

# ADD-vantage



Attention Deficit/Hyperactivity Disorder

*Issue 17*

Newsletter

*Summer 2006*

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Dear Members,

Here we are in the middle of summer and yet we have managed to issue another Newsletter. This is thanks to the Committee who are all working together on all the projects we have in hand.

You all know that in October 2006 we will have the medication Strattera available in Malta. Unfortunately it will be against payment, we haven't been lucky enough to get AD/HD on the Schedule 5 yet! Another bit of good news is that Concerta is also in Malta now. Again against payment but for those for whom a long lasting methylphenidate is important, it will be worth it. For further details please contact a Committee member.

The first three-day In-Service Training Course was held this year for the Department of Education and I am sure you will all be pleased to hear that 200 teachers/facilitators applied for it. The bad news is, that we could only accommodate 30! So next year we will run it twice. Many many thanks to all those who contributed in one way or another, your help is invaluable, especially the two Daniels who came and stood up in front of everyone and said their piece. Their contribution and that of the two parents who also participated were the highlight of the course.

We have also come to the end of the Behaviour modification course which has been run for the first time and which initial reports tell us has been successful. Hopefully a similar one will be run next summer unless the demand is there in winter too.

Meanwhile, enjoy the rest of your summer holidays and we look forward to seeing you all again on the THIRD Friday of September, since the 2<sup>nd</sup> Friday is a Public Holiday.

The Editor

## **\*\*Attention-Deficit Hyperactivity/ (ADHD)\*\***

## **Disorder**

**Kytja K. S. Voeller, MD**

The following is the second part of an article by Dr. Voeller which may be of interest to parents and/or professionals. The first featured in the last issue of this newsletter.

### **Treatment of ADHD**

This section focuses on some general principles of the treatment of the child with ADHD.

#### Principle 1

The treatment of ADHD involves the selection of an appropriate medication at an appropriate dose in combination with behavioral therapy. A number of different medications are now available for the treatment of ADHD, and the generic names and trade names are listed in Table 2 .

A specific discussion of the selection of a medication for a given child is beyond the scope of this article, but it is worth a brief review of the Multimodal Treatment Study of Children With ADHD (MTA), which was cosponsored in 1992 by the National Institute of Mental Health and the US Department of Education.

This study provides a great deal of valuable information about the treatment of ADHD. It was conducted at six different sites in North America and involved 579 boys and girls who met the DSM-IV criteria for ADHD, combined type, and their families. The children were randomly assigned to four different treatment conditions: medication only, medication plus behavioral treatment, behavioral treatment only, and "community care" (ie, after the initial evaluation, families were provided with a report summarizing the assessment results and a list of mental health resources in their community and were then followed as part of the study). The medication management protocol (used for the medication only and the combined treatment groups) involved a sophisticated titration phase: the child was tried on a range of doses (including placebo) given at breakfast, at lunch, and in the afternoon during a 28-day titration period. Medication and placebo followed a random schedule, and both the parents and the clinicians were unaware of the dosage or whether the child was receiving placebo or active drug. Daily

records of behavior and side effects were kept, and the optimal dose was selected after the records were reviewed blindly by experienced clinicians at a different site. Of the 289 subjects who entered this segment of the study, 256 completed it. After the optimal dose was determined, the children were seen at monthly visits, and the response to the treatment and side effects were monitored. No side effects were reported in 35.9%, mild side effects in 49.8%, moderate side effects in 11.4%, and severe side effects in 2.9%. In about half of those children who had severe side effects (depression, worrying, irritability), the side effects might have been unrelated to the medication. Interestingly, teachers reported more side effects when children were on placebo, suggesting a "negative halo" effect, and teachers saw fewer side effects with increased dosage. Parents proved to be more reliable monitors of side effects, and many of the side effects occurred as an "end of dose" phenomenon (ie, they were worse as the medication was wearing off). The most common parent-reported side effect involved decreased appetite, stomach-aches, tearfulness, trouble sleeping, headache, and a dull or listless appearance. (Parenthetically, it should be noted that some of these "side effects" are present in children with ADHD even before medication is started and can often be remedied by an adjustment in timing and dose.)

Behavioural treatment administered to the combined medication and behavioural treatment group and the behavioural treatment only group involved parent training, child-focused treatment, and a school-based intervention organized and integrated within the school. The child-focused program was based on the summer treatment program developed by Pelham and Hoza and involved an 8-week program, 5 days per week and 9 hours per day, delivered in group-based recreational settings, with specific rewards, time-out, and social skills training, as well as individualized academic skills practice and reinforcement of appropriate classroom behavior. The school-based treatment involved 10 to 16 sessions of biweekly teacher consultation and 12 weeks of part-time interventions, with a paraprofessional working with the child. A daily report card was filled out by the teacher and went home with the child, to be

reinforced by the parents on a daily basis. In short, the behavioural treatment was well designed and intensive, to a much greater degree than would usually occur in a standard clinical or school setting.

At the end of the 14-month period, the results indicated that the medication management alone and combined medication and behavioural treatment group showed a considerably more robust response than the behavioural treatment alone and community care groups. Combined treatment was superior to the behavioural treatment for internalizing problems, oppositional or aggressive symptoms, and reading achievement scores. Another interesting facet of the study was that the medication dose was adjusted upward during the 14 months of the study, but the rate of increase was less marked in the combined therapy group. The optimal dose for most children was in the range of 1 mg/kg/dose, which is somewhat higher than is often used. When the children were re-evaluated at the end of 24 months, 68% in the combined group, 56% in the medical management group, 34% in the behavioural treatment group, and 25% in the community care group showed improvement.<sup>[128]</sup>

Thus, in summary, the results of the MTA study support the use of medication in the treatment of ADHD. The rate of side effects was quite low. The combination of medicine and behavioural management was associated with a better 2-year outcome than the medication group alone. In the long run, the difference (68% vs 56%) was relatively small but was significantly better compared with behavioural treatment alone and community care. The behavioural treatment was extremely intense and involved (1) parent training, (2) individual work with the child, (3) integration of the school into the behaviour program, and (4) a daily report card completed by the teacher, which was then used by the parents to deliver consequences. This large, well-designed study strongly supports the use of medication integrated with a behavioural program.

## **Principle 2**

Adequate behavioural therapy involves intensive and prolonged parent

involvement and cooperation from the teacher.

With regard to the parents' role in the management of ADHD, there is little question that the optimal management of a child with ADHD requires an enormous time and energy commitment on the part of parents to maintain an extremely high degree of consistency and structure. The goal is to help the child become autonomous in self-regulation. The parent needs to learn to act as an "accessory frontal lobe," at the same time helping the child to develop increasing insight and competence in his or her own behavioural regulation. Depending on the child's age and the associated learning and behaviour problems, as well as the environment, this might not be an easy or rapid process. Very young children with ADHD require close parental supervision, and children in elementary and middle school need continuous monitoring and support for school work. Adolescents, particularly those who have been recently diagnosed and treated, pose a special challenge. They have had a number of years to develop dysfunctional strategies and require close supervision and support and usually individual therapy. Although the child with ADHD does well when provided with structure and predictability, this can be something of an oxymoron in a busy household.

