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## **Effective treatment of attention deficit hyperactivity disorder : a multimodal approach**

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## Effective treatment of attention deficit hyperactivity disorder : a multimodal approach

### Abstract

The beginning of the 1990's brought with it increased attention to what is becoming the most talked about disorder of childhood and adolescence, attention deficit hyperactivity disorder (ADHD). This disorder is estimated to afflict between 3% and 9% of the entire United States school-aged population. The most common treatment consist of behavior modification, cognitive therapy, diet restrictions and food supplements, cognitive and social skill training, psychosocial interventions, interpersonal problem solving and prescription medicine such as Ritalin.

The literature on stimulant medication and psychosocial treatments for children with ADHD suggest that no single method of treatment alone yields significant long-term therapeutic gains. A number of studies in the last five years focus on the emergence of what is called multi-modal treatment.

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**EFFECTIVE TREATMENT OF ATTENTION DEFICIT  
HYPERACTIVITY DISORDER: A MULTIMODAL  
APPROACH**

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**by**

**Dave A. Lipinski**

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The beginning of the 1990's brought with it increased attention to what is becoming the most talked about disorder of childhood and adolescence, attention deficit hyperactivity disorder (ADHD). This disorder is estimated to afflict between 3% and 9% of the entire United States school aged population, considered children and adolescents in grades K-12 (e.g. American Psychiatric Association, 1994). Even as long as eleven years ago, children diagnosed with ADHD accounted for over 40% of referrals to mental health counselors in settings ranging from community mental health centers to private practices (Anderson et. al, 1987). While a majority of the information about ADHD has only recently surfaced, evidence of factors directly related to the disorder go back as far as the late 19<sup>th</sup> century. Heinrich Hoffmann, a German physician and cartoonist, detailed in a comic strip a child who could not sit still in his chair, and was dubbed "Fidgety Phil" (Zametkin, 1995). In 1904 reports began to detail people with mild brain trauma who experienced problems with impulsivity and inattention (Meyer, 1904).

Over the years, ADHD was known by a variety of different names, each disorder looking like the previous one, (minimal brain dysfunction, hyperactive child syndrome, attention deficit disorder with or without hyperactivity), each having mostly minor changes in diagnostic criteria (Zametkin, 1996). There is general consensus in the literature regarding the significant number of children experiencing difficulty in their lives related to core clinical symptoms detailed in the DSM-IV (Castellanos et al., 1996; Richters et al., 1995; Weiss, 1990) There is debate,

however, about the most appropriate definitional boundaries for hyperactivity and the scientific legitimacy of its status as a distinct clinical syndrome (Hinshaw, 1994). The DSM-IV diagnostic criteria lists the age of 7 for onset of symptoms. Some researchers believe the core clinical features are distinguishable in individuals as early as 3 years of age (Campbell et. al, 1986; Palfrey et. al., 1985). The core features that persist throughout school years include, developmentally inappropriate activity levels, low frustration tolerance, impulsivity, poor organization of behavior, distractibility, and an inability to sustain attention and concentration (Pelham, 1982).

Neuropsychological research findings indicate that the core deficit in ADHD is a failure to inhibit or delay motor responses (Barkley, 1994). The results of these deficits and behavioral problems include academic difficulty, poor social adjustment, parent-child relationship struggles and increased risk taking behaviors. Debates over whether or not ADHD continues into adulthood are prevalent (Shaffer, 1994). A recent longitudinal study conducted by Columbia University's Department of Clinical Psychology found that children diagnosed with ADHD at an average of age 7, completed significantly less formal schooling and had lower social and financial status at an average age of 24 (Mannuzza, et. al., 1997).

The study also suggested that childhood ADHD predisposes an individual to specific disadvantages in adulthood which are not easily remediated. A study by Erk (1995) concludes that people with ADHD experience difficulty acquiring social skills necessary to maintain appropriate work related activities. Frequent

daydreaming, confusion, apathy and poor motivation to attend to tasks for an extended period of time, appear to be trademarks of those who have been diagnosed, which in turn leads to poor employability (Erk, 1995).

