

Attention Deficit Disorder

Practical Coping
Mechanisms



Second Edition

Edited by
Barbara C. Fisher, Ph.D.

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*Brain Evaluation/United Psychological Services
Washington Township, Michigan, U.S.A.*

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I dedicate this book to my father and to my son:

My father, whose will and determination carried him through so many serious medical crises this year. He is a man of great strength, and our family feels blessed to have him with us still.

My son, who has risen to the occasion to become my partner in business and whose wisdom, insight, and counsel I have come to rely upon so much.



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Preface

The biggest challenge of specializing in the diagnosis and treatment of attention deficit disorder and attention deficit hyperactivity disorder (ADD/ADHD) for the last 15, going on 20, years has been the controversy and the vast array of opinions regarding one disorder. I recall being on a panel with rather esteemed colleagues for a large pediatric conference several years ago. Every time the audience asked a question, none of us agreed with one another. While attempting to be polite and not to dispute one another publicly, it was rather clear that no one agreed on what ADD/ADHD was and what it wasn't. The result was a lot of confusion for the public, who probably left this meeting with more questions than answers.

Since that day I have always dreamed of having a book in which professionals from all types of disciplines could express their opinions about this rather controversial and disputed over- and under-diagnosed disorder in order to help other professionals and the public to have a better sense of exactly what ADD is. Although there are opinions expressed in this book that differ based upon the discipline of the writer, there are even more themes that are similar and represent agreement in the field. Many, many books have been published on ADD/ADHD. What makes this book different is that its contributors and the wide range of professionals who contributed their opinion represent one of the first times — if not the first time—that experts from all of the professional fields—functional medicine; neurology; sleep medicine; psychiatry; cardiology; neuropsychology; psychology; family practice; academic, speech and language pathology; tutorial, weight/nutrition, and respiratory therapy,—united their efforts. I hope that this will be the beginning of a new era in the world of ADD/ADHD, where professionals from different disciplines gather to exchange knowledge rather than to dispute one another in their correct opinion. I am also hopeful that there will come a day when professionals agree wholeheartedly on a specific test battery to evaluate ADD/ADHD (similar to what we already have in terms of cognitive, intellectual, and achievement assessment). When this occurs I predict that the confusion around what ADD is, and what it isn't, will be resolved rather quickly. In using a test battery to evaluate ADD/ADHD, the process starts with evaluation and then rules in clinical symptoms—as opposed to beginning with symptoms and trying to prove their existence by evaluation. The latter process has not been successful and continues to be unsuccessful, succeeding only in creating more confusion and more controversy as professionals cling to their belief system, which has not been validated by evaluation. What we have been doing so far has not worked. Everyone agrees that ADD/ADHD is overdiagnosed and underdiagnosed—that the diagnosis of ADHD masks disorders that become worse due to lack of diagnosis, and that treatment becomes equally problematic for the same reasons.

The various chapters describing sleep disorders will serve to illustrate the tremendous overlap we are finding between attention deficit disorder with hyperactivity and sleep deprivation, upper airway resistance syndrome, frank sleep apnea, periodic limb movement disorder, and restless legs syndrome. In citing the various sleep disorders that can create sleep deprivation and/or daytime sleepiness, it is essential to rule out such possibilities prior to the diagnosis of attention deficit disorder with hyperactivity. Treatment begins with the assessment process and encompasses a range of interventions—from medication to cognitive therapies to compensatory strategies and various tools that can be implemented to improve anyone's quality of life—with the goal being graceful aging. Accurate assessment is a pivotal component in the development of a treatment plan that has greater odds of being successful due to the clear delineation of primary versus secondary problematic attention symptoms.

This book illustrates that attention deficit disorder with hyperactivity is not solely a behavioral problem, nor is it solely a cognitive issue, and it certainly is not immune to the overlap of an assortment of undiagnosed syndromes and disorders that contribute to its symptom manifestation. Treatment takes its power from the accuracy of the diagnosis and the combined forces of treating professionals from diverse backgrounds working together to solve an equally diverse disorder.

I am grateful to the authors, leaders in their respective fields, whose contributions are contained in this book, and I hope that this book will set the stage for professionals to work together, exchanging information with one another and working towards the common goal of helping a child, adolescent, adult, and aged person to be the best that they can be. ADD/ADHD never needs to be the reason that a person does not maximize their skills or fulfill their dreams. We can control the symptoms of ADD/ADHD with knowledge; there is absolutely no reason it ever has to control us. It is a new day with new horizons, new treatments, and new solutions to a problem affecting so many—we have many choices and more solutions than we know.

Barbara C. Fisher



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Contributors

Kathy Albrecht Fisher Academy, Washington Township, Michigan, U.S.A.

Donna Lynn Antonucci Department of Pediatrics, Children's Hospital of Philadelphia, St. Christopher's Hospital for Children, and Private Practice, Neurodevelopmental Pediatrics, Philadelphia, Pennsylvania, U.S.A.

G. Avci-Wolf Avci Medical Center, Waterford Township, Michigan, U.S.A.

Karla M. Dzienkowski Restless Legs Syndrome Foundation, Rochester, Minnesota, U.S.A.

Barbara C. Fisher Brain Evaluation/United Psychological Services, Washington Township, Michigan, U.S.A.

Christian Guilleminault Sleep Medicine Program, Stanford University, Stanford, California, U.S.A.

Wayne A. Hening Department of Neurology, University of Medicine and Dentistry of New Jersey, Robert Wood Johnson Medical School—New Brunswick, New Brunswick, New Jersey, U.S.A.

Yu-shu Huang Department of Child Psychiatry, Chang Gung University, Taiwan

Patricia Jason Cognitive Precision Therapy, Washington Township, Michigan, U.S.A.