In the role of "accessory frontal lobe," the parent must learn to anticipate problems and develop a tactful approach to dealing with them. For example, helping a young child get organized for school in the morning is often stressful for many families. A standard complaint is that the child with ADHD dawdles while getting dressed and delays the family's departure. (The frustrated mother of one of my patients reported that her 10-year-old daughter seemed to be unable to get dressed and get downstairs in time to eat breakfast, whereas her 5-year-old daughter was able to do this autonomously and consistently.) Although medication often decreases the severity of the problem of getting ready for school, the parent needs to provide support until the medication has taken effect in the morning. This requires making sure that the child gets up early enough and receives medication

and, then, if necessary, is monitored during the dressing process (this does not mean dressing the child but rather helping the child stay on track and complete the process on his or her own). This also means that the parent needs to be up early enough to manage this process. It is important to make sure that the child has organized the backpack for school the night before, again requiring close supervision. Bedtime is another problematic time. Given that many children with ADHD (on or off medication) have difficulty settling down to sleep, a lengthy and predictable bedtime routine often needs to be in place to help the child calm down. When both parents work and arrive home after 5 pm, this whole process requires split-second timing and teamwork to prepare dinner, wash the dishes, supervise homework, perform the backpack check, and get the child to bed on time. If a parent is busy or absent, it is important that whoever takes over knows what the routines and expectations are. Having a child with ADHD spend time in multiple environments (school, an after-school program, a baby-sitter's home, and, if the parents are divorced, different homes) can be extremely disorganizing. Even when there are several children in a household, maintaining routines and anticipatory management strategies requires considerable managerial skill.

Unfortunately, many households have difficulty in managing these routines. Because ADHD is such a strongly genetic condition, one or both parents can also have ADHD, which often makes it extremely difficult for parents to regulate their own behaviours enough to adhere to such routines, let alone provide the systematic support that the child requires. In a study that examined the parenting styles of parents who described themselves as inattentive and impulsive, fathers with this profile reported lax parenting both before and after parent training. Even after parent training, they tended to overreact. Mothers who described themselves as having moderate levels of inattention had the most negative parent-child interactions.

Although parent training is often very helpful, there are occasions when the situation improves only after the parent's own attention problems are medically treated. One mother complained that her son was unable to keep track of his homework, forgot

his assignments, and, on the rare occasions when he did complete them, often forgot to turn them in. This pattern had gone on through elementary school, so that the boy (then age 12 years) was not particularly motivated to change his *modus operandi*. To effectively deal with this problem, his mother needed to monitor him closely, keep in touch with the school on a daily basis, and make sure that positive rewards occurred when he completed his work. After several months, it was apparent that she could not do this in a consistent manner. She recognized that some of these difficulties were due to her own inattention and, once she was started on medication for her own ADHD symptoms, was able to provide the required structure much more effectively.

### Principle 3

Treatment of ADHD is not the same as treating a learning disorder, and vice versa. Given the high degree of comorbidity between ADHD and learning disorders, a child should be carefully evaluated for a learning disorder, and treatment should be put in motion for remediating the learning disorder.

### Principle 4

Making sure that the child gets enough to eat, gets enough sleep, and has sufficient exercise is a crucial part of the treatment. Although medication might help a sleepy child stay awake during school, chronic sleep deprivation is not conducive to learning. It takes creative parenting to make sure that the child gets enough sleep and remains on schedule over the weekends. Some children require 10 hours of sleep, and the logistics of getting the child to bed on time while completing the rest of the evening routine are formidable. Eating is another problem: some children on medication are simply not hungry at dinner and start foraging for food about the time they are expected to go to bed. Parents often view this as stubbornness or manipulation, but it usually works better for children to eat if they are hungry. Making sure that they have eaten breakfast and have a snack in the afternoon is also helpful because psychostimulant medication can

suppress hunger, and they might not be aware that they need to eat.

Vigorous exercise on a daily basis is extremely helpful not only for the cardiovascular benefits but also because exercise helps increase arousal and enhances brain-derived neurotrophic factor, which facilitates memory and learning.<sup>[130]</sup>

Providing the child with opportunities to move around after working on a project for a given length of time is helpful. However, many parents have difficulty finding time for their own exercise program, let alone developing one for their children.

### Principle 5

Encourage self-awareness and autonomy. Helping children with ADHD understand themselves so that they can function effectively is important. Telling them that they are "hyper," "ADHD," or "disorganized" (particularly if this is communicated in moments of anger) is much less helpful than defining the dysfunctional behavior in very concrete terms ("You have trouble keeping track of your homework, so we will work out a system together that will make it easier."). One 40-year-old man who had asked to be evaluated after his son was diagnosed with ADHD pointed out that when he was growing up, he always had the sense that whatever he was doing was "never enough." It had been made clear to him that if he just "tried harder" and "did something different," he would perform better. However, he had no idea what "trying harder" and "doing something different" meant. This emphasizes the need to lay out a very clear and explicit program. When a child tells a parent or a teacher that he or she cannot do something "because of the ADHD," this should be treated as a serious problem and addressed immediately; the child usually employs this as a way of not carrying out an unpleasant task. The more a parent or teacher buys into the "I can't do it because I have ADHD" routine, the more the child will use this excuse.

### Principle 6

A child's compliance with a routine should be closely monitored, and reminders as well as consequences should be provided.

Children with ADHD cannot monitor their own behavior well, so frequent pleasant and focused reminders when they are drifting away from the program are helpful. Rewarding compliance with routines works better than punishing noncompliance, and sometimes letting a child experience a "natural consequence" helps reinforce the routine. Thus, if a child does not perform the nightly routine of checking the backpack and forgets homework, a series of natural consequences might ensue. (However, if the child's teacher does not respond with an immediate consequence if the homework is not turned in, the child learns that it is not very important to perform this routine.) Natural consequences are usually better than "unnatural" consequences. When it comes to long-range projects, parents need to be aware that it is extremely difficult for a child with ADHD to anticipate and plan a long-term project, so monitoring homework and providing tactful reminders and assistance ("Let's plan out how you're going to tackle your book report that is due next month"; "Have you put the report in your backpack?") are more helpful than allowing the due date to creep up or to let the child forget the final version. If a child has done well working on such a long-range project, but then forgets to turn it in on time, such a "natural consequence" might be unnecessarily harsh.