Children diagnosed with ADHD often suffer from poor peer relationships as a result of impaired social skills functioning (Lawrence, 1985). This occurs because many children diagnosed with ADHD often engage in annoying behaviors (which are typically disruptive in nature), are openly defiant, and destroy property more than their peers (Grizenko et al., 1993). The results of these types of behavior places children with ADHD at serious odds with those around them.

While the literature reflects ADHD as being a commonly diagnosed syndrome affecting a significant portion of the population, many questions remain. The questions center primarily around the extent to which ADHD differs from other disorders in relationship to etiology, treatment and outcome (Jensen, 1993). Outcomes are primarily what parents, teachers, counselors and the ADHD patient him/herself are concerned with. The most common treatment consist of behavior modification, cognitive therapy, diet restrictions and food supplements, cognitive and social skill training, psychosocial interventions, interpersonal problem solving and prescription medicine such as Ritalin. The literature on stimulant medication and psychosocial treatments for children with ADHD suggest that no single method of treatment alone yields significant long-term therapeutic gains (Richters et. al., 1995). A number of studies in the last five years focus on the emergence of what is

called multi-modal treatment.

### Causes

The exact cause of ADHD is not known, although research findings suggest there is metabolic dysfunction in the brain (Fowler, 1991, Zametkin, 1995). It is likely that ADHD has no single cause, but represents a final common pathway of various interacting biologic and psychosocial variables (Weiss, 1990). Many people who do not believe ADHD is a legitimate clinical syndrome of childhood, a belief fueled by news TV specials that report on the abuse of stimulant medication by some, blame poor parenting, schooling and lack of direction of youth for the symptomology characterized in ADHD diagnosis. Recent advances in the area of tomography scanning (brain mapping) seem to offer alternative explanations to those who would blame the individual for the problems associated with the disorder. In addition, information gathered from family members of ADHD children is pointing to genetic predisposition's for sustaining symptoms of the disorder. Zametkin (1995) concluded that the disorder is highly likely to be inherited with 1 out of 4 children diagnosed with ADHD having a biological parent who is similarly affected.

The inheritance of hyperactivity was documented in the early 1970's by 2 separate sets of researchers. In each study, hysteria, sociopathy and alcoholism were found to exist in a biological parent of a diagnosed hyperactive child (Cantwell, 1972; Morrison and Stewart, 1973). Genetic factors have also been shown in work that demonstrated a full sibling concordance rate of 50% for hyperactivity, versus a

half sibling rate of only 9% (Safer, 1973). Another study reports a 51% concordance rate for hyperactivity in monozygotic twins, compared to 33% for dizygotic twins (Goodman and Stevenson, 1989).

Current scientific advances allow researchers to use highly technical and powerful tools to map the brain and delineate certain areas of study as they pertain to specific disorders (Castellanos et al., 1996). Neuropsychological studies using magnetic resonance imaging (MRI) report frontal dysfunction of the brain in a significant portion of children diagnosed with ADHD (Castellanos et. al., 1996). Dr. Castellanos and his colleagues (1996) found that three structures in the affected circuit on the right side of the brain ( the prefrontal cortex, caudate nucleus and globus pallidus) were smaller in boys diagnosed with ADHD in comparison to a control group. Like a central processing unit (CPU) in a computer, the prefrontal cortex can be thought of as the human brains command center. The caudate nucleus and the globus pallidus gather commands and synthesize them into behavior. In terms of an automobile, the caudate and globus can be thought of as the accelerator and brakes, with the prefrontal cortex being the steering wheel (Castellanos, 1996). The current information obtained from the analysis of these smaller brain parts in ADHD children is that the braking, or inhibiting function, is not working properly as compared to children without ADHD.

Positron emission tomography (PET), is a scanning technique which provides images of brain function using fludeoxyglucose to measure glucose

metabolism in cortical and subcritical regions, specifically in the premotor and motor cortices (Zametkin et al., 1993). Zametkin and his team (1990) found via PET that adults with ADHD had decreased glucose uptake in frontal regions of the brain. Glucose can be considered brain food, and the decrease in the use of this food suggests impairment of this part of the brain. This “neglect” in the brain has been shown to be normalized when methylphenidate, a pharmacological treatment for ADHD, has been administered (Malone et. al., 1994). This area of science (PET scans) is one of the most promising for determining more about how brain dysfunction contributes to ADHD. Weiss (1990) reports the work completed by Zametkin and his coworkers represents a clear advance in the understanding of the biologic antecedents of ADHD.