S. Korotkin Cardiology Associates of Birmingham, Bingham Farms, Michigan, U.S.A.

Maria Cecilia Lopes Sleep Disorders Clinic, Stanford University, Stanford, California, U.S.A., and Department of Psychobiology, Federal University of Sao Paulo, Sao Paulo, Brazil

Rafael Pelayo Sleep Disorders Clinic, Stanford University, Stanford, California, U.S.A.

Daniel Picchietti University of Illinois and Carle Clinic Association, Urbana, Illinois, U.S.A.

Megan Rauch Great Lakes Sleep Diagnostics, L.L.C., (GLSD) Canton, Michigan, U.S.A.

Gerald Mark Rosen Department of Pediatrics, University of Minnesota School of Medicine, and Pediatric Sleep Laboratory, Children's Hospitals and Clinics, St. Paul, Minnesota, U.S.A.

Ronald C. Savage North American Brain Injury Society (NABIS), Lash and Associates Publishing and Training, and Graduate, Program in Traumatic Brain Injury, The George Washington University, Washington, D.C., U.S.A.

Pamela W. Smith Board of the American Academy of Anti-Aging Physicians, The Center for Healthy Living and Longevity, and American Academy of Anti-Aging and Functional Medicine Fellowship, Gross Point Farm, Michigan, U.S.A.

Bharat M. Tolia Comprehensive Neurology, Headache and Pain Center, Bloomfield Township, St. Joseph Mercy Hospital, Pontiac, and Department of Neurology, Wayne State University, Detroit, Michigan, U.S.A.

Nancy Torgerson Fisher Academy, Washington Township, Michigan, U.S.A.

Arthur S. Walters Center for Sleep Disorders, Treatment, Research and Education, New Jersey Neuroscience Institute, JFK Medical Center, and Department of Neuroscience, Seton Hall University, School of Graduate Medical Education, Edison, New Jersey, U.S.A.

Sharon Witberg Sterling Heights, Michigan, U.S.A.

K. Wrobel Cognitive Precision Therapy, Washington Township, Michigan, U.S.A.

Ara H. Yardumian Bally Total Fitness—Ann Arbor, Ann Arbor, Michigan, U.S.A.

Pearl Lee Yu Department of Pediatrics, University of Virginia School of Medicine, and Pediatric Sleep Disorders Program, University of Virginia Children's Hospital, Charlottesville, Virginia, U.S.A.

SECTION A
Defining ADHD and Its Subtypes

**Part I: What Is ADD/ADHD? Diagnosing
This Disorder Through Time**

Barbara C. Fisher

*Brain Evaluation/United Psychological Services,
Washington Township, Michigan, U.S.A.*

INTRODUCTION

Attention deficit disorder (ADD) has been historically defined as a genetic, biochemical disorder that affects two neurotransmitters involved in providing focus and attention to the brain. One of the few things that professionals diagnosing and treating ADD/attention deficit with hyperactivity disorder (ADHD) agree upon is that there is a genetic inheritability affecting the neurotransmission system serving the attentional brain areas. Beyond that, the field remains in dispute as to what constitutes ADD/ADHD versus the presence of another disorder presenting similar traits or symptom overlap.

Dr. Antonucci, citing the pathophysiology of ADHD as complex, suggests the presence of genetic influences that interact with environmental factors, toxic insults, and physical assault on the brain. Dr. Savage separates the developmental genetic version of ADHD from the acquired secondary attentional disturbances incurred with traumatic brain injury. In approaching ADD/ADHD from a functional medicine viewpoint, Dr. Smith documents the physiological influences of amino acid deficiencies, hormonal, and nutritional imbalance. Dr. Korotkin discusses the connections and interactions between ADHD and the cardiovascular system, reporting the increased incidence of heart-related defects in the child and adult population.

Specific sleep disorders overlap with attention symptoms more likely exacerbating the ADHD disorder although at times the sleep disorder may be responsible for the primary manifestation of symptoms. The idea that mild ADHD like behaviors can be misperceived—and the sole result of a sleep disorder—is a theoretical construct tendered by the foremost sleep neurologists in the sleep field writing on topics of sleep disordered breathing, restless leg syndrome (RLS), periodic limb movement disorder (PLMD), and additional sleep disorders that carry the risk of sleep deprivation and daytime sleepiness. Hyperactivity is often the child's response to daytime sleepiness and is often misinterpreted as a behavioral sign of ADHD. Drs. Huang and Guilleminault, in presenting the risk factors for a sleep-related breathing disorder, suggest a routine rule out when diagnosing ADHD due to the symptom overlap and exacerbation of attention symptoms. In one study,

treatment for the sleep disorder exceeded treatment for the attention problems. Drs. Walters, Hening, Picchiotti, and Dzienkowski have done extensive research on the overlap of ADHD, PLMD and RLS with both adults and children citing a genetic inheritability common for both disorders, a common neurotransmitter system, sleep disruption and low ferritin as co-related factors. The impact of sleep disruption and deprivation on factors of inattention, behavioral disruption and hyperactivity related to the above sleep disorders (in addition to other sleep disorders such as insomnia) is the reason why Drs. Pelayo and Lopes caution anyone diagnosing ADHD to first rule out the presence of a sleep disorder. Rauch presents the picture of normal sleep throughout the developmental life span. Given the two roads, sleep and seizure when considering any type of brain injury in children or adults, Dr. Tolia discusses the use of the diagnostic electroencephalogram EEG as a powerful tool to separate out seizures from ADHD symptomatology.

The brain system suspected as being primarily involved in ADD/ADHD is anterior based upon symptom description and the assumption of executive reasoning/frontal lobe dysfunctioning. While radiological studies have confirmed this localization hypothesis comparing ADHD to normals, the neuropsychological test studies have not. In other words, when attempting to actually test this hypothesis on brain behavior test measures, executive reasoning deficits did not significantly differentiate the ADHD population. The question is raised as to whether the radiological studies actually ruled out co-related disorders when comprehensive testing was not associated with these studies.