### Principle 7

Teacher involvement is crucial. The teacher is a very important player in this situation. If there is minimal feedback from the teacher, or it does not occur in a very timely fashion (ie, the same day), it is almost impossible to improve the situation. A child learns quickly that if the homework assignment is written illegibly or is "forgotten," or if he tells his parents convincingly (but untruthfully) that he "has no homework," or the necessary workbooks or other materials are not brought home, then the homework cannot be completed. At 7 o'clock in the evening, it requires a herculean effort for the parent to correct the situation. This strongly reinforces homework avoidance. Children with ADHD benefit enormously from daily communication between the parent and teacher, with the focus on fixing

responsibility on the child and teaching the child to monitor his or her own homework. However, this means that the teacher must check the homework list, might need to remind and monitor what materials the child is taking home, and provide immediate feedback to the parent if homework is either not turned in or is substandard. The parent then becomes responsible for delivering prompt rewards or negative consequences. Be forewarned: training these behaviors takes a long time and requires great persistence on the part of parents. I have worked with children who have perfected the art of "flying under the radar." One normally intelligent but language-disordered 12-year-old boy was able to generate such a cloud of confusion around homework that he almost never had to do it (his family had no idea of the status of his homework). When the parent and teachers began to communicate very closely and a tight behavioral program was set up, it required almost 24 months for this child to begin to change his behavior.

## **\*\*Some Information About Medications for ADHD\*\***

Parents and teachers sometimes state that a child cannot have ADHD because the child is not "hyper." Some believe that psychostimulant treatment is designed to "slow the child down, and find it hard to imagine that a child who is slow-moving, dreamy, chronically disorganized, and somewhat unaware of his or her surroundings would benefit from the same medication used to treat a child with rampant hyperactivity and impulsivity, but the medication works well in both situations. Psychostimulant medication appears to activate neural networks, subserving performance of specific tasks.<sup>[131]</sup>

A number of different types and formulations of medication are now on the market. Medications used to treat ADHD act by inhibiting the dopamine transporter (methylphenidate) or increasing dopamine release into the synaptic cleft (dextroamphetamine), or a combination of both mechanisms. Although the vast majority of children respond to methylphenidate or dextroamphetamine, an occasional child does not. Medications that increase norepinephrine (eg, tricyclic

antidepressants) might be useful in treating children who have failed psychostimulant treatment.<sup>[132]</sup> Bupropion and atomoxetine (both of which increase central dopamine and norepinephrine) are also medications that might be helpful in this situation. Pemoline, which has the potential for liver damage and requires repeated blood tests, is useful in the treatment of drug-abusing adolescents. Modafinil, which is used to treat narcolepsy or daytime drowsiness in adults with partially treated sleep apnea, might also be helpful.

### **Parental Concerns**

When the diagnosis of ADHD is made and medication is recommended, parents often state that ADHD is diagnosed too frequently, and the solution is to "throw medicine at it" rather than look for "the root cause." As discussed above, the root cause involves dysfunctional brain circuits, which are either genetic or acquired, and the most effective treatment involves psychostimulants and behavioral treatment.

What are the risks of *not* treating ADHD? Although parents are often concerned that starting a child on psychostimulant medication will increase the risk of drug abuse in later life, available data would suggest that it is quite the reverse. Children with ADHD, particularly those who are not treated with psychostimulants, are at much greater risk of drug abuse than children without ADHD. They start smoking at an earlier age than peers, possibly because nicotine enhances attention. They also tend to be drawn into deviant peer relationships, which are strongly associated with drug abuse, and are especially vulnerable to these undesirable social influences, further increasing the risk of drug abuse.<sup>[135]</sup>

Appropriate treatment with psychostimulants has been shown to reduce the risk of later drug and alcohol abuse in children with ADHD. Children with ADHD who are on stimulant therapy are three to four times less likely to abuse drugs than those who are untreated. In fact, one study demonstrated that treatment with psychostimulants in high school appeared to protect against hallucinogen abuse by adulthood.<sup>[138]</sup>

Despite concerns regarding its addictive potential, methylphenidate is not a very good addictive medication unless it is administered intravenously. Methylphenidate binds to the dopamine transporter and

increases dopamine levels in the brain. This is similar in its mechanism to cocaine, but the euphoric effects and addictive potential of cocaine occur because it is administered in ways that result in a very rapid increase in blood level, with about 60% of dopamine transporters blocked. In addition, cocaine remains bound to the dopamine transporter for very brief periods of time; therefore, repeated high intravenous doses have euphoric effects and set the stage for abuse. In contrast, methylphenidate remains bound to the dopamine transporter for several hours; therefore, repeated doses have very little effect. When methylphenidate is administered by mouth at a standard clinical dose, euphoric effects are not present.<sup>[140]</sup>

Dextroamphetamine has a somewhat more complicated mechanism of action. There are many medicines that, if administered incorrectly, are dangerous but at the appropriate dose are lifesaving (eg, insulin or digitalis).

Some parents worry that starting children on a psychostimulant medication will commit them to lifelong use. Although no parent wants to see his or her child on medication, particularly a chronic medication, there are some situations in which a child needs to take medication and continue it throughout life (eg, children with diabetes require insulin, children with endocrine disorders or asthma need to take medicine). ADHD is no different. It is a chronic, impairing disorder that is perhaps not as life-threatening as diabetes but is, nonetheless, impairing. The real issue is to weigh the risks of treatment against the risks of nontreatment.

What are the risks of nontreatment? Children with ADHD who are not treated are likely never to live up to their potential in school, are at greater risk of behavior disorders and psychiatric disorders (major depression and personality disorders),<sup>[142]</sup> have a much higher rate of traffic violations than peers, and, untreated, are more likely to abuse drugs than children with ADHD who are treated.

## **\*\*Pharmacogenomics: A Glance at Medicine Management of ADHD in the Future\*\***

The recent information regarding the genetic basis of ADHD opens up the possibility that more sophisticated pharmacologic management of this disorder will become possible. Although most patients respond well to psychostimulants, a small group has atypical responses or is at increased risk of undesirable side effects. Understanding the genetic basis of ADHD and how different drugs affect the central nervous system will make it possible to effectively select an appropriate medication. A few examples will suffice. Children with ADHD who are homozygous for the 10-repeat allele at the dopamine transporter 1 ( *DAT1* ) gene show a poor response to methylphenidate. A SPECT study of children with this genotype, who showed some response to methylphenidate, had significantly higher regional cerebral blood flows in the medial frontal and left basal ganglia regions than children who did not have this genotype. Individuals with two catechol O - methyltransferase Met/Met alleles (resulting in slower elimination of dopamine from synapses) performed less well on tasks assessing prefrontal executive function when treated with dextroamphetamine, whereas performance on these tasks was enhanced by dextroamphetamine in subjects with a different (the Val/Val) phenotype.<sup>146</sup> Because a number of different genes are involved in the ADHD phenotype, understanding these complex interactions will take much further investigation.