These recent biologic findings lend relevance to pharmacological interventions which alleviate symptoms in significant numbers of individuals diagnosed with ADHD (Dulcan, 1990). It is imperative to remember that neither MRI or PET scans show beyond a doubt what causes impulsivity. Pharmacological treatments do not alleviate ADHD symptoms for everyone, although they have been extremely helpful (Elia J et. al., 1991).

A popular belief among parents and certain health care professionals is that the symptoms of ADHD are caused by sugar and food additives in the diet of children. Barkley (1990) has reviewed a substantial amount of controlled studies regarding this issue and found no substantiative link between food additives and

ADHD. A report by the National Advisory Committee on Hyperkinesis and Food Additives (1980) concluded similarly a decade earlier.

### Comorbidity

ADHD is not an easy disorder to diagnose due to the high comorbidity rates for other disorders of childhood and adolescence. For over ten years, research has documented how characteristically comorbid ADHD is with other disorders, primarily conduct and oppositional defiant disorders (Hinshaw, 1987; Klein and Manuzza, 1990; Loney and Milich, 1982). Biederman et al. (1991) reported rates of comorbidity for clinically referred children with ADHD to be 30% to 50% for conduct/oppositional defiant disorder, 15% to 75% for mood disorders, approximately 25% for anxiety disorders, and between 10% to 90% for learning disorders. Cross-cultural studies completed in New Zealand reported 47% of children diagnosed with hyperactivity also received a diagnosis of conduct or oppositional disorder, while 26% had a coexisting anxiety or phobic disorder, and 18% had two or more comorbid conditions (Anderson et al., 1987). Epidemiology studies in Puerto Rico (Bird et al., 1988) and Canada (Szatmari et al., 1989) report similar patterns of comorbidity.

Conduct disorder is more likely misdiagnosed as ADHD than vice versa, demonstrating a need for more careful clinical assessments due to the differing nature of both disorders (Abikoff and Klein, 1992). A recent study by Thomas (1995) reports a tendency to mislabel children with posttraumatic stress disorder or

traumatic stress disorder with a diagnosis of ADHD due to overlapping of symptoms such as hyperactivity, distractibility, impulsivity, temper tantrums, irritability and aggression. Comorbid associations contribute to the complexity of properly diagnosing and treating ADHD. Potential lack of attention by clinicians to comorbidity could lead to significant problems that have serious implications for future research.

### Diagnosis

Child psychiatrists, psychologists and pediatricians with specific behavioral training can make a diagnosis of ADHD (Zametkin, 1995). Evaluations that suggest a diagnosis of ADHD, for the purpose of referral to one of the above mentioned professionals, can be completed by a schools Child Study Team (Fowler, 1991). The team usually consists of people trained in behavior management, with an identification of the symptoms of ADHD being a focus of training. These types of evaluations can be initiated by a parent or teacher. The diagnosis of ADHD is made primarily from a child history gathered from parents, teachers or day care providers (Zametkin, 1995). Symptoms of ADHD are not constant in all individuals, therefore direct observation made at the time of an office visit to a mental health care provider, or a pediatrician, is often misleading (Zametkin, 1995).

Several measurement instruments are used to gather baseline data for children referred for diagnosis of ADHD. The reliability and validity of the Achenbach (Chen et al., 1994) Child Behavior Checklist, which provides data

leading to diagnosis of oppositional-defiant disorder and conduct disorder as well as ADHD, has been studied extensively and is a widely accepted and used instrument (Jensen et al., 1993). Like the Achenbach, the Conners Rating Scales is another measurement instrument used frequently to assist in diagnosing ADHD, especially by school personnel (Werry et al., 1975).

