

**CLASSROOM INTERVENTIONS: METHODS TO IMPROVE ACADEMIC
PERFORMANCE AND CLASSROOM BEHAVIOR FOR STUDENTS WITH
ATTENTION-DEFICIT/HYPERACTIVITY DISORDER**

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Behavior management techniques are essential components of any treatment method for students with ADHD. Further, they appear to be the only line of treatment to which school personnel have direct access. Research has suggested that nearly all educators employ some form of behavioral modification techniques in their classroom. This paper will explore a variety of classroom interventions to assist teachers to work successfully with children with ADHD. These include: classroom structure, teaching modifications, peer interventions, token economies and self-management. The interventions reviewed were presented on a continuum from the least basic modifications needed in the classroom to those in which more time and resources are involved. All the strategies reviewed were evidence based. Also included in the paper is an interview of a general education instructor and an review of the strategies he employs in his classroom.

Attention-deficit/hyperactivity disorder (ADHD) is a persistent disorder characterized by significant problems with attention, impulsiveness and overactivity (American Psychiatric Association, 1994). This is the most common reason for referral of children to mental health clinics (Cantwell, 1996) and a problem affecting an estimated 3% to 5% of the elementary-school-age population (Barkley, 1998; Carbone, 2001; Fabiano & Pelham, 2003). On average, these estimates place at least one child with ADHD in every classroom in America (Fabiano & Pelham, 2000). For this reason, the use of effective interventions for reducing the classroom impairment characteristics of students with ADHD is important to all school personnel. Given this data, it is not unexpected that a

wide variety of treatments have been used with ADHD. A recent comprehensive review found that there are currently three treatments for ADHD that can be considered supported by research: (1) psychostimulant medications; (2) behavior intervention; and (3) a combination of these two (Busch, 1993; Pelham, Wheeler, & Chronis, 1998; Waschbush & Hill, 2001;). A significant amount of research has been conducted that supports the combination of these two interventions in the treatment of ADHD (Barkley, 1998).

Despite these findings there is a need to continually examine the behavior modification treatments used to improve the skills of children with ADHD. The American Academy of Pediatrics (AAP) has recommended that the initial treatment of ADHD should be educational and behavioral (Campbell & Cohen, 1990). Their article goes further to say that medication should never be used as an isolated treatment. Something that most of the evidence-based literature regarding classroom behaviors of children with ADHD supports.

The purpose of this paper is to describe some of the more commonly used in-school treatments and to evaluate their effectiveness. The discussion of these alternative treatments is a practical for three reasons. First, ADHD does not have its own disability designation for special education intervention. This means that with the exception of an *Other Health Impaired* designation, ADHD is predominately addressed in the general education classroom (Heward, 2003). Second, while recommendations of medication treatment for an ADHD student may be discussed in a meeting involving instructors, the decision surrounding this approach is not one for the instructor to make. Finally, the classroom interventions and attempts at behavioral intervention are solely in the hands and guidance of the classroom instructor. Many times this falls on the general education instructors to ensure a healthy learning environment for their entire class.

The heterogeneous nature of ADHD, with its variance in severity and response to treatments mean that a full range of techniques must be at the instructor's disposal. Myths about the generalities and limited interventions have been addressed and dispelled in an article by DuPaul, Eckert, and McGoey (1997). The reader is referred to that article for more information and discussion regarding the myths surrounding ADHD. Therefore, this paper will focus on a variety of classroom interventions that can have an effect on the characteristic impairments of students with ADHD.

Classroom Structure

General characteristics of ADHD are inattention, high distractibility and impulsivity and hyperactivity. These traits make concentrating on school-work and lessons very difficult. To be successful academically, students with ADHD must be able to focus their attention on the instructor and the lesson. Therefore, students with ADHD benefit greatly from an orderly environment (Yehle & Wambold, 1998). For this reason, classroom structure is one of the most salient areas of instructor influence in the classroom. The use of classroom structure to alleviate the effects of ADHD in the classroom has received much

attention and empirical support (Abramowitz & O’Leary, 1991). Classroom structure can be divided into two distinct categories, physical structure and schedule structure.