We are currently in process of analyzing some of the data collected over a fifteen year span of diagnosing ADD/ADHD in children, adolescents and adults, using a specific battery of tests designed to measure attentional attributes—specifically cognitive and processing speed, information processing deficits, distractibility, slow and fast paced verbal and non-verbal input and visuospatial deficits. This battery is described in depth in the chapter on assessment. Starting with females, age 5 through adulthood, we excluded those individuals on whom I had completed assessment beyond the initial attention battery to rule out additional neurological concerns beyond that of ADD. With the population that was left (490 adults and 126 children) we then proceeded to analyze the trends noted on the self report measures completed by the parent, the teacher and the adult (being evaluated for ADD/ADHD). Preliminary results suggested only one attention symptom (distractibility) that was of significant concern for parents of children in kindergarten through 6th grade on an attention self-report measure. There were no significant attention symptoms that emerged when parents of mostly 7th and 8th graders (age range to 14 years) completed the same self-report measure. However the teachers of these children indicated symptoms of failing to finish things or carry out assigned tasks, concentration, daydreaming and distractibility. Teachers did not indicate significant symptoms of either the hyperactive or the combined subtype. Adults (age 15 years and upward) reported significant concerns of depression, anxiety, fatigue and memory loss. The only attention symptom of concern that was reported was concentration.

What this points to is that when assessing ADD on neuropsychological test findings and excluding those individuals felt to have additional neurological concerns beyond that of ADD, the population exclusively isolated was ADHD Inattentive Type. Granted these are preliminary findings and those of a single neuropsychologist in private practice thus requiring further confirmation. That being said, the results still clearly suggest that after ruling out co-related disorders, on

testing completed over a fifteen year period of time, the real ADD that emerged via symptom report was the inattentive subtype. Given that there was a significant percentage of the population excluded due to the finding of additional concerns warranting further evaluation—in many cases resulting in additional disorders being diagnosed—points to the diversity of this population, which may be the reason there is so much confusion in ascertaining what ADD actually is.

Consequently, the following presentation references ADHD inattentive type as the genetic ADD disorder or the “real ADD.”

BIRTH TO AGING

Throughout the book there are references to ADD, as well as ADHD and the words “attention deficit disorder.” To clarify, when I am using the term “ADD,” I am referencing the developmental genetic attention disorder, primarily characterized by inattention accompanied by the long term problems of reading and emotions (mainly anxiety) which I affectionately term, “the garden variety ADD.” The term, ADD/ADHD, is used to describe this disorder as my contemporaries use it. I will present reasons in the following chapters as to why I maintain that labeling everything ADHD has created untold confusion for professionals as well as parents and diagnosed adults. Too often the disorder meeting the hyperactive and combined subtype criteria, typically associated with ADHD, represents either another disorder entirely or an additional disorder to the developmental ADD. Attention symptoms are exacerbated accompanied by additional symptoms typically involving the memory or frontal processes or both of these brain areas.

There are those who believe that ADD crosses the life spectrum while others continue to argue that ADD is a childhood disorder that is resolved by late adolescence/young adulthood. The criteria necessary to diagnose ADD in an adult is the documentation of learning difficulties and/or ADD symptoms in childhood. This documentation may be school records or the adult’s recollection of not enjoying school. This can be problematic for many reasons. Firstly, a bright individual may not report struggling through school. Secondly, if the person is middle aged—the time period when previously dormant symptoms that the adult was able to compensate for, may emerge due to exacerbation of stress, nutritional and hormonal factors—the structure in school precluded attention symptoms from emerging as well as the absence of the fast pace currently seen whereby children must attend preschool to keep up and kindergarten is actually first grade on an academic level. Thirdly, college was not as demanding allowing a full two years to wander around until finding one’s expertise, perfect for the ADD individual, allowing time for maturity and development of study skills. Consequently, today ADD is more evident for a number of reasons, one of which is the fast pace requiring advanced thinking skills earlier in life.

In using a specific battery comprised of a group of tests assessing attention symptoms, the child, adolescent or adult is evaluated on brain behavior measures removing the “guess work” associated with a symptom based diagnosis. In using these specific tests for almost 20 years, an unmistakable pattern is evident on a continual basis on each and every test profile. I have tested individuals as young as five years of age and as old as 75 years whereby the same pattern remains evident. It is in continually observing the same pattern repeated on test measures across gender, age, socioeconomic status and education, that my theoretical foundation used to define what ADD is and what it is not is formed. Test findings led to

the conclusion that ADD is a developmental disorder spanning the life span, with the propensity to appear differently depending upon the age related demands.

In evaluating children, adolescents, and adults for many years, specific patterns have emerged on the neuropsychological test battery routinely administered, which have been replicated over time. In completing reevaluation anywhere from a few years to five or even 12 years later, the pattern has been specifically replicated (sometimes with score discrepancies of only a few points). Re-evaluation with this specific test battery points to the stability of these test measures as well as the diagnosis of ADD over time despite ongoing use of stimulant medication over a period of two to twelve years. Test results confirmed the short-term effects of medication and the long-term impact upon brain function. The long-lasting effect of ADD symptoms is further confirmed by patient reports of the same persistent symptoms throughout their lives. It would be interesting to see how test results fare in the future especially when individuals have addressed nutritional, hormonal and amino acid imbalances with treatment. We have not completed enough re-evaluation to separate out developmental ages and to ascertain if ADD symptoms reported as worsening with age, menopause and stress, affects these test results.

It has been my experience that different symptoms emerge at varying times or developmental ages, depending upon individual and environmental variables, much of the time related to academic and work demands. For example, ADD symptoms seen with the inattentive type usually manifest when reading and independent work are required in the school setting. When children have to read and write for longer periods of time or be responsible for their own work, avoidance and procrastination emerges often hiding reading difficulties. There are nodal periods or specific developmentally related time periods, whereby there is a greater likelihood for genetic attention problems to emerge. For example, the third grade is a primary demarcation, the first time in the child's academic career that independent work is required, meaning that the child has to produce something on his or her own. That "something" is usually a written document based upon material that the child was supposed to read and understand. These tasks are directly affected by ADD symptoms, specifically the long-term consequence of management of attention symptoms. Because we know that this is a disorder with specific symptoms that remain rather stable through time despite the intervention of medication, we also know that medication treats the symptom, not the problem. In contrast, a cognitive training program used in treatment over the past five/six years is proving that changes in brain function can produce changes in the manifestation of ADD attention symptoms, specifically the reading difficulties associated with the long-term compensation of ADD deficits.