High comorbidity rates for anxiety and other mood disorders (Abikoff and Klein, 1992; Biederman et al., 1991; Klein and Manuzza, 1990) warrant use of other scales to assist with differentiating ADHD from other disorders of childhood. The Child Depression Inventory is self scored instrument that documents the child's symptoms of depression from his or her own perspective (Kovacs and Beck, 1977). Anxiety in the child is often measured using a true/false self-report questionnaire called The Revised Children's Manifest Anxiety Scale (Reynolds and Richmond, 1987). Both depression and generalized anxiety are often considered look alike disorders due to the symptomology characteristic of ADHD. The look alike problems associated with these disorders warrants a complete psychiatric examination to avoid misdiagnosis and eventual mistreatment (Zametkin, 1995).

### Treatments

There are many therapeutic approaches that seek to reduce symptoms of ADHD. These symptoms include impulsivity, fidgetiness, impaired social

functioning, depression, low self-esteem, academic underachievement and inattention to tasks, and negative behaviors which are also associated with comorbid conduct and oppositional defiant disorders (Grizenko et al., 1993).

The most common treatments target the reduction of deviant behaviors, either through the use of medication (Pelham et al., 1985), behavior modification (Hersher, 1985), and/or parent training in behavior management techniques (Abramowitz and O'Leary, 1991). The rationale of using one of these modalities to the exclusion of others, is that once the disruptive behaviors come to an end, the associated social and personal problems will gradually improve without intervention (Grizenko et al., 1993). This does not appear to be the case. One difficulty involved in all medication trials is participant drop out (Richter et al., 1995; Schachar et al., 1997), or parent unwillingness/inability to employ techniques of behavior modification (Gard and Berry, 1986). These two factors alone warrant an approach that uses more than one therapeutic modality.

### Pharmacological

Although there are numerous individual treatments aimed at alleviating the behavioral symptoms of ADHD, the use of stimulant medication stands out due to the sheer number of times it is prescribed as a treatment modality (Bosco and Robin, 1980; Pelham et al., 1993; Schachar et al., 1997). A recent study by Bramlett et al. (1997) reports approximately 3% of all elementary aged children are receiving stimulant medication, such as methylphenidate (Ritalin), at school from a school

nurse. The actual percentage of children receiving stimulant medication is no doubt higher because the study does not take into account children who receive stimulant medication at home, without the school nurse's knowledge. The benefits and limitations of short-term treatment of ADHD with methylphenidate have been studied extensively (Schachar et al., 1997).

Medication has proven to be effective in alleviating symptoms of ADHD, specifically reducing restlessness, increasing the ability to sustain attention to tasks, increasing impulse control, improving the ability to concentrate and improving moods (Chiarello and Cole, 1987; DuPaul and Eckert, 1997). In placebo controlled studies, stimulant medications have demonstrated a dramatic effect on task-irrelevant activities (e.g. finger tapping, fidgetiness, fine motor movement, off-task during direct observation) and classroom disturbance (e. g. oversolicitation in class during direct observation), with associated increases in compliance and sustained attention (Abikoff and Gittelman, 1985; Jacobvitz et al., 1990; Pelham et al., 1992). It has also been reported that stimulant medication produced positive effects on parent-child interactions (Barkely and Cunningham, 1979). Stimulant medication has been reported to decrease aggressive behavior for both elementary and secondary school aged children diagnosed with ADHD and comorbid conduct disorder, both in structured and unstructured settings (Gadow et al., 1990; Hinshaw, 1991).

A major problem in considering methylphenidate as a single treatment option

for ADHD, however, is that most studies examining the effect of the drug on the associated symptoms of aggression and oppositional behavior report limited long term impact (DuPaul and Eckert, 1997; Schachar et al., 1997). The same study that concluded limited impact (Schachar et al, 1997) also reports the danger of not taking into consideration the “halo effect.” This effect accounts for parental reports of progress that are made following positive school reports regarding behavior, but do not take into account a lack of positive carryover to the home setting.

Methylphenidate acts on body chemistry quickly, and upon wearing off (usually before a school aged student gets home) results in a return of ADHD symptomatic behavior, making parent/sibling-ADHD child relationships continually tense and problematic (Richters et al., 1995; Schachar et al., 1997). Also disappointing is the fact that stimulant medications have not reliably demonstrated significant impact on academic performance (Chales and Schain, 1981; Richters et al., 1995).