### **WHY I LOVE MOM**

(dedicated to Mums everywhere)

Mom and Dad were watching TV when Mom said, "I'm tired, and it's getting late. I think I'll go to bed." She went to the kitchen to make sandwiches for the next day's lunches. Rinsed out the popcorn bowls, took meat out of the freezer for supper the following evening, checked the cereal box levels, filled

the sugar container, put spoons and bowls on the table and started the coffee pot for brewing the next morning. She then put some wet clothes in the dryer, put a load of clothes into the washer, ironed a shirt and secured a loose button. She picked up the game pieces left on the table, put the phone back on the charger and put the telephone book into the drawer. She watered the plants, emptied a wastebasket and hung up a towel to dry. She yawned and stretched and headed for the bedroom. She stopped by the desk and wrote a note to the teacher, counted out some cash for the field trip, and pulled a text book out from hiding under the chair. She signed a birthday card for a friend, addressed and stamped the envelope and wrote a quick note for the grocery store. She put both near her purse. Mom then washed her face with 3 in 1 cleanser, put on her Night Solution & age fighting moisturizer, brushed and flossed her teeth and filed her nails. Dad called out, "I thought you were going to bed." "I'm on my way," she said. She put some water into the dog's dish and put the cat outside, then made sure the doors were locked and the Patio light was on. She looked in on each of the kids and turned out their bedside lamps and TV's, hung up a shirt, threw some dirty socks into the hamper, and had a brief conversation with the one up still doing homework. In her own room, she set the alarm; laid out clothing for the next day, straightened up the shoe rack. She added three things to her 6 most important things to do list. She said her prayers, and visualized the accomplishment of her goals. About that time, Dad turned off the TV And announced to no one in particular. I'm going to bed." And he did...without another thought. Anything extraordinary here? Wonder why women live longer...'CAUSE WE ARE MADE FOR THE LONG HAUL.....and we can't die sooner, we still have things to do!!!!)

**\*\*Pioneering Research  
'Sidelined' Assertions That  
ADHD Brain Differences Are  
Drug Induced; NYU**

**Researcher Recognized by  
APA\*\***

Contact: Dave DeCicco of the NYU Child Study Center, 212-263-3652 or [Dave.DeCicco@nyumc.org](mailto:Dave.DeCicco@nyumc.org)

The NYU Child Study Center today announced that its research director, F. Xavier Castellanos, M.D., was presented with the Blanche F. Ittleson award by the American Psychiatric Association on Monday evening in Toronto. The award is widely regarded as the most prestigious award in child psychiatric research.

Dr. Castellanos' landmark research using magnetic resonance imaging (MRI) definitively proved quantitative anatomic brain abnormalities in children with Attention-Deficit/Hyperactivity Disorder (ADHD). In its praise of Dr. Castellanos, the American Psychiatric Association wrote that his findings "sidelined assertions that structural brain abnormalities seen in ADHD might be drug induced."

Previously, many scientists contended that the front part of the brain is altered in ADHD children, but Dr. Castellanos demonstrated differences in several regions of the brain. In addition, the brains of ADHD children were 3 percent smaller in volume compared with normal children. The brain differences among ADHD children who took medication, such as Ritalin, and those who were not treated with medication were similar, evincing that brain differences are not the result of medication.

The Blanche F. Ittleson Research Award is given by the American Psychiatric Association to a psychiatrist or a group of psychiatric investigators for published results of research in child psychiatry. This research has led to an important advance in promoting the mental health of children. The award was presented to Dr. Castellanos Monday evening at the American Psychiatric Association's annual meeting in Toronto.

Dr. Castellanos was given the award on the basis of his study Developmental Trajectories of Brain Volume Abnormalities in Children and Adolescents with Attention-Deficit/Hyperactivity Disorder (ADHD) which

was published in 2002 in The Journal of the American Medical Association. The study has been the basis for multiple lines of subsequent research, by numerous groups around the world, including the Institute for Pediatric Neuroscience that Dr. Castellanos founded at the NYU Child Study Center.

### **The Mayonnaise Jar and Two Cups of Coffee**

When things in your lives seem almost too much to handle, when 24 hours in a day are not enough, remember the mayonnaise jar and the 2 cups of coffee.

A professor stood before his philosophy class and had some items in front of him. When the class began, he wordlessly picked up a very large and empty mayonnaise jar and proceeded to fill it with golf balls. He then asked the students if the jar was full. They agreed that it was.

The professor then picked up a box of pebbles and poured them into the jar. He shook the jar lightly. The pebbles rolled into the open areas between the golf balls. He then asked the students again if the jar was full. They agreed it was.

The professor next picked up a box of sand and poured it into the jar. Of course, the sand filled up everything else. He asked once more if the jar was full. The students responded with a unanimous yes."

The professor then produced two cups of coffee from under the table and poured the entire contents into the jar effectively filling the empty space between the sand.

The students laughed.

"Now," said the professor as the laughter subsided, "I want you to recognize that this jar represents your life. The golf balls are the important things--your family, your children, your health, your friends and your favourite passions---and if everything else was lost

and only they remained, your life would still be full.

The pebbles are the other things that matter like your job, your house and your car.

The sand is everything else---the small stuff. "If you put the sand into the jar first," he continued, "there is no room for the pebbles or the golf balls. The same goes for life. If you spend all your time and energy on the small stuff you will never have room for the things that are important to you. "Pay attention to the things that are critical to your happiness. Play with your children. Take time to get medical checkups. Take your spouse out to dinner. Play another 18.

There will always be time to clean the house and fix the disposal. Take care of the golf balls first---the things that really matter. Set your priorities. The rest is just sand."

One of the students raised her hand and inquired what the coffee represented. The professor smiled. "I'm glad you asked. It just goes to show you that no matter how full your life may seem, there's always room for a couple of cups of coffee with a friend."

### **\*\*\*\* Daily Life of Children with ADHD and their Moms \*\*\*\***

By Dr. David Rabiner, Ph.D.  
Duke University

The study reviewed in this issue of Attention Research Update is one that I find fascinating. In this study, the researchers used Personal Digital Assistants - PDAs - to capture previously unavailable information about the day to day lives of children with ADHD and their mothers. Over a 1-week period, randomly scheduled "beeps" from the PDA prompted moms and their child to record information about their activities, mood, and the quality of their interaction.

The result is a rich data set that offers a window into the daily experience of children with ADHD and their mothers and provides more detailed, nuanced, and fine grained information than traditional behavior rating

scale methods. Because all children in this study were being treated with medication, we learn - unfortunately - about ways that they and their mothers continue to struggle despite the treatment they are receiving.

This is one of the most interesting studies I have seen in recent years and I hope that you will share my enthusiasm for the quality and originality of this work.

Although thousands of studies on children with ADHD and their families have been conducted, it is surprising how little is known about the quality of their day-to-day lives. Behavior rating scales tell us relatively little about the quality of moment-to-moment interactions, and observational studies, although a rich source of data, are necessarily limited to extremely small samples of time.

A fascinating study to be published in an upcoming issue of the Journal of Abnormal Child Psychology addresses this important gap in the literature (Whalen, et al. (2006). Toward mapping daily challenges of living with ADHD: Maternal and Child Perspective using Electronic Diaries).

In this study, Personal Digital Assistants - PDAs - were used to provide a unique window into the challenges of living with ADHD, challenges that remain despite important benefits that may be provided by medication treatment.