There has been abundant research done in the area of physical structure conducive for ADHD students in the classroom. In the past, these physical adjustments included the use of cubicles for completing work, bare walls and instructors dressed in neutral colors and plain clothing. While novel visual and auditory distractions can produce negative effects on performance of children with ADHD, not all stimuli are detrimental (Zentall, 1983). Articles by Carbone (2001) and Yehle and Wambold (1998) give a very comprehensive list of modifications that can easily be introduced into the physical layout of the classroom to help minimize the disruptive effects of ADHD.

Instructors need to look around the classroom and find ways to reduce unnecessary clutter. An unorganized room filled with unfinished projects and wall-to-wall displays can be very distracting to those with ADHD. When considering architectural layout, research has shown that the closed classroom architecture (i.e. four walls and a door) is more conducive than an open classroom plan (Barkley, 1998; Haake, 1991; Whalen et al., 1979). The closed classroom design presents considerably less auditory and visual distractions that impair the concentration of students with ADHD. The current trend to make classrooms into learning communities with groups of students at tables instead of desks should be used with discretion. For the student with ADHD, the traditional row-seating pattern is best. In this pattern the ADHD student should be placed in the front/middle of the room close to the instructor (Carbone, 2001; Gardill et al., 1996; Purvis, Jones, & Authement, 1992; Yehle & Wambold, 1998). This can eliminate the distraction of the students sitting in front of them and may provide closer instructor proximity. Surround ADHD students with well-behaved and attentive classmates (Haake, 1991). The use of positive peer interactions have shown to be helpful and will be discussed in more detail later. Take notice that the seating area for the student is away from other external distractions such as pencil sharpeners, drinking fountains, doors or windows. A final consideration is the inclusion of a *free desk* where ADHD students can go to tune out external stimulus and focus on their work. The presence of a *stimuli reduced* area for ADHD provides an outlet for the student and can be used in almost any environment. This inclusion allows the ADHD student to have a place that is free from much distraction and still participate in the cooperative group setting of the class.

While the physical structure of the classroom is a good place to start, just as important is in the schedule. By schedule is meant the procedures used to guide lesson times, activity transitions and behavior. The rule here is clarity and consistency. Yehle and Wambold (1998) provide the following list of procedures. Establish and post simple and clear classroom rules. These should be at the front of the room and posted in an eye-catching manner. While being simple they need to be complete. If there is a desired behavior or conduct expected in an activity; post it, define it and practice it. Establish and post clear consequences that follow rule infractions. These consequences should logically apply to the infraction. Cause and effect are notions that can be lost to students with ADHD due to impulsivity. Logical consequences help to reinforce the rule. Follow through on

consequences consistently and calmly. ADHD students tend to have issues with self-esteem; therefore the delivery of consequences should be delivered as rudimentary, not personal or out of anger. It is important to review rules and consequences frequently throughout the school year. Repetition is a key to developing a desired behavior. Other suggestions are to rotate the placement of the rules to attract attention to them. Establish structure in the classroom by providing students with a daily schedule (Ayllon et al., 1972; Barkley, 1998; Pfiffner, & O'Leary, 1993). The schedule should include a detailed list of transitions and activities for the day, thus allowing students to predict what will happen next (Gardill et al., 1996). Finally, call or send notes home frequently when the student follows rules. This is a great reward to students with ADHD. These procedures are supported by several studies and reviews (Barkley, 1998; DuPaul & Stoner, 1994; Gardill et al., 1996; Grandy & McLaughlin, 1999; Hogan, 1997; Purvis et al., 1992). The modification of classroom structure to fit the various needs of students with ADHD is perhaps the easiest and should be the first line of treatment within the classroom.

Curricular and Teaching Modifications

Of course all these modifications are interventions directed by the instructor. However, this category specifically targets the various interventions that can be incorporated into the daily development and delivery of academics. In the battle of gaining and maintaining the attention of ADHD students there are several easy to implement modifications an instructor may use.