### Multimodal treatments

Multimodal treatment of children with ADHD is not a purposeful branch of the multimodal therapy model developed by Arnold Lazarus, although they have many tenets in common. Lazarus’s basic premise about all individuals is that persons who seek counseling are usually troubled by a multitude of specific problems that should be dealt with by a similar multitude of specific treatments (Corsini and Wedding, 1989). Multimodal treatment of ADHD, as it is referred to in

the literature, is not a specific, coherent therapy, as are the methods developed by Lazarus. Multimodal treatments of ADHD do, however, focus on a multitude of problems stemming from biological predispositions and environmental conditions with an impressive range of interventions. When several different therapeutic modalities are used in conjunction, as opposed to individual treatment efforts, results indicate increased efficacy in the remediation of core ADHD symptoms (Abramowitz and O'Leary, 1991; Grizenko et al., 1993; Nathan, 1992; Richter et al., 1995; Satterfield and Cantwell, 1981).

Lazarus's multimodal approach assumes personality can be differentiated by using the acronym, BASIC-ID, in which each letter represents a function of personality (Corsini and Wedding, 1989). Multimodal treatment of ADHD does not intentionally address personality issues by attempting to eliminate distressing and unwanted responses, nor does it seek to overcome deficits that exist in each of the personality modalities. Instead, multimodal treatment seeks to maximize approaches that individually target disabilities of the child diagnosed with ADHD, focusing on altering disruptive behavior without focusing on issues relating to personality (Grizenko 1997; Satterfield et al., 1981). However, Lazarus's multimodal position does emphasize that people have diverse needs and expectations, come from very different molds, and require a wide range of stylistic, tactical and strategic maneuvers from the therapist (Corsini and Wedding, 1989). Multimodal methods of treating ADHD share the same philosophy when it comes to approaching individual

children, and members of that child's family.

Lazarus (1956) contends the emphasis in rehabilitation must be a synthesis which would embrace a diverse range of effective therapeutic techniques, as well as innumerable adjunctive measures, to form part of a wide and all-embracing re-educative program. Both the well developed literature on stimulant medication and the emerging literature on psychosocial treatments for children diagnosed with ADHD, suggest that no single treatment alone is likely to yield clinically significant long-term, therapeutic gains ( Detweiler et al., 1995; Frankel et al., 1997; Richters et al., 1995). This supports Lazarus's 42 year old statement regarding the use of diverse techniques that take the individuality of each person into account.

The same literature which supports the previous statement from Lazarus also supports other tenets of Lazarus's approach to treatment. Specifically, Lazarus's contention (Corsini and Wedding, 1989, p.530) that regardless of the specific treatment format, the multimodal approach needs to encompass: (1) specification of goals and problems; (2) specification of treatment techniques to achieve these goals and remedy problems; (3) systematic measurement of the relative success of the techniques used. Richter et al. (1995) addressed these facets by reporting there is little reason to even expect isolated treatment of any type to produce lasting, clinically significant, broad spectrum therapeutic effects when administered without regard for important individual, and family, differences. Satterfield et al. (1987) concurred with study results that indicate multimodal treatment is the most sound

clinical practice, and the most effective, when addressing ADHD.

Multimodal treatment of ADHD will usually incorporate different ranges of specific modalities, in no particular order or intensity. The differing backgrounds and awareness of treatment modalities for ADHD of psychiatrists, psychologists, pediatricians, mental health counselors and school guidance counselors is the reason for the lack of continuity in any multimodal treatment effort. Most efforts, however, at using this type of treatment will have several components in common. They may include: psychostimulant medication; behavioral modification techniques for parents and educators; psychoeducation on the nature of ADHD; social skills training coupled with individual counseling for the person diagnosed with ADHD; family counseling; peer tutoring and in special circumstances, special education programs (Richter et al., 1995, Zametkin 1995).