Participants were 27 children with ADHD (average age 10.5 years, 18 boys, 9 girls) and their moms as well as 25 children without ADHD (average age 10.5 years, 15 boys, 10 girls) and their moms. All children in the ADHD group were being treated with a long acting stimulant - either Concerta or Adderall XR - at the time of the study. Children in the comparison group had no known learning or behavioral problems. Because the authors were interested in examining mother-child relationship issues, enrollment was limited to mother-child dyads together for at least 4 hours each day.

To learn about participants' the day to day experience, electronic diary monitoring using Personal Digital Assistants - PDAs - was scheduled across 7 consecutive days during

nonschool hours. The PDAs were programmed to beep approximately every 30 minutes to signal that it was time to complete a diary checklist. Both mothers and children had their own PDA, which were programmed to beep at different times, and each completed their own electronic diary. The PDAs were programmed to beep when mothers and children were likely to be together - before school, after school, and on weekends.

The diary items were selected to "...tap contexts, behaviors, and moods that are relevant to the daily lives of parents and school age children, to capture the quality of their interactions, and to include dimensions that often prove problematic for children with ADHD.

Each time the PDA beeped, participants used the PDA to identify their location, social context, i.e., by themselves, with each other, with peers, and their current activity. Then, mother and child rated the child's symptomatic behaviors (e.g., impatient, restless), and moods (e.g., angry, good mood). Mothers also rated their own moods. Each also rated the difficulty of the activity they were currently engaged in and evaluated their ability to do it successfully.

Despite the frequent recording demands, moms and children did a good job of completing the diary entries. Mothers received an average of 91 signals to complete a diary entry during the 7-day period while children received an average of 95 signals. Completion rates were approximately 90% for mothers and children, and did not differ between the ADHD and comparison group. Thus, even though some children in the study were as young as 8, the use of a PDA to learn about children's ongoing experience appears to be a very viable research method.

## **\*\* RESULTS \*\***

### **- Child Problem Behaviors -**

Compared to mothers of comparison children, mothers of children with ADHD were more likely to record their child as displaying problematic behavior when

prompted by the PDA. The specific results are as follows:

Impatience - 26% vs. 12%  
Restless - 34% vs. 7%  
Talking too much - 20% vs. 7%  
Too loud - 17% vs. 7%

Thus, during 26% of the nearly 100 recording intervals spread across the week, moms of children with ADHD rated their child as displaying impatience. In contrast, moms of comparison children observed impatience during only 12% of the intervals. The other problem behaviors can be interpreted in a similar manner. These results highlight that moms of children with ADHD felt themselves to be dealing with challenging behavior far more often, and provides an indication of the greater challenges they face on a daily basis, DESPITE the fact that their child was receiving medication treatment.

Interestingly, ratings provided by children did not show the same differences. In fact, children with ADHD did not report that they were engaging in these problem behaviors at higher rates than comparison children, and highly the significant discrepancy between maternal and child perception of children's behavior.

#### **- Child Mood -**

Mothers of children with ADHD were also more likely than moms of comparison children to observe their child in problematic mood states. The specific results are as follows:

Bored - 15% vs. 9%  
Sad/discouraged - 11% vs. 4%  
Angry/frustrated - 19% vs. 10%  
Stress - 14% vs. 11%  
Good mood - 71% vs. 79%

Thus, during 15% of the nearly 100 recording intervals spread across the week, moms of children with ADHD rated their child as displaying boredom. In contrast, boredom was observed by moms of comparison children during 9% of the intervals. The other mood states can be interpreted in a similar manner. Although these differences in observed mood are not as pronounced as differences in problem

behavior, they point to a consistent pattern in which moms of children with ADHD were more likely to see their child in a negative mood state and less likely to see their child in a positive mood.

In rating their own moods, differences between children with and without ADHD were also found. Specifically, in the mornings, children with ADHD were three times more likely than comparison children to report being sad (7.5% of morning recording intervals vs. 2.5%). They also reported over three times the rate of restlessness (14% vs. 4%).

There were also intriguing differences between weekend and weekday reports in children's self-reported moods. In fact, children with ADHD were over 10 times more likely than comparison children to report feeling stressed during the weekend, reporting this in 10% of weekend diary entries. In conjunction with the findings reported above, these results suggest that mornings and weekends pose special challenges for children with ADHD.

#### **- Time Spent Together: Negative Affect and Quality of Interactions -**

There were no significant differences in the percentage of recording intervals that mothers and children in the two groups reported being together. There were, however, important differences in the report quality of that time.

Group differences in mom's report of feeling angry when children were present were particularly striking. Mothers of children with ADHD were over one and a half times as likely to report being angry when they were with their child than when not with their child. They were also more than 3 times as likely to report disagreeing with their child, reporting this for 10% of the intervals when they were with their child vs. only 3% for comparison mothers.

This was echoed in children reports, as children with ADHD reported disagreeing with their moms in 7% of intervals vs. 3% for comparison children. Thus, although the absolute rate of reporting disagreement was relatively low, it was still a substantially more

common experience for children with ADHD and their mothers.

### - Parenting Perceptions and Quality of Day -

Mothers of children with ADHD were only half as likely as mothers of comparison children to report that their child made them feel good as a parent. They were also less likely to report feeling effective as a parent and to report that their child limited both their and their families' activities.

### \*\* SUMMARY AND IMPLICATIONS \*\*

The use of PDAs to provide snap shots into the experience of children with ADHD and their mothers at multiple times across a typical week provides a unique insight into the challenges that each experience.

Although all children were being treated with stimulant medication - the treatment approach that currently has the strongest empirical support - the daily experience of children with ADHD and their moms still differed in important ways from that of other mother-child dyads.

Specifically, children with ADHD displayed higher rates of symptomatic behaviors, including restlessness, excessive talk and loudness, impatience, and difficulty concentrating. Mothers reported that these types of problematic behaviors occurred anywhere from 2 to 5 times as frequently as mothers of comparison children.

In addition, children with ADHD were more likely to be seen by their mothers as angry, frustrated, and sad or discouraged and their interactions with their mothers were more likely to be marked by disagreement. Based on children's own reports, mornings and weekends were particularly challenging times, and they reported feeling stressed on the weekends over 10 times as often as comparison children.

Greater difficulty in the morning may be related to difficulties getting organized and ready for school. On the weekends, however, children's schedule is typically more flexible, so this would seem unlikely to explain their more frequently report stress.

Instead, this may relate to the difficulty children with ADHD often have in peer relationships, which could result in fewer opportunities to participate successfully in organized peer group activities such as team sports. This, of course, is quite speculative.

Although mothers of children with ADHD did not report more anger in general, their anger rates were elevated relative to other mothers when they were with their children. They were also more likely to report feeling ineffective as a parent and that their child was limiting their activities. This pattern of results suggests that children with ADHD "...may indeed have an impact on parenting interactions and the quality of family life, even when these children are being successfully treated with pharmacotherapy."

Overall, results from this intriguing study point to continued difficulties in the daily experience of children with ADHD and their mothers, and highlight that medication treatment - although it can be extremely helpful to many children - often fails to normalize children's behavior. Instead, residual difficulties often adversely impact the daily lives of children with ADHD and their parents. Of course, this does not necessarily apply to all children with ADHD and their parents, although the overall group trends were quite clear.