Keep the curriculum interesting, vary presentation formats and task materials through the use of different modalities to increase and maintain student interest and motivation (Barkley, 1998; Gardill et al., 1996; Grandy & McLaughlin, 1999; Raza, 1997; Walden, & Thompson, 1981; Zentall, 1993). Use of color, large fonts, bold lettering etc. to draw attention to critical aspects of tasks (Carbone, 2001; Hogan, 1997; Yehle, & Wambold, 1998). Another way to cut down on the multitasking of students with ADHD is to provide guided notes. These may be copies of lesson overheads, outlines or even a designated peer note-taker (Busch, 1993; Raza, 1997; Yehle, & Wambold, 1998). Make academic tasks brief and give immediate feedback about the accuracy of the assignments. The student with ADHD requires frequent and intermittent feedback while working on assignments (Gardill et al., 1996). While walking around the room, make it a habit to comment on something they are working on (Raza, 1997). The combination of proximity control (Barkley, 1998; Gardill et al., 1996; Yehle, & Wambold, 1998) and constant use of consequences helps both the maintenance of social behavior and academic performance. It is important to remember that teachers need to assess the abilities of their students. For example, when one has given lengthy written assignments or pages of math problems, break these down into smaller manageable units. Also allow the ADHD student to take breaks from the material, to move and expend pent-up energy (Busch, 1993; Haake, 1991; Hogan, 1997; Yehle, & Wambold, 1998). Finally, do not be afraid to ask for help from those with more expertise dealing with children with ADHD. For example one may be able to increase staff-to-student ratios. The use of paraprofessionals, volunteers and peer helpers may increase the accessibility additional persons in the classroom. By doing this you may considerably diminish the wait-time ADHD students

experience when in need of assistance (Raza, 1997). These suggestions are not only helpful for those who struggle with ADHD but can improve the learning and behavior of an entire class.

The use of evidence-based curricular to assist students in the general education setting. The most widely evaluated set of materials has been those associated with Direct Instruction. These materials span the curricular spectrum from reading to writing in context. These materials are evidence-based with impressive outcomes across various curricula and with students in general and special education settings (Engelmann, Becker, Carnine, & Gersten, 1988; White, 1988). Enough emphasis cannot be placed on the importance of using evidence-based curriculum in both general and special education classrooms to assist all children. There is a great deal of evidence that poor instruction increases the risk of students failing (Greenwood, 1991; Heward, 2003).

Peer Intervention

When educators are attempting to modify the behavior of a student with ADHD, enlisting the aid of classmates as a peer-mediated intervention offers many advantages over those mediated by the classroom instructor (Barkley, 1998). Positive results of using peer reinforcement systems include: being more efficient in delivering immediate and consistent feedback, promoting generalization across settings, and may consequently result in the improved behavior and academic performance of the peer mediating the intervention (DuPaul & Henningson, 1993; Gardill et al., 1996).

There are two types of peer interventions. Peers can be used as a part of a contingency or as tutors. Using peers as contingency groups, peers are given responsibility for general classroom behavior. This can be as a whole class or as groups. Peers then are used as instruments for monitoring and rewarding desirable social and academic behavior. Because of the need for ADHD students to be accepted and the accessibility to immediate feedback, attention improves and impulsivity decreases (Waschbush, & Hill, 2001).

Peer tutoring is an instructional strategy where two students work together on an academic activity with one student providing assistance, instruction and feedback to the other (DuPaul, Ervin, Hook & McGoey, 1998; Greenwood, 1991). DuPaul et al., (1998), conducted a two year study with nineteen ADHD students ranging from grades first through fifth in two separate school districts. In this study the participants were rated on academic performance and on-task behaviors. During baseline these students were instructed without the use of peer intervention or peer tutoring. During intervention, the students were paired with peer tutors who provided guidance and immediate feedback. Results of this study revealed increased on-task behavior, decreases in fidgeting and increased academic performances on tests. Another positive effect of peer interventions is the ease in mobility. The behaviors elicited in peer interventions are able to generalize across settings. Others have found this to be the case in both general and remedial education settings (Greenwood, 1991; Greenwood, Delquadri, & Hall, 1984).