### Behavior Modification

A majority of the literature on behavior modification techniques report on systems used primarily in classroom settings for school-aged children diagnosed with ADHD. Classrooms are typically more conducive to such techniques because of the existing structure in them when compared to most home settings. They are also places where behavior modification systems are more pertinent as the result of having 10 to 30 other children in the room in addition to the child diagnosed with ADHD. Frequently there will be more than one student in the room with an ADHD diagnosis, making modification systems more attractive to teachers (DuPaul and

Eckert, 1997).

A meta-analysis of school based behavioral interventions by DuPaul and Eckert (1997) reports that two specific types of behavior management systems are most common. The first, academic intervention, involves predetermined changes made by the teacher that focus on instruction or classroom materials. This is also referred to as “antecedent conditions” and includes school setting, environmental design, class structure in regards to expectations and consequences class scheduling (Abramowitz and O’Leary, 1991).

At one time it was believed by many educators and mental health professionals that stimulus control, employing techniques designed to decrease distractibility, should be a focus of classroom management. Muted, minimally stimulating environments which often included use of a cubicle to isolate a child diagnosed with ADHD were often touted as effective methods of controlling impulsivity in children diagnosed with ADHD (Abramowitz and O’Leary, 1991). Ross and Ross (1976) reported minimal support for this theory, and since then, most classrooms have avoided using this idea as a significant component of ADHD management.

In direct opposition to the aforementioned stimulus deprivation theory is a theory that focuses on optimal stimulation. Zentall and her colleagues (1985) reported on a number of task characteristics that had a positive effect on task behavior rates for children diagnosed with ADHD. Specifically, optimal stimulation

theory purports that children with an ADHD diagnosis perform better in the classroom when novelty and stimulation accompany relatively easy and repetitive tasks. However, new or difficult tasks do not receive the same benefits. The use of concrete task structure, with the addition of color, shape and texture to manipulative tasks has been found to produce favorable results in facilitating attention in ADHD children (Zentall, 1989).

Seating arrangements are another facet of environmental conditions a classroom teacher can change in order to facilitate on-task behavior. Research indicates that the way seats are arranged in a classroom has a considerable effect on the rates of on/off-task behavior (Rosenfield et al., 1985). Clustered seating, (i.e. where students sit together at a shared table) is the least likely to promote on-task behavior when an assignment is expected to be completed independently. Circle seating has been found to reduce off-task behavior when discussions are taking place, while row seating appears to promote on-task behavior for independent seat work (Weinstein, 1979).

Most behavior modification systems are associated with contingency management. This type of system uses consequences, either positive or negative, that are contingent on specific child behaviors. The most widely used contingency is teacher attention to children in the classroom (Abramowitz and O'Leary, 1991). This includes primary use of verbal feedback to students, both positive and negative. Use of frowns, smiles and head nods are also part of this type of management. The

common view that praise should be used as frequently as possible has been challenged by a number of studies that report negative consequences yield more favorable results in children diagnosed with ADHD (Abramowitz and O'Leary, 1991; Conway and Pfiffner, 1984; Rosen et al., 1984). These studies all report that the absence of positive praise towards the ADHD student from teachers had no impact on on-task behavior rates, while removing negative reprimands severely decreased on-task behavior. They also report that adding praise while reprimands were already in use did not correlate positively with increased rates of on-task behavior. It is important to note that the reprimands used in these studies are described by Rosen et al. (1984) as "prudent" (calm, firm, consistent and immediate). Many teachers are reluctant, for obvious reasons, to touch a child in order to sustain attention. Van Houton and colleagues (1982) report however that effectiveness of reprimands for ADHD students is increased by the use of eye contact, close proximity and a firm grasp of the shoulders. Overly emotional "lectures" and delayed negative responses do not produce the desired on-task behaviors the same way prudent reprimands have been shown to produce.

Another form of behavior modification includes using token economies. In these systems points/tokens are used, given and/or taken, for contingent behaviors that are desirable in the classroom. Abramowitz and O'Leary (1991) report that extensive literature reviews document the power of token economies to motivate students and encourage on-task behaviors. Many classroom teachers are unwilling

to use systems that take away things from children, believing that it is harmful and demeaning to the child. Pfiffner and O'Leary (1987) report students diagnosed with ADHD are far more likely to benefit from token economies only when the use of reduction of privileges or points is used. They do note, however, that if a child begins to lose more points than they are gaining, modification of the system needs to occur immediately so the child can earn something.