There are important limitations to this study that should be acknowledged.

The sample size was relatively small, and the period of data collection - 1 week - was relatively short. Also, the sample was predominantly middle class, and whether the findings would generalize to families of different socioeconomic status is unclear.

It should also be noted that the medication treatment received by these children was provided in regular community settings, which is often less carefully monitored and effective than what is found in clinical research trials. Thus, it is certainly possible that medication treatment provided in a more stringent manner would eliminate, or at least reduce, many of the residual difficulties that were clearly evident in this sample.

The clear discrepancies in the report of problematic behavior provided by children and mothers, with mothers reporting higher rates of symptomatic behavior, is also worthy of consideration. Whether mothers were "over reporting" or children were "under reporting" cannot be determined by this study, although biased reporting among parents of children with ADHD has not been found in prior studies.

Finally, it should be emphasized that one should not assume that problematic behavior in children with ADHD caused their mothers to feel angrier or less effective as parents. Cause and effect relationships cannot be established in studies like this, tempting though such inferences are to make.

Despite these limitations, the creative data collection methods used in this study provides us with a fine-grained assessment of the ongoing experience of children with ADHD and their moms. What has been documented is continued problematic behaviors and moods in children with ADHD, as well as negative impacts on mothers and families.

Such findings highlight the need to better understand the experience of children with ADHD and their families, the continued need to develop treatments that can complement benefits that medication can provide, and "...the need to extend treatment targets beyond the identified child to include parents and perhaps other family members." The study also documents the value that technology such as PDAs can play in helping us to better understand what it is like for children with ADHD and their parents.

**\*\* New Issue - A New Way of Thinking about ADHD: Barkley's Theory \*\***

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As implied in the title of his book, *ADHD and the Nature of Self-Control*, Dr. Barkley argues that the fundamental deficit in individuals with ADHD is one of self-control,

and that problems with attention are a secondary characteristic of the disorder.

Dr. Barkley emphasizes that during the course of development, control over a child's behavior gradually shifts from external sources to being increasingly governed by internal rules and standards. Controlling one's behavior by internal rules and standards is what is meant by the term "self-control".

For example, young children have very little ability to refrain from acting on an impulse - i.e. to "inhibit" their behavior. Instead, it is more typical for a young child to "act out" the things that pop into his or her mind. In addition, when a young child is able to refrain from acting on impulse, it is often because something in the immediate surroundings keeps them from doing so. For example, the child may refrain from throwing a toy when frustrated because his mother is present, and he knows he will be punished if he throws it.

This is different from an older child who may also have the impulse to smash a toy, but who does not act on this impulse because he/she can anticipate the following consequences:

1. He won't have the toy to play with later on;
2. His parents would be upset if he broke his new toy;
3. He would be upset for letting down his parents;
4. He would be upset because he let his temper get out of control - he let himself down;

In this example, the child has learned to "inhibit" and regulate their behavior based on internal controls and guidelines, rather than requiring the immediate threat of external consequences.

**- Self-Regulation as the Core Deficit in ADHD -**

Dr. Barkley argues that the critical deficit associated with ADHD is the failure to

develop this capacity for "self-control", also referred to as "self-regulation". He suggests that this results primarily for biological reasons, and not because of parenting.

As a result of this core deficit in self-regulation, specific and important psychological processes and functions subsequently fail to develop in an optimal way. These include the following:

\* **Working Memory**, which refers to the ability to recall past events and manipulate them in one's mind so as to be able to make predictions about the future. This is an important part of dealing effectively with day-to-day situations that Barkley feels is diminished in individuals with ADHD. In fact, recent research has documented a deficit in working memory in individuals with ADHD.

\* **Internalization of Speech**, which refers to the ability to use internally generated speech to guide one's behavior and actions. Think about how often you use internal speech - i.e., talking to yourself, to help regulate and guide your behavior and to solve problems you may be confronting. Dr. Barkley argues that this capacity develops later and less completely in individuals with ADHD.

\* **Sense of Time**, which refers to the ability to keep track of the passage of time and to change/alter one's behavior in relation to time. Consider how often one needs to evaluate the time required to accomplish a particular task and how the time you are devoting to a particular task compares to what is available, and what will be required for other tasks. Dr. Barkley suggests that for individuals with ADHD, the psychological sense of time is impaired, which prevents them from being able to modify/alter their behavior in response to real world time demands. This is seen, for example, in the adolescent who may become engrossed in a project and wind up spending far more time on it than should have been allocated, given other demands that need to be met.

\* **Goal Directed Behavior**, which refers to the ability to establish a goal in one's mind and use the internal image of that goal to shape, guide, and direct one's actions. This is an incredibly important capacity as it underlies consistent effort and persistence.

Imagine how much harder it would be to persevere through difficult and frustrating times if you were not able to hold a long-term goal in your mind. Dr. Barkley argues that individuals with ADHD have great difficulty doing this, and thus have difficulty with making a consistent effort to achieve long-term goals.

### - Implications of Considering ADHD a Disorder of Self-regulation -

Conceptualizing ADHD as a disorder of self-regulation, and not a disorder of attention, has significant implications for understanding the difficulties experienced by individuals with ADHD and how to assist them in coping more effectively with those difficulties. Below is a brief summary of Dr. Barkley's views on this.

First, he argues that individuals with ADHD may not lack the skills and knowledge to be successful, but rather, their problems with self-regulation often prevent them from applying their knowledge and skills at the necessary times. As Dr. Barkley puts it, "ADHD is more a problem of doing what one knows rather than knowing what to do."

For example, although a child with ADHD may "know" that sharing and cooperating are an important part of making and keeping friends, he may fail to apply this knowledge with peers because the immediate rewards associated with getting one's way overpowers the less salient goal of keeping a friendship. Or, the child may know the steps to follow to do a good job on a school project, but not act on this knowledge because of problems with managing time and using a long-term goal to guide behavior.

The treatment implication that follows from this conceptualization is that treatment should focus on helping individuals apply the knowledge they already have at the appropriate times, rather than on teaching specific knowledge and skills. This will require frequent external cues and reminders to apply this knowledge, because their internal guides for behavior are less effective.

For example, consider the child who does

not share and cooperate because the immediate payoff of getting what he wants is more salient than the long-term consequences this behavior has for his friendships. Dr. Barkley would argue that this child may not need to be taught "social skills", as he already knows the right thing to do. Instead, he needs to be provided with frequent reminders about how to behave during actual peer interactions. This could take the form of having the child review a short set of "social rules" immediately before a playtime with peers, as well as reminding the child of these rules at regular intervals during the playtime.

In regards to following classroom rules and getting work done, Dr. Barkley also emphasizes the need to provide external prompts. Writing rules down on signs around the classroom is one way to do this. Posting class rules on an index card taped to the child's desk is another. During work times, one possibility is to have the child wear headphones and listen to a tape that provides frequent reminders to stay on task, to write neatly, and to check one's work. In all of these examples, the principle is to compensate for the child's inability to control his or her behavior through internal means by providing as many external prompts and reminders as possible.