TELLING PARENTS AND CHILDREN ABOUT ADD

It is important to tell a child diagnosed with ADD that this is a genetic disorder inherited from one or both parents. This actually attaches the feelings the child may have about it to the family as opposed to making him/her feel isolated or alone with the disorder. I make the point that having ADD is akin to requiring glasses to see: that there is nothing wrong with their brain, they are simply in need of some help. This help may come in the form of medication, cognitive training, behavioral therapy, coping mechanisms and strategies, and/or some other type of therapy. The impact of having ADD varies from person to person. Some people may have more problems with distractibility, while others may find difficulties in

information processing or thinking speed. As the brain becomes taxed in compensating for problem areas, the spatial issues become more problematic; the more the compensation, the more severe the visuospatial deficits. Testing and follow-up becomes very important if medication is prescribed in determining its impact.

ADD tends to be diagnosed by a wide variety of healthcare professionals using varying means of testing. Commensurate with the gold standard the ADD diagnosis may be totally based upon self-report measures. Unfortunately this lack of standardized testing leads to confusion and misdiagnosis for many patients. Those in the field generally agree that neuropsychological testing along with self-reporting is the most effective means of diagnosis for ADD. Indeed, neuropsychological evaluation is now a requirement when completing necessary testing to qualify for testing accommodations for national and state examinations.

The problems with relying upon self-report measures to diagnose ADD are numerous, specifically documented in one of the following chapters. An individual may not recognize the existence of a symptom in a particular setting or the person may already be compensating for the symptom without realizing it. In addition, some symptoms mask other symptoms relating to other underlying problems. As mentioned previously, problems attributed to ADD are often made in a child's early academic career. While learning problems are typically defined as a significant difference between cognitive functioning and achievement, this gap is not always present in an ADD student.

INDICATIONS TO TEST FOR ADD

There are three primary indications for which testing for ADD may be recommended:

- Slow reading speed
- Completion of in class and homework assignments, language output problems
- Poor grades, dislike or feeling neutral about school

Slow reading speed and reading comprehension more often occur jointly, contributing to one of the primary reasons that children feel ambivalent about school. As such reading is the first area of testing and intervention often occurring within the school setting related to making a decision regarding additional school services. Reading is difficult for someone with ADD due to decoding problems, such as learning phonetics, difficulty chaining letters to make words, and spatial problems. Decoding problems resulting in slow reading speed do not provide sufficient fluency to comprehend what one is reading while reading the passage. As a result, a passage must be read several times after the initial reading in order to understand and gain sufficient meaning to respond correctly to comprehension questions. In short, comprehension and decoding cannot occur at the same time. Decoding has to be over learned, reading has to be sufficiently fluent to picture the words and their meaning as the person is reading. This is the reason why ADD individuals will sometimes read out loud. Reading out loud enhances their ability to "hear" what they are reading. Testing that I have completed over time, documenting the presence of an attention disorder is always accompanied by a spatial problem seen as the primary culprit for the specific type of reading problems seen in the ADD population. This is further confirmed by the miraculous reading recovery that occurs once the person has completed a cognitive training program that specifically addresses spatial/parietal functioning.

Language output problems are the result of the dual issues of language (lack of vocabulary development related to decreased reading) and emotions, seen in the avoidance and procrastination of all papers and homework that need to be completed in written form. Children will usually get a project done that involves drawing, cutting or pasting. However, when it comes to writing, all of their fears set in. The problem is not so much language output (characteristic of frontal deficits) instead the problem relates to the fears the child has of being criticized by the teacher due to misunderstood directions leading to incorrect completion of the paper. Deficits in information processing resulting in missing pieces of information and ultimately misunderstanding of oral as well as written instructions and directions typically leads to incorrect completion of the assigned task. The child may have misunderstood the teacher and/or misread the directions of the paper they were supposed to complete. Once they have experienced the shame of their paper being returned to them marked incorrect, their fear heightens igniting increased avoidance and procrastination. It is typical for the ADD individual to miss little bits of instruction or directions, labeled an auditory processing problem, resulting in the information dropping out, not reaching higher levels of the brain for use. The information which has dropped out is the reason why the ADD person adamantly asserts that they never heard the instruction or direction and never had the conversation.

Small pieces of directions and instructions can be missed such as page references or what math problems to complete. Directions on tests may be misread, which is characteristically problematic on tests using multiple choice questions. Gradually ADD individuals avoid reading directions all together, using logic to fill the gap of missing pieces of information to figure out computer program or how to assemble something. The result is that they learn to use logic and to guess. This system transfers to the reading issue resulting in an enormous amount of word substitution when reading—the child reads the first three letters and guesses at the remainder of the word. Deficits of information processing results in the described symptoms of missing directions in class, not taking the time to read the directions, and/or needing to have directions repeated. Distractibility is another reason for poor language output, a culprit for unfinished tasks. Internal thoughts and environmental interruptions contribute to task non-completion. Distractibility may lead to “forgetting” the assignment at home that the child spent all night with the parent completing. Usually distractibility is fueled by anxiety when this situation occurs.