Home-school contingencies involve cooperation between the classroom teacher and the parents of a child with ADHD. Teachers complete some form of a checklist which indicates whether or not specific behavior goals were met during the day. These reports are reviewed by parents, at which time a reward or a consequence is administered based on pre-determined criteria. Advantages of this type of system include: daily communication between the teacher and parents; large changes are not necessary; a significant amount of time investment is not required; elimination of the argument that ADHD students receive too many special privileges; parents have wider range of reinforcers and consequences available to them; improved parent-child relationships are possible and delayed gratification may result in secondary behavioral gains during the school day for the student diagnosed with ADHD (Kelly and Carper, 1988).

As with contingency management techniques in the classroom, positive reinforcement that is combined with loss of privileges at home is reported as being superior to using only praise (Rosen et al., 1990). It is very important to spend time

with parents discussing types of appropriate consequences for ADHD children. To increase consistency and encourage long term use of this type of system, frequent support for the parents by somebody such as a school counselor is important.

Time-out from positive reinforcement is a technique that is used by classroom teachers frequently, and with a significant amount of success (Bratner and Doherty, 1983). Time-out can be minimally or highly restrictive, ranging from 2 minutes of “sit still” time in the student’s desk seat, to a much longer period of time in isolation areas either in the classroom or the school office. As with all forms of behavior modification, it is important to have a pre-determined set of expectations for which behaviors will precede a time-out. The efficacy of the intervention depends largely on the teachers prudent use of the technique and an understanding of the nature of how it impacts individual students (Abramowitz and O’Leary, 1991).

### Cognitive-Behavioral Interventions

Teaching children diagnosed with ADHD self-control skills and problem solving strategies is the cornerstone of cognitive training. Specific techniques in this area include: self-instructional training; cognitive modeling; self monitoring; self-reinforcement and cognitive and interpersonal problem solving (Abikoff, 1991). The expectation of cognitive training is that impulsive responses will be changed through the use of self-reflecting statements that focus on problem-solving. Self-monitoring strategies are centered around children monitoring their own behavior without always being prompted by a teacher, while self-reinforcement involves

children rewarding themselves based on their self-monitoring (Abramowitz and O'Leary, 1991).

High expectations that cognitive-behavior techniques would significantly improve academic performance, and reduce the impulsivity associated with children diagnosed with ADHD, have been met with disappointing research findings.

Abikoff (1991) reviewed 28 studies on cognitive training and concluded that there is no proof that using these techniques alone result in improved academic performance. He also concluded that desired changes in behavior were not significant with the use of these techniques.

Using cognitive-behavioral techniques in conjunction with other modalities has, however, been reported as contributing to the production of beneficial changes in undesirable behaviors associated with an ADHD diagnosis. Whalen and Henker (1991) report increased positive responses in areas associated with ADHD, (e.g. decreasing impulsivity), when the techniques are supported with psychostimulant medication (primarily methylphenidate), behavioral treatments and parent education about the nature of ADHD. Weinstein (1994) summarized the combining of medication, individual counseling to remediate emotional concerns, and cognitive-behavioral techniques to facilitate self regulation, produced desirable changes in behavior for those diagnosed with ADHD.

### Social Skills Training

The constant interaction with peers that occurs in any school setting requires

attention. Social skill training involves attending to verbal and non-verbal expression of expressive behavior, specifically areas associated with body language, voice tone and inflection, and eye contact (Corsini and Wedding, 1989). Needs in those areas can be addressed through individual counseling and reinforced via social role modeling by peers, teachers and parents.

Pelham and Bender (1982) report that using a combination of behavioral therapy techniques, along with psychostimulant medication, is effective in producing desirable behavior changes in children diagnosed with ADHD. It has not, however, been shown to produce positive changes in peer relationships. The researchers suggest that adding social skills training in combination with contingency management will produce desired changes in peer relationships. Frankel et al. (1997) report positive results from a study in which ADHD children and their parents received 12 sessions of social skill development training. The study included control groups of children with ADHD on a waitlist. Results indicate that children with ADHD are best helped when social skills training is used in combination with training for parents, and psychostimulant medication for the child.