#### **- The Limitations of External Prompts and why Rewards are Necessary -**

Even when external prompts are provided, however, an important limitation is that their effectiveness remains dependent on the child's motivation to follow these rules rather than pursuing alternatives that may be more immediately appealing. Because individuals with ADHD are so attuned to immediate consequences, however, attractive short-term alternatives will often be pursued. To enhance the child's motivation to meet the behavioral expectations that have been set, therefore, he feels it is necessary to provide rewards and privileges for meeting those expectations that are more attractive and appealing than those associated with alternative behaviors the child could engage in.

What can make this difficult to do with children who have ADHD is the immediacy

with which rewards may need to be provided. For example, the problem with telling a child with ADHD that having a good week at school will result in a reward on the weekend is that it assumes the child can use the anticipation of this reward to guide their behavior over an entire week. According to Dr. Barkley, however, this is likely to be ineffective because it depends on the type of internalized control of behavior that he believes is deficient to begin with.

To overcome this, he argues that long-term objective must be broken down into numerous shorter-term goals, each of which has its own associated reward. For example, the special weekend treat may need to be supplemented by daily privileges that are contingent on the child's meeting specific behavioral expectations each day. Behavioral expectations for the day may need to be broken down into numerous shorter intervals during the day. Frequent reminders to the child about what those expectations are, and what will be attained by meeting them, may also need to be incorporated. Obviously, this is very difficult to do, and is one reason why implementing an effective behavioral treatment plan for a child with ADHD can be so challenging.

It is important to emphasize, however, that this approach is not equivalent to rewarding the child for simply doing what he should be doing in the first place, as is sometimes argued. As Dr. Barkley notes, "...the required response of others to the poor self-control shown by those with ADHD is not to eliminate the outcomes of their actions and to excuse them from personal accountability. It is to temporally tighten up those consequences, emphasizing more immediate accountability."

In other words, a child with ADHD is not "let off the hook" because of their condition. Instead, one needs to heighten the child's accountability in the form of more frequent checks and feedback on their behavior, supplemented by the provision of appropriate rewards and privileges when desired standards of behavior have been met.

- **Why Treatment Needs to be Ongoing and Long-term** -

Even when these principles are faithfully applied, recognizing that the behaviors seen in ADHD result from an underlying deficit in self-regulation implies that gains associated with treatment will not persist after treatment is discontinued. Thus, treatment reflects an ongoing effort to manage the child's symptoms rather than "curing" the disorder.

While this may be discouraging, Dr. Barkley also notes that as children with ADHD mature, their diminished capacity for self-regulation will mature as well. Thus, even though they may never fully catch up to their peers in this regard, their ability to guide and govern their behavior via internal means will nonetheless grow and develop. Over time, therefore, an individual's reliance on external sources of motivation will diminish, as will the required intensity and frequency with which these external sources are needed to be provided. Eventually, the adolescent or young adult with ADHD may learn to provide their own external prompts in the form of lists and other types of cues that prove to be effective, and to provide themselves with their own rewards for meeting their self-imposed standards.

Another treatment implication that follows from Dr. Barkley's model is that medication treatment may be effective because it normalizes, or at least improves, the underlying deficit in behavioral inhibition that he regards as the core feature of ADHD. Dr. Barkley reviews evidence for this contention in his book, and argues that medication is the only currently available treatment that has been demonstrated to produce such results. As such, he believes that it should be the predominant treatment approach for individuals

with ADHD.

- **Summary and Conclusions** -

Barkley's theory has been widely recognized as a significant advance in our thinking about ADHD that helps to organize a vast body of literature and clinical observations about the disorder. As with any theory, its ultimate value will depend on the amount of new research that it stimulates, and the information that is obtained from those studies.

One important point to note is that even if one agrees with Barkley's notion that ADHD is fundamentally a deficit of self-regulation, it does not necessarily follow that the interventions he advocates - basically, behavior therapy and medication treatment - are the only approaches to be pursued. Clearly, these are the interventions that currently enjoy the strongest empirical support. They are limited, however, in that neither is conceptualized as resulting in any enduring change in the child. External prompts and the provision of rewards are intended to compensate for the child's deficits rather than correct them and medication provides a short-term improvement in those deficits that vanishes when it has cleared the child's system.

What about the possibility of interventions that may result in more enduring changes in the child? The capacity for self-regulation and the other executive functions (e.g., working memory) that Barkley describes are ultimately the outcomes of aspects of brain functioning. Given what we know about the plasticity of the nervous system, especially at younger ages, is it possible that children with ADHD could be provided with specific cognitive training exercises and experience that might result in more enduring changes in their

functioning?

In the field of ADHD, this is the proverbial \$64,000 question. There are, in fact, intriguing hints that this may be possible. For example, recent research has demonstrated that computerized training of working memory skills is associated with a decrease in ADHD symptoms. Whether such changes are enduring, however, remains to be demonstrated. There have also been a number of studies of neurofeedback - a treatment approach that attempts to teach individuals to alter and control basic aspects of brain functioning - in which more enduring changes in the child have been suggested. At this point, however, far more research will be required to determine the value of these approaches and whether they are capable of producing any longer-term benefits.

In this regard, it is disappointing to find that when one surveys the research literature on ADHD, the number of studies that have investigated these types of approaches is extremely limited. Relative to the hundreds and hundreds of studies that have been published on behavior and medication therapy, the number of studies of treatments intended to result in enduring changes in the child is remarkably few.

Although research on behavior and medication therapy is clearly important, and the treatments that have emerged from this research has been beneficial for many children and families, it is time to also begin serious investigation of interventions that are intended to produce more enduring changes in children with ADHD. Let's hope that this is already occurring and that there will be interesting research on these issues that will emerge with greater frequency over the next several years.

*(Anyone interested in reading more about this can borrow the book which is in our library.)*

## **\*\* New Issue - Does Tutoring Help Children with Attention Problems? \*\***

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For children with ADHD, succeeding academically is often especially difficult. In fact, numerous studies have documented that academic underachievement is one of the most frequent consequences of the disorder.

There are a variety of reasons why this may occur. First, traditional instructional methods during elementary school may not be conducive to promoting learning in many students with ADHD.

Second, a significant percentage of children with ADHD also have specific learning disabilities; the presence of a learning disability can make it even more difficult for a child to acquire the basic academic skills needed to succeed in school.

Even when specific learning difficulties are not present, however, problems attending in the classroom can interfere with the acquisition of academic skills and knowledge. This has already been clearly demonstrated in a number of published studies, and one can easily imagine that a child who struggles with attention in class would fail to master these skills as well as classmates, even when the child was equally capable intellectually. As a result, this child would be less prepared to succeed in subsequent grades, and a downward spiral could have already begun.