Poor grades, dislike of or feeling neutral about school by definition leads to a lack of development of study skills, careless work, assignments not turned in on time, as the cyclical spiral fueled by anxiety completes itself in a closed system with avoidance, and procrastination operating at the primary symptom. Fear built up to irresolvable proportions, creates avoidance and non-completion of the task. Non completion of the task and anticipated criticism results in further avoidance of the parental figure. The avoidance becomes widespread as the child avoids the parent predicted as disappointed and the teacher assumed to be similarly unhappy. As the child becomes used to and ensconced in the pattern of avoidance the thought of poor grades takes on less significance, with the advent of depression and accompanying apathy and the cyclical spiral has now become a system that is highly resistant to treatment or intervention.

Infiltrating the system that has gradually developed into a total aversion to school becomes a rather “heady” task as it means confronting a child who is more committed to not working than trying to learn. By this time the child’s belief system is well developed around the concept of not being smart making it difficult to

convince them otherwise. Time away from school during breaks, while providing temporary relief, brings no resolution.

Our cognitive training program has been surprising in being able to break through this system previously impervious to all of my efforts at treatment. As the child experiences unprecedented success, their self esteem allows them to take risks that their brain is now prepared for and they gradually agree to either read more or learn the skills necessary to read. When this cycle is not broken, parents become worn out trying to get through to a child who remains resistant to their efforts. Punishment does not change their behavior as their dislike of school supercedes the loss of a toy or privilege. Gradually, the parent tired of arguing and the all night efforts to complete work that the child forgets to take to school, avoids homework similar to the child.

Following the cognitive training program, having broken through to the child is when homework times can be structured and study habits developed.

The following response was provided by a 13 year old girl to answer the question raised by her treating psychologist as to why she did not like school. At the time she was failing all of her classes and did not care. Her responses were reproduced on a note given to me prior to her evaluation for ADD.

PROFILE OF A TEENAGER WITH UNDIAGNOSED ADD

A 13-year-old girl's thoughts of school:

"I get cramps a lot when I write."

"I do not like school at all."

"My homework load is usually overwhelming."

"I get headaches when people try to explain things over and over, changing words around—that becomes confusing for me."

"I cannot spell very good."

"I feel like I am going in circles (written "cyrclcs") when people talk in class."

"I feel like I should be doing better things than sitting there trying to comprehend what people are explaining."

"I do not have very good study habits (written "habbits")."

"I feel really dumb in class when everyone else gets it and I don't."

"I can't wait until the day is over and I often look at the clock (I know that lunch is just over 1/2 of the day.)"

What is so striking here is that no one thought that this girl had symptoms of an attention disorder. She was not a behavior problem in class, the teacher did not find her inattentive and she never discussed school as being difficult for her. The focus had remained upon her dislike of school not her academic competence. Her testimony provides one of the more classic pictures of ADD inattentive type. Evaluation confirmed the pervasive presence of an attention disorder that resulted in mostly average scores which represented a significant discrepancy from evidence of superior potential that she was unable to mobilize or use. The result was feeling overwhelmed and inadequate, which eventually created her dislike of school.

PEER RELATIONSHIPS CAN BE PROBLEMATIC

Social life can be quite difficult for the ADD child, escalating into more painful experiences as an adolescent that may or may not be resolved in their adult life.

Social difficulties can be attributed to several different issues from the underlying pervasive anxiety, creating fear of peer rejection to the effects of anger and depression as school becomes more difficult and self-esteem lowered. The ADD child who is struggling in school has difficulty finding a happy medium socially. They tend to either withdraw from social interactions remaining shy and worried about peer acceptance or they throw themselves into social activities with the primary goal of being the most popular child. It takes extra effort to learn adequate social interaction as attention symptoms such as distractibility and information processing deficits result in social mistakes and the tendency to miss the social subtleties that are critical to positive peer relationships. Spatial issues emerge in body language, missing the whole picture resulting in the tendency to say the wrong thing at the wrong time, misinterpreting the nonverbal cues or something as simple as missing the punch line of a joke are common reasons for ADD children to retreat from social interactions. Avoidance of social situations results in less practice and more anxiety. Low self-esteem and self-doubt becomes cemented by anxiety and a sense of hopelessness. The already anxious ADD child finds their anxiety escalating in social situations that remain awkward until they have sufficient encounters to finally become comfortable, thus the two roads: the child who withdraws versus the child who makes social adjustment a primary goal.

DESCRIPTIONS OF COMMONLY SEEN SYMPTOMS OF THE “REAL ADD”

ADD Means . . . Being Distracted

- You are late to everything because it is hard to resist becoming distracted as you walk out the door by the toy left out, the plant that has fallen to the ground, the dirty dish in the sink
- Distraction is worse when you are in a hurry, when your mind is preoccupied, and when you are stressed
- You are thinking many different thoughts all at the same time
- You are trying to multi-task but you forgot the first task that you were working on while trying to complete the second task
- Your efforts to be more efficient do not work as you never come back to complete the first task once leaving to complete the second task
- You are caught playing with an object and accused of not listening or attending to the conversation by the teacher, by your friend, by your spouse, or by your child
- You become preoccupied with looking out the window
- You lie in bed and remember all the tasks or things you said you were going to do and forgot to do
- You feel like you are traveling on a fast train much of the time. The fast train has too many frequencies, too many radio stations and too much noise

ADD Means . . . Information Processing Problems

- You miss pieces of information
- You may be misdiagnosed with a central auditory processing problem
- You miss little bits of information—not the big things
- You miss the time, date, or place of a meeting

- You miss the correct page number or homework items discussed
- You miss segments of a business meeting
- Your spouse thinks you do not listen
- It can create many arguments and lots of people thinking that they are right—all at the same time
- Arguments that no one wins given the total lack of agreement on the exact conversation that actually took place
- Arguments that center around who said what and when

