75	88	72
Attention Problems	75	69	71
BASC T Scores - Parent			
Hyperactivity	79	84	71
Attention Problems	71	68	73

Observations	Subject 1	Peer	Subject 2	Peer	Subject 3	Peer
Observation 1	37%	9%	40%	5%	36%	5%
Observation 2	36%	4%	19%	4%	13%	8%
Observation 3	38%	2%	31%	0%	22%	2%

This reflects the percentage of time the subjects engaged in hyperactive or inattentive behaviors.

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APPENDIX C

RAW DATA

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Curriculum Based Measures

The following provides the raw data obtained on CBM of spelling. The numbers represent the median CLS obtained by each student on each administration of the three probes.

	Subject 1	Subject 2	Subject 3
Probe 1	79,87,94	86,97,97	81,84,89
CWPT 1	84,76,80,94,79		
Probe 2	93,89,90	87,96,89	83,89,86
CWPT 2		80,82,89,93,84	
Probe 3	93,88,87	90,93,97	97,91,87
CWPT 3			73,78,79,91,88
Probe 4	100,84,90	102,87,94	95,86,81

Observations

The following is the raw data obtained during the observations for each subject. The numbers indicate the percentage of time the subject was either off-task or fidgeting, respectively.

Subject 1	Off-Task	Fidgeting
Probe 1	87,93,91	97,97,100
CWPT 1	3,0,13,17,13	10,12,10,23,12
Probe 2	7,10,9	17,20,15
CWPT 2		
Probe 3	10,7,7	10,17,7
CWPT 3		
Probe 4	3,13,13	10,3,7

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Subject 2	Off-Task	Fidgeting
Probe 1	66,67,60	87,73,80
CWPT 1		
Probe 2	47,43,47	67,73,70
CWPT 2	11, 12, 7, 10, 7	10, 8, 9, 15, 13
Probe 3	20,20,0	20,10,7
CWPT 3		
Probe 4	10,17,13	7,10,0

Subject 3	Off-Task	Fidgeting
Probe 1	75,25,33	23,33,58
CWPT 1		
Probe 2	33,53,67	67,93,93
CWPT 2		
Probe 3	55,60,52	90,82,80
CWPT 3	0, 3, 6, 13, 3	17, 13, 33, 20, 10
Probe 4	3,7,0	7,10,7

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CURRICULUM VITAE

Carol Matheson

Education:	Pennsylvania State University Master of Science, School Psychology (GPA, 3.87)	University Park, PA Aug.'91 to Aug. '94
	Thesis: " A validity study of the Comprehension of Symbols for School Learning, the Peabody Picture Vocabulary Test - Revised and the Woodcock-Johnson Psychoeducational Battery - Revised"	
	Texas A&M University	College Station, TX
	Bachelor of Science Major: Psychology Minor: Biology	May '87 to Dec. '90
Certification:	Nationally Certified School Psychologist	January '96
	Associate School Psychologist Texas	August '96
	Pupil Personnel License Commonwealth of Virginia	June '95
	School Psychologist Certification Commonwealth of Pennsylvania	October '94
	Elementary School Counselor Certification Commonwealth of Pennsylvania	October '94
Professional Experience:	School Psychologist North Belt Elementary School	Humble, TX July '96 to present
	Doctoral School Psychology Intern *Virginia Beach Public Schools*	Virginia Beach, VA July '95 to July '96
	Educational Psychologist *Memorial Child Guidance Clinic*	Richmond, VA January '95 to June '95
	Elementary School Guidance Counselor *Huntingdon Area School District*	Huntingdon, PA May '94 to July '94
	Academic Tutor *The Learning Assistance Center* *Pennsylvania State University*	University Park, PA Jan. '92 to Jan. '94
	Researcher *National Head Start Transition Project* *Department of School Psychology*	University Park, PA Jan. '92 to Aug. '94
	Graduate Assistant *Department of School Psychology* *Pennsylvania State University*	University Park, PA May '92 to Aug. '94

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