Token Economies

According to DuPaul, Eckert, and McGoey (1997) other than stimulant medication, the most widely evaluated treatment for ADHD has been the implementation of token reinforcement and response cost systems in classroom settings. Classroom token economies involve the presentation (token reward) and or removal (response cost) or both of tokens, points or other items. Initially, these items have no value until they are paired with teacher praise and used to purchase back up items contingent upon specified desirable or undesirable behaviors (Kazdin, 1977; McLaughlin & Williams, 1988; Pfiffner, & O'Leary, 1993; Pfiffner, Rosen, & O'Leary, 1985). At designated periods (i.e., daily, weekly, etc.) those accumulated tokens are exchanged for rewards with previously ascribed values. These rewards may consist of tangible objects, activities or privileges (Abramowitz, & O'Leary, 1991; Barkley, 1998; Carbone, 2001; Grandy & McLaughlin, 1999; McLaughlin & Williams, 1988).

A token economy may or may not include a response cost procedure, which involves the loss of privileges, tokens or points contingent on inappropriate behavior. However, a combination of positive reinforcement and a penalty system appear to be a more effective behavioral strategy (Carbone, 2001). Token economies can be of great value to the impulsive student because it offers a tangible reason to act appropriately and avoid a *fine*. Carbone (2001) outlines a *five-fold* process to be conducted between the student and instructor upon implementing such a system.

First, discuss the problem with the student. In this portion, both inappropriate and desired behaviors need to be discussed. Along with discussion, this may include modeling of desired behavior and particular attention to the situations that these will target.

Second, mutually agree on a reinforcer. Have a good idea of what activities, privileges or objects interest the student along with what may be feasible for you. Do not settle on reinforcers that may cause problems of distraction or that inhibit academic performance. Reinforcers can be as simple as collecting materials for class, computer time (Hoff, & DuPaul, 1998) or free time for classroom games (Fabiano, & Pelham, 2003).

Third, if response costs are going to accompany the token economy, a clearly defined and stated fine must be in place. This must be made mutually clear.

Fourth, establish a means to communicate the reward and fine. The procedures for tallying points must be outlined and easily accessible for both instructor and student. Post a chart in the room or in a folder that can be checked frequently. The transfer of points must be objective and clear. There should be no surprises in the gaining and losing of points. Again, frequency and consistency are the keys to modifying the student's behavior.

Finally, ensure that the rewards outweigh the fines. Goals must be within reach to promote *buy-in*. Token economies can easily be manipulated into being more effective as you go along (Fabiano, & Pelham, 2003).

Token economies can be designed for individual students or for the entire class (McLaughlin & Williams, 1988). Involving the entire class may be particularly effective when peer contingencies are competing with instructor contingencies (i.e., when peers reinforce disruptive behavior of ADHD students by laughing or joining in on their off-

task behavior) (Barkley, 1998). A type of group contingency is where the behaviors or academic achievement of a group or class are assessed and points are earned for group responding. One example of a group contingency that uses a response cost system is the *Good Behavior Game*, developed by Barrish, Saunders and Wolf (1969). In this game the class is divided into teams or groups. Target behaviors or academic achievement levels are selected (i.e., talk-outs, out of seat, or academic performance). Dependent upon the rate or frequency of such behaviors, points are allotted for violations of individual team members. At the end of the day, teams that do not exceed a certain number of infractions win the game. This game has been successful in improving student behavior and has also been well accepted by instructors (Barkley, 1998). Furthermore, results from the use of the *Good Behavior Game* have been replicated in other settings and behaviors (Kosiec, Czernicki, & McLaughlin, 1986).