ADD Means . . . Spatial Issues

- As a child learning phonics as the blueprint for language and grammar rules is highly problematic
- Difficulty with phonetics leads to the tendency to memorize words using a whole word approach
- Reading remains difficult unless you read often to develop fluency. If this does not occur then you have to read and re-read the paragraph to know what it says
- There is difficulty with comprehension questions due to not having an understanding of the paragraph you supposedly just read
- Dislike or reading and anything associated with reading
- Difficulty with handwriting as well as with drawing designs (unless able to break the design down logically into its component parts)
- Poor fine motor coordination and skills unless particular asset area
- A tendency to miss things written by the teacher on whiteboards and overheads
- Misreading multiple-choice questions, which increases with added anxiety
- Difficulty with time management
- You do not add up events and underestimate the time they each take in a given day so you are always trying to do too many things without time to do them
- You miss the whole picture
- Math was okay in elementary years—algebra and equations are hard . . .
- geometry is even tougher
- You have problems with foreign languages
- You find it difficult to assess the whole situation

Life as an ADD Adult Means

- You take too long to make decisions . . . or you make them too quickly without considering all of the consequences
- You live in fear—all of the time
- You tap, you dance, jiggle, touch, and play with everything

Being ADD Also Means

- That you have a sense of humor
- That you never give up
- That you can problem solve any issue in your life
- It does not make you less smart—sometimes you are much smarter than the next guy
- It is a matter of coping . . . and believing in yourself

ADD does not mean that you cannot do something if you put your energy and commitment behind it.

After almost 20 years of evaluating ADD in children through the aged population, it is my belief that ADD is a genetic disorder passed down in families. Often symptoms are not seen or are masked by other disorders. Often the only symptoms that outwardly appear are a reading comprehension problem and a lack of motivation which few people ever suspect is related to ADD. ADD does not mean there is damage to the brain. ADD individuals typically use logic and memory to get by. They tend to think that they are always right about things and that does not leave them particularly amenable to consider the opinions of others. The anxiety that more often than not accompanies ADD results in people giving up too easily and becoming depressed.

ADD can be treated in many different ways, primarily with accurate diagnosis—ruling out the co-associated disorders documented in this book—as well as addressing the physiological issues identified in a functional medicine workup, and secondarily with cognitive training and development of coping mechanisms. Having ADD never has to be a deterrent to attaining one's lifelong goals or being successful in life at home, at work or in the school setting. Having ADD does mean that you have to work harder at times and that things might not come easily all of the time. However, this simply provides a method to strengthen one's character and resolution which I believe are necessary assets in today's changing world. The problem is that too often we think ADD means more than it does, too often we use ADD as an explanation of why we can't do something (or to avoid something), and too often it is misdiagnosed as something else (or another disorder is not identified that is present in addition to ADD).

Welcome to the world of ADD, I hope you will have more information and less confusion by the time you finish reading this book. If this is not the case please let me know and I will work on clarifying things even more with the next edition.

Part II: Recognized Subtypes of ADHD: Inattentive, Combined, and Hyperactive

Barbara C. Fisher

*Brain Evaluation/United Psychological Services,
Washington Township, Michigan, U.S.A.*

The goal of this section of the book is to define what attention deficit disorder (ADD) is and what it is not. The problem of diagnosing this disorder primarily with symptoms is that by definition ADD is a brain behavior disorder resulting in cognitive difficulties that involve various aspects of attention. Chapters in this section document the theoretical findings based upon assessment of ADD using the same neuropsychological tests over a fifteen year plus time span. Repeated evaluation over time provides confirmation of a reliable method to assess a disorder that has created confusion and disagreement among both parents and professionals.

Based upon evaluation and clinical symptoms a theoretical construct is provided to describe the “real ADD.” Using this same construct the following chapters discuss what ADD is not, establishing the hypothesis that there are disorders (diagnosed and undiagnosed) that can present the behavioral symptomatology used to diagnose the hyperactive or combined subtype. The idea being that these two latter disorders may represent either an entirely different disorder and/or the exacerbation of ADD symptoms due to the overlap of symptoms from other disorders. Research using neuropsychological evaluation reports similar test findings albeit different conclusions as the field remains unfortunately committed to the search for frontal lobe deficits (1–3).

Although professionals have a growing awareness of reading and reading comprehension difficulties associated with attention disorders, reasons as to why this has been a co-related finding remains elusive. Reading issues are explained at length in the following chapters. Language differences among the three subtypes are explained, using the long term experience of this examiner as well as neuropsychological evaluation to rule in what ADD is and what it is not.

Finally there is a chapter on adult ADD identifying characteristic signs and symptoms as well as an explicit pattern seen on testing that allows the residual form of ADD to be ruled in and other disorders to be ruled out as independent or co-related factors. The use of evaluation negates the reliance upon learning difficulties diagnosed in childhood especially given the wide set of variables that could easily explain why an ADD adult who attended school some 20 to 50 years ago was not diagnosed with ADD.

As indicated in the preceding chapter, the trend noted with the adult female population that we studied over a 15-year time span was to report primarily emotional symptoms relating to anxiety and depression, stress and fatigue. The attention issue related primarily to distractibility—presumed the result of multi-tasking and the difficulty maintaining the multiple roles of the female—and lack of sustained focused attention. The significance of this study, as the process of analyzing the test results remains ongoing, is that diagnosing ADD using

neuropsychological test measures and ruling out those patients who were suspected of additional disorders, the population that remained was clearly attention deficit hyperactivity disorder (ADHD) inattentive type/ADD without hyperactivity by their reported symptoms.

Herein lies the crux of the situation. If the field agrees that measurement of attention can be accomplished by neuropsychological evaluation then the self-report can be used to rule in the subtype depending upon the symptoms reported. This means that the diagnostic decision tree moves from the test to the symptoms as opposed to the current structure of moving from the symptom to the test. I believe if this were to occur nationwide, if the field agreed upon a specific body of tests to measure this disorder then there is a good likelihood that the confusion over the diagnosis would be resolved. In testing for ADD and being aware of the differences among the test patterns, following the prompt to complete further evaluation (when memory problems are seen and/or the profile suggest greater severity than a genetic attention disorder) then more co-related disorders would be diagnosed thus clearing up the overlap problem as well.

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Will the Real ADD (ADHD Inattentive Type) Please Stand Up?