One plausible approach to prevent this from occurring would be to identify children with attention difficulties during first grade, and provide them with extra assistance so that they acquire the critical skills necessary for academic success. For example, because attention problems may interfere with their mastering critical early reading skills, perhaps specialized tutoring would help them to learn things they would otherwise

miss out on, and thus provide a foundation for more solid academic success.

This was the premise of a study that my colleagues and I reported last year in the *Journal of Abnormal Child Psychology* (Rabiner, Malone, et al.,(2004). The impact of tutoring on early reading achievement in children with and without attention problems. *Journal of Abnormal Child Psychology*, 32, 273-284.). Participants in this study were 581 children who were part of a larger study designed to prevent the development of serious conduct problems in children at risk for this outcome because of early behavior difficulties.

Children randomly assigned to a treatment or control group; those in the treatment group received a comprehensive set of interventions designed to prevent the development of conduct problems. Of particular relevance to this study was 90 minutes of individual reading instruction that they received over the entire first grade year. Children who were randomly assigned to the control group received no such assistance.

All participants completed a standardized assessment of reading ability before and after first grade. In young children, such assessments examine the ability to recognize letters, awareness of letter-sound combinations, and to read simple words. Children who scored poorly on this measure prior to first grade were thus starting out with evidence of difficulty in their early acquisition of important reading skills. The assessment completed at the end of the year allowed us to determine how much progress in reading each child had made.

In addition to these reading assessments, teachers also completed a standardized behavior rating measure on each child at the end of first grade. Among the items rates were the inattentive symptoms of ADHD. This was not intended to provide a formal diagnosis for any child, but simply to quantify the level of attention difficulties during the year that had been observed.

As noted above, half the children received reading tutoring during first grade. This was a fairly intensive intervention and consisted

of 3 30-minute sessions per week over the entire year. The tutoring program emphasized a phonics-based, mastery-oriented approach to the development of initial reading skills. Tutoring was provided by paraprofessionals who had received over 40 hours of training in the program and who were closely supervised during the year.

Our particular interest in this study was to examine whether the presence of attention difficulties resulted in tutoring being less helpful, both for children with and without evidence of early reading problems. The primary question of interest was thus whether the benefits children derived from tutoring depended on their level of attention problems. We made the following predictions:

1) Children without early reading problems but with attention problems will fall behind in reading if they do not receive tutoring; this hypothesis was based on prior findings that attention problems interfere with the acquisition of early reading skills.

2) Children without early reading problems but with attention problems who receive tutoring will make adequate progress in reading during the year; this hypothesis reflected our belief that tutoring would provide these children with skills they would otherwise miss out on and enable them to keep pace with their peers.

3) Children with early reading problems but without attention problems who receive tutoring will make excellent progress during the year; this hypothesis reflects the fact that this was a well validated tutoring program that would help children struggling in their early reading development.

4) Children with early reading problems and attention problems who received tutoring would progress less, but would still show clear signs of progress relative to similar children who did not receive tutoring; this hypothesis reflected our belief that although attention difficulties might somewhat undercut the beneficial effects of tutoring, these benefits would still be apparent within this group.

## RESULTS

Do the benefits children derived from tutoring depended on their level of attention problems?

The results we obtained indicate the answer to this question is clearly yes. Specifically, we found that at low levels of attention difficulties, children who received tutoring had substantially higher achievement scores after first grade than children who were not tutored. As children's attention difficulties approached the level that is often seen in ADHD, however, the beneficial affects of tutoring were substantially reduced. Because we controlled for a number of other factors that may have influenced children's reading achievement, including IQ, parental involvement in school, there is a strong basis for concluding that attention difficulties were the critical factor in whether or not tutoring was likely to be beneficial.

What about results for our specific hypotheses?

**Hypothesis 1 - Children without early reading problems but with attention problems will fall behind in reading if they do not receive tutoring;**

This hypothesis was supported. By the end of first grade, children with no early reading problems but who were inattentive during first grade had reading achievement scores that were now significantly below other children.

**Hypothesis 2 - Children without early reading problems but with attention problems who receive tutoring will make adequate progress in reading during the year;**

We found partial support for this hypothesis. These children did not fall as far behind as children with attention problems who were not tutored, but they also did not make as much progress as children without attention difficulties. In fact, if the trend we observed continued for another year, they would have fallen significantly behind.

**Hypothesis 3 - Children with early reading problems but without attention**

**problems who receive tutoring will make excellent progress during the year.**

This hypothesis was strongly supported - in fact, by the end of the year, reading scores for these children were no longer significantly below average. This provided clear evidence that the tutoring program was effective for children who entered first grade with early signs of reading difficulty, but who were not inattentive.

**Hypothesis 4 - Children with early reading problems and attention problems who received tutoring would progress less, but would still show clear signs of progress relative to similar children who did not receive tutoring.**

The results we obtained here were quite unexpected. To our surprise, we found that for children with both early reading difficulties and significant attention problems, there was no evidence of any benefit from tutoring. That is, children with these characteristics were still far below average in reading at the end of first grade, regardless of whether they had been tutored. In fact, those who were tutored did not score any higher than those who were not.

## DISCUSSION

We began this study hoping to document that identifying children with attention problems during first grade, and providing these children with specialized tutoring, would enable them to make good progress in the acquisition of early reading skills.

To our surprise and disappointment, however, this was not the case. Although tutoring was quite helpful for students with good attention skills, children with attention difficulties were found to benefit far less. In fact, among children with both attention problems and early reading difficulties, we found no evidence of any benefit from tutoring.

There are several reasons why these results should not be interpreted to mean that tutoring and other forms of specialized academic help are a waste of time for children with ADHD. First, we were not

working with a diagnosed population. Second, participants in this study also had high levels of acting out behavior problems, which is not the case for many children with ADHD. Third, our sample was restricted to first graders and it is quite possible that tutoring older children with attention difficulties would be more beneficial. Fourth, the tutoring we provided was restricted to reading, and tutoring in other academic subjects may have been more helpful. Fifth, and most importantly, it is possible that the specific tutoring program we used would need to be modified to provide greater benefits to students who struggle with attention difficulties.

sure to include them in Attention Research Update.

Because of all these issues, it is definitely not the case that parents and educators should stop pursuing efforts to provide extra academic help for students with ADHD. Doing so would represent a strong misreading of what can be concluded from this study.

What these results do clearly suggest, however, is that we cannot assume that academic interventions that are quite helpful for students with academic problems but good attention skills will prove equally helpful to students who also struggle with attention difficulties. Thus, the results underscore the pressing need to develop and research alternative interventions that may be more effective in promoting academic success for students with attention difficulties. In fact, an unfortunate truth in the current research literature is that there is currently no intervention for children with ADHD that has been conclusively demonstrated to promote long-term gains in academic achievement.

As a result of this study, I chose to pursue research on alternative interventions to boost academic achievement in students with attention difficulties. Currently, I am getting a study underway in which we will test whether computerized attention training and computerized instruction in basic academic skills will help inattentive first graders make better academic progress. The results from this study are at least 2-3 years away, and hopefully promising results from similar types of investigations will be published in the interim. If they are, I will be