#### Family Therapy-Parent Training

Children with ADHD typically demonstrate disruptive behavior more frequently than their peers. This disruptive behavior is not limited to the school setting, and frequently strains parent-child interactions. Grizenko and her colleagues (1993) report there is a growing consensus that attention to treatment of ADHD

should focus on more than the individual child and the classroom. Focusing on the child with ADHD's family, which is the primary social system, makes sense.

Cordell and Allen (1997) report that a synthesis of individual counseling and family therapy is often very beneficial in helping children diagnosed with ADHD, as well as other family members.

Many of the most disruptive children with ADHD get referred to a human service agency for contemplation of out of the home treatment in a group or hospital setting. This results largely from negative/illegal activity associated with the high (30-50%) comorbidity rate for conduct/oppositional defiant disorder, which is typically characteristic of those who commit delinquent acts (Biederman et al., 1991).

For children with ADHD who display severe acting-out behaviors, family therapy and the associated parent training that often accompanies such treatment, is reported as being a beneficial adjunct to other treatment efforts (Grizenko et al., 1993). This type of treatment effort is opposed to the option of removing the child from the home for individual treatment. Intervention techniques of parent training often include: helping the parents learn about the importance of developing social competence and positive peer status; using incidental teaching and self-evaluation strategies; instructing how to become strategic organizers of the child's social life; and becoming case managers to facilitate more consistency between the significant adult's in the child's social environment (Cousins et al., 1993).

### Peer Tutoring

Hinshaw (1992) reports that the rate of underachievement, or learning problems, for children with ADHD is between 40-80%. It is often not possible for a teacher in a regular classroom setting to spend a significant amount of time with any one student. Taking into account the higher rates of positive task response received from students with ADHD when feedback is immediate and individualized, as opposed to delayed and in a group setting, peer tutoring for these students is a reasonable accommodation to make in the class setting ( DuPaul and Henningson, 1993; Pfiffner and Barkley, 1990).

Most of the research in the area of peer tutoring focuses on results produced by a specific peer training program developed by Greenwood and colleagues (1988). The procedure outlined in this program includes specific training of the student with ADHD, the tutor and the teacher. The authors of the system report it is successfully used across a broad range of academic areas (e.g., reading, math, spelling). Controlled study results from DuPaul and Henningson (1993) report significant increases in on-task behaviors, coupled with improvements in the decreasing of restlessness while focusing on a task.

### Conclusions

A significant percentage of school-aged children have been diagnosed with

ADHD. In addition, high comorbidity rates have been reported in many children diagnosed with conduct/oppositional defiant disorder, mood/anxiety disorders and learning disorders. Psychostimulant medication, typically Ritalin, is reported as being the most common treatment method for the disorder. Recent research reports 3% of school-aged children are receiving medication from school nurses (Bramlett et. al., 1997). It is likely that many children take medication at home without a school nurse being aware as well, making the percentage of children receiving medical treatment for ADHD higher than 3%. Medical interventions have been reported as being successful in the reduction of many symptoms associated with ADHD (e.g. impulse control, distractibility). However, limited impact in the area of academic performance and the reduction of oppositional behavior characteristic of many children diagnosed with ADHD warrant attention to other treatment modalities (DuPaul and Eckert, 1997; Schachar et. al., 1997).

Multimodal treatment of ADHD consist of utilizing several modalities in unison, specifically tailored to the individual needs of the child/family. The combination of modalities most cited as being successful at reducing symptoms experienced by children with ADHD are: stimulant medication; behavior modification; social skills training/individual; and family therapy-parent training. The use of these different treatment modalities has been reported as being superior to any one method alone (Biederman, 1991; Nathan, 1992). The current body of literature citing the shortcomings of any individual treatment of ADHD exemplifies

the need for a multimodal approach to be the cornerstone of any treatment regime.

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