Barbara C. Fisher

*Brain Evaluation/United Psychological Services, Washington Township,
Michigan, U.S.A.*

ANXIETY CAN MIMIC HYPERACTIVITY

Attention deficit disorder (ADD) children tend to be highly anxious, generally growing up with a genetic anxiety disorder that runs through the family. Consequently, children grow up with anxiety in their household; this anxiety is modeled through their parents and manifests in the child's own internal anxiety. An anxious child appears to be restless, moves around a lot, plays with various gadgets and toys (from paper clips to anything that is available, balancing pencils, etc.). They may gnaw through erasers, chew on fingernails, or suck through the collar of their jacket. Their hands and feet seem to be in continual movement. In contrast, a child with hyperactivity issues moves uncontrollably, runs, is loud, and is unable to attend to simple things even for a few moments. Anxious children can attend for longer periods of times and are not wild and uncontrollable in their actions. When adults, this anxiety continues to be evidenced in much the same manner; the fiddling does not stop even though the objects change and the method is different. Generally, there are more individuals diagnosed with ADD without hyperactivity when this misdiagnosis of attention deficit hyperactivity disorder (ADHD) hyperactivity is not applied.

Anxiety is a generalized substrate of edginess, nervousness, and worry that can increase to symptoms of panic to the point that it feels like you are having a heart attack. Anxiety easily leads to avoidance of a fearful situation or stimulus and procrastination of doing things that are feared. For the ADD child or adult this means avoiding paperwork or the things they do not feel competent about. There is a tendency to become perfectionistic and compulsive, which increases when there is more stress and things seem out of control.

WITH TIME, ANXIETY AND FAILURE LEAD TO DEPRESSION

People who are anxious and upset develop the tendency to feel sad about the things they cannot fix, the things they have no control over, and basically their own inability to effect change in their day-to-day life. With these feelings there tends to be the notion that everyone around them has an easier life, that learning is not as hard, that others can accomplish the same tasks with less effort, that no one struggles as much as they do.

Depression can manifest itself as either anger or sadness depending upon the personality type or gender. Males generally tend to react with anger before they allow themselves to cry. Women tend to cry before they are able to show anger. Societal values and how men and women believe they need to present themselves


Inattentive Type: Symptoms of Anxiety & Depression

- **Anxiety = Generalized:** edgy, nervous, preoccupied, indecisive, irritable, sleeping problems, distracted, sharp tone vs. **Panic:** shallow / heavy breathing, feels like heart attack, flushed
- **Depression =** Anger turned in or outward, low frustration tolerance

Depression

- **Depression is negative thinking:** predicting the worst, gloom & doom
- **Depression is anger:** resistance, not wanting to do anything
- **Depression means being alone:** isolation, periphery of the group, not engaging socially





Anxiety

Anxiety is fear:
New situations, fear of failure

Anxiety is avoidance:
School work, family activities, tests, papers completed but not turned in

Anxiety is nervousness:
Biting of lip, over-focusing, unable to relax, always thinking

Anxiety is Perfectionistic & Compulsive:
Feeling criticized & mis-understood

in public undoubtedly impact these tendencies. Depression in any form means predicting the worst, expecting bad things to happen, and not expecting good things to occur; life is experienced as a series of adverse events.

ONE OF THE BIGGEST ISSUES IN BRIGHT CHILDREN IS THEIR USE OF COGNITIVE RESERVE OR HIGHER LEVEL ABILITIES TO COMPENSATE FOR ADD SYMPTOMS

Typically, a bright child's ADD symptoms remain hidden; the child's ability is not seen. Instead everything appears average suggesting that there is not a problem at all and prompting the professional to assure the parent that the child is fine. The problem is that children who are bright tend to compensate for ADD symptoms using their intellect, thus repressing higher levels of functioning as scores regress to the mean or the average. No one realizes the struggle that is going on when the child attempts to learn and retain newly learned information. The child, unaware of this process, gradually develops initial anxiety over performance difficulties, which gradually gives way to increased helplessness when interventions are unsuccessful, leading to depression and outward signs of decreased or absent motivation. Assuming that the child does not care, professionals, parents, and teachers miss the underlying internal conflict.

Because these children do not appear to be struggling, they are labeled as lazy, with comments that they do not try as hard as they could. Typical comments of "He is a good kid, he just doesn't care" or "He needs to work harder" become frequent statements at teacher conferences or referenced on report cards. No one stops to

consider that perhaps these children are already working as hard as they can to get average grades as the attention symptoms remain hidden by the effort that the child is actually expending. Some children prefer the idea of being seen as lazy rather than risk anyone thinking that they are not smart. Often, their response to adults thinking that they need to work harder or put forth greater effort is upset and increased frustration. Too often, these children do not believe that they are bright, given their continual struggle to perform within average limits. They may feel that they are smarter than their fellow students but become frustrated in trying to keep up and not get left behind. Some children become acutely aware of who finishes the paper or the test first, which can lead to quantity replacing quality and the typically seen symptoms of rushing through tasks simply to get them done. There are actually two major benefits derived from completing homework quickly. One, the child who avoids problems gets to be rid of school work that is difficult for them and secondly, they maintain an outward appearance of competence in front of their peers who have no idea whether the paper they just turned in is actually correct. When none of these methods are successful, the child is at risk to give up totally, turning to substance abuse driven by a need for anxiety reduction. Goals in college may be replaced by some other type of school program that is quicker and shorter and easier to complete. School may be abandoned for some other type of role. Girls may decide to become a wife and mother and not work at all. The sad part is that often the presence of ADD is not identified and these children as grown adults carry with them the belief that they are not bright. Failure becomes part of their lives, something to be avoided by lowering goals and expectations, and something to be feared and perhaps expected given the feeling of imminent failure that cannot be denied or prevented from occurring.

WHAT DOES ADD LOOK LIKE THROUGH THE ACADEMIC YEARS?