Several studies indicate that token reinforcement systems produce high levels of on-task behavior as well as increased academic achievement (Ayllon, Layman, & Burke, 1972; Barkley, 1998; Grandy & McLaughlin, 1999; McLaughlin, & Williams, 1988). Incentive-based behavioral programs have produced better results than the use of negative reinforcement or depriving privileges (Hogan, 1997; DuPaul, & Stoner, 1994). Ayllon et al. compared the effects of a token reinforcement system and medication (Ritalin) on the academic performance of three students with ADHD. Their findings indicated that the delivery of token reinforcement resulted in increased levels of academic performance. Although the medication was effective in reducing hyperactivity, the academic growth of the students was hindered while they were being medicated (Gradual et al., 1996).

However, there are some problems associated with token economies. These problems are in the way of maintenance and generalization (Abramowitz, & O'Leary, 1991). The issue with maintenance seems to be in the assessment of goals and rewards. These programs can be subject to frequent manipulation and compromise to induce the desired goals or behavior standards. Rewards can become less stimulating and require regular rotation or up-grading to keep the interest of the participants (Fabiano, & Pelham, 2003). There is also the practical issue of generalization. The target behaviors or academic performance is attached to the token economy. Absent the reinforcer, (i.e., in another class or at home) the behavior may severely deteriorate (Abramowitz, & O'Leary, 1991).

Self-Management Strategies

Self-management procedures have emerged as an effective approach for improving classroom behavior (Kern, Marder, Boyajian, Elliot, & McElhattan, 1997). Self-management strategies can be separated into measures based on the principles of contingency management or cognitive control strategies (Shapiro, DuPaul, & Bradley-Klug, 1998). Interventions based on principles of contingency management highlight the correlation between behavioral responses and their consequences. In general, these measures require the student to evaluate his or her behavior and apply the appropriate consequences after the behavior has occurred. Strategies such as self-monitoring, self-

reward and self recording are examples of contingency-based self-management procedures (Shapiro et al., 1998).

In contrast, cognitive-based self-management strategies underscore the antecedents of responding. These measures necessitate the ADHD student to examine the thought process that comes before a response. Rational for these treatments is the belief that behavioral self-control can be increased by enhancing specific cognitive or meta-cognitive skills that are believed to underlie and promote impulse control (Waschbush, & Hill, 2001). The modification of the thought process is the goal of this intervention. Strategies used in this intervention are problem-solving techniques and self-instruction. However, studies have consistently demonstrated that cognitive treatments for ADHD generally result in no clinically important changes in the academic or behavioral performance of the student (Abikoff, & Gittelman, 1985; Barkley, 1998; Bloomquist, August, & Ostrander, 1991; Busch, 1993; Shapiro et al., 1998;). Therefore, only the strategies emphasizing contingency management will be explored here.

It is useful to conceptualize self-management interventions on a continuum. At one end the intervention is entirely controlled by the instructor. All feedback regarding the student's behavior and attainment of goals are evaluated by the instructor. Further, the receptions of appropriate consequences are directed by the instructor. At the other end, the student engages in evaluating his or her own behavior against the pre-set criteria. Consequences and rewards are student directed (Shapiro et al., 1998).

The key to using self-management in the classroom is student self assessment accuracy. The student must be trained to accurately recognize and record target behaviors (McLaughlin, 1984). These behaviors must be clearly outlined and understood. A series of matching between the recorded behavior observed by the teacher and those of the student must result in the accurate recording by the student before training is complete. During this time, the acquisition of points or rewards for accuracy can promote the process. The use of self-management/evaluation techniques naturally lend themselves to the use of reinforcers and response cost systems for the individual. There are many ways to record behavior. The student may use a chart taped to the desk and at appointed intervals check the targeted behavior. These charts may be designed as a *yes or no, smile or frown*, or a rating scale (i.e., 1-5). These may be combined into a daily report card that travels with the student to other classes and subsequently home.

An important study was conducted by Hoff and DuPaul (1998) in which three fourth grade boys who met the criteria for ADHD were studied in three settings. Observations were conducted during baseline, implementation of a token economy and during self-evaluation. It is important to note that none of the participants were being treated with medication throughout the study. During intervention, verbal praise and feedback of appropriate behavior occurred. Appropriate behavior increased closer to the level of classroom peers both in class and at recess. These behaviors continued to increase with the gradual fading of the classroom token economy and reliance of self-monitoring. The results of this strategy have further been examined as effecting academic performance.

Increases have been reported reading comprehension (Edwards, Salant, Howard, & McLaughlin, 1995), in mathematic scores (McDougall, & Brady, 1998), on-task (Stewart & McLaughlin, 1992), assignment completion (McLaughlin, 1984), and cooperative play (Hinshaw, Henker, & Whalen, 1984). Some practical outcomes of using self-management strategies are: during a fading phase of a token economy and instructor monitoring (Abramowitz, & O'Leary, 1991) and self-management strategies are easily portable from one setting to the next.

Teacher Interview

As a part of our coverage of this topic we were able to secure an interview with a elementary general education teacher employed in a local school district. The instructor both teaches and is an administrator of a private school in southern Spokane County. There were two points of interest behind this particular interview. First was the fact that the teacher has ADD without hyperactivity. Second, despite the small class size, approximately 60% of the class displays ADD/ADHD type symptoms. The purpose of the interview was to assess what particular strategies were being used in this general education classroom and if there were any significant correlations to the ones described above.

The first strategy expressed in the interview was the focus of the instructor to know and build a relationship with each student on an individual basis. This was stated to be the *key* in developing any intervention for behavior modification and academic goals. Classroom/Instructional modifications for individuals were an accepted part of the classroom dynamics and were no secret. ADD and ADHD are openly discussed in the classroom in an effort to promote acceptance. The instructor presents these particular traits as *gifts not disorders*. The structure of the classroom and lesson delivery was expressed as non-traditional. The occurrence of talk-outs and fidgeting are tolerated until the point of bothering other classmates. At this point the student may opt to engage in a physical activity away from the class (i.e., run some laps). These breaks for expending energy can be prompted by either student or instructor. The instructor engages in frequent use of positive feedback and reprimands. The criteria for these are: *they must be immediate, legitimate and purposeful. They need to address inappropriate behavior with consequences that assign responsibility and teach cause and effect.* Along with classroom feedback, the instructor informally meets the parents each day at which time informal daily reports can be given.

The use of a reward system is in place with daily goals for each student and the class. This system is a group contingency used to target individual behaviors. The behaviors targeted refer to time on task and goals in academic performance. If goals are met, the class is rewarded with free-time. According to the instructor, this works well for these students because they want peer acceptance. *They want to be heroes.*

The use of self-management techniques have not been widely used in this class. Occasionally, after trying other approaches and learning more about the student an individual social contract will be explored between the instructor, student and parents.

The instructor uses these strategies in his classroom out of experience of what works for him and meets his needs. Consequently, these strategies have produced a positive effect for all students involved. It was related that the academic performance on standardized tests significantly raised for students during the time spent in this classroom as opposed to the level of achievement attained in their previous year.

Conclusions

Students with ADHD are a heterogeneous group. Each student with ADHD comes with their own skills and behavior across a wide continuum of impairments. Intervention strategies must be individualized based on the function of particular behavior, grade level of the student and the structural constraints of the classroom. The interventions and modifications that are essential for the academic achievement of one student with ADHD may be entirely different for another. Consequently, instructors will need to pick and choose from a variety of strategies in order to meet the individual needs of their students. The strategies discussed in this paper are by no means comprehensive. However, they are many of the most researched and suggested by the evidence. Finally a recent study conducted by Miranda, Presentacion, and Soriano (2002), concluded familiarity of these techniques have been shown to be beneficial in the treatment of children with ADHD in the classroom. Improvements were realized in primary symptoms of inattention-disorganization, hyperactivity-impulsivity. Furthermore, the results showed an impressive increase in academic scores and decreases in inappropriate classroom behaviors. Children with ADHD require our best efforts and instruction. Providing teachers with these evidence-based procedures appears to be a very viable undertaking to assist children with ADHD in the classroom.

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