Preschool and Elementary

Academic tasks are difficult due to deficits in fine motor coordination such as writing, cutting, and drawing. Spatial issues are one of the first signs to emerge, resulting in difficulty acquiring early reading and language fluency, particularly decoding and performing tasks of drawing. Printing and writing tend to go all over the page with no spaces between.

Symptoms of the Junior High Student

This is the leap from elementary school when classes change and children are expected to be even more responsible for their work. Homework is now part of everyday life. Academic life is definitely more demanding. Various types of paper assignments are part of the curriculum, which involve more reading and refinement of writing skills. Changing classes means keeping things straight and remaining organized. Finally, examinations begin to incorporate two things: scanners and use of multiple-choice questions, both of which are difficult for the ADD child affected by spatial deficits.

Medical management in the form of stimulant medication does not reveal a difference in spatial functioning when viewed through neuropsychological test measures. While other attention symptoms of distractibility, thinking speed, and information processing reveal improvement, the spatial problem is due to the brain

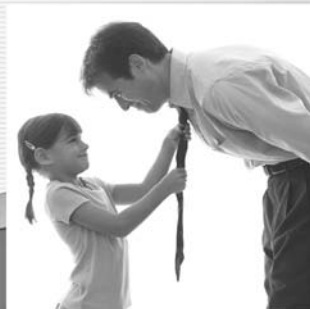


Symptoms of the Pre-School Child

- **ADHD:** Behavior problems out of control, impulsive behavior, hyperactive, fighting with peers, non participation in group activity
- **ADD w/out Hyperactivity:** Academic tasks are difficult due to fine motor coordination: writing, cutting, drawing

Symptoms of the Pre-School Child

- Separation loss, fearful when away from home
- Anxiety in the morning while getting ready for school
- School phobia
- Getting ready for school
 - Morning routine: Distracted
 - Stomachache, headache



re-organizing itself and as such is non-responsive to medication. When spatial issues are a primary factor medication appears to provide only temporary relief, a honeymoon period and brief respite eventually overshadowed by reading, math, and time management difficulties. In these cases, medication management assumed to be unsuccessful is the result of a lack of knowledge as to how the attention disorder affects the person. Everyone is different which is why specific diagnosis of attention problems using neuropsychological evaluation not only improves accuracy but suggests treatment that will be the most beneficial. When spatial deficits are the primary problem, relief will not be seen with medication. At that point the cognitive training programs we offer around the country would provide the most beneficial intervention. However when attention symptoms of distractibility, information processing and speed are primary, then medication will make a big difference in functioning and as such provide a positive intervention.

As the child nears the end of the junior high school years and embarks upon high school and college, time management becomes a primary symptom to address as time spent studying needs to be balanced with the demands of sports and social activities. Typically shy children retreat, becoming more withdrawn when they have been teased or isolated due to learning problems in the classroom. Girls are particularly vulnerable to being socially spurned by their peers (particularly if their peers tend to be girls who are rather cliquy and discriminating). Boys are grappling with success versus failure, establishing an identify through sports if school is going poorly for them. Often, boys will focus on developing a prowess in sports to compensate for their academic difficulties and/or establishing themselves through their expertise in socializing with girls.



Emotional Issues with Adolescent Girls

- **If they keep trying....** A personality develops of being quite serious, accompanied by compulsivity
- **If they give up....** They are at risk for promiscuity and over-sexualized behavior or a high degree of dependency
- **Serious issues of self-esteem:** Feelings of inadequacy and questions of self-worth

EMOTIONAL SYMPTOMS RELATED TO ADOLESCENCE

- Social difficulties, defining of the self
- Family/parent relationships: different attitudes, religion, friends, dress, music, sexuality, work

EMOTIONAL ISSUES WITH ADOLESCENT GIRLS

Girls either keep trying to succeed in school or they give up and declare school boring. If they are persistent, then a personality of being quite serious develops, accompanied by compulsivity. When girls give up and declare themselves "stupid," then they are at risk for promiscuity, over-sexualized behavior, and/or a high degree of dependency. Problems in school can lead to serious issues of self-esteem, leading to feelings of inadequacy and questions of self-worth. When girls do not feel bright they tend to avoid school as much as possible. Too often, they do not pursue academics beyond that of high school, tending to take jobs that require less ability and appear easier to perform as opposed to more demanding work situations. Unfortunately, there is the tendency for girls who do not feel competent intellectually to become overly focused upon their looks, their bodies, and their sexuality. Or they become overly dedicated to developing excellent social skills and/or develop the persona of a caretaker with the primary goal of pleasing others to elicit praise. Donning any of these hats in the search for self-importance can lead to a life that is stressful and filled with unhappiness, unrequited love, and/or unfulfilled goals. Diminished self-esteem and the inability to receive the praise they need from others (lacking the internal ability of self-praise) the daughter is at greater risk to feel judged by her mother regardless of whether this is reality or assumption. Feeling judged generally does not elicit positive outcomes resulting in an increased struggle for self-acceptance and internal peace regarding their sense of self.

EMOTIONAL ISSUES WITH ADOLESCENT MALES: THE CONFLICT, EITHER REAL OR PERCEIVED, OF GAINING PARENTAL ACCEPTANCE

Males tend to feel judged and criticized, laboring under the belief that they need to maintain some sort of family legacy. Too often, this results in the tendency to easily give up if failure is predicted. Failure is more easily predicted with increased task difficulty creating a cyclical pattern that promises to end in increased symptoms of anxiety and depression. Life conflicts involve being able to become a person who is equal to the status of the father or able to live up to the father's image and most importantly engender feelings of pride and acceptance from the father. This process is heightened by attention symptoms and failure experiences and further heightened by a critical, harsh, judgmental, and/or distant father figure.

PHYSICAL SYMPTOMS SEEN IN TEENS

- Stomachaches, headaches
- Poor eating habits
- Always fatigued, lack of sleep

Emotional Symptoms Related to Adolescence

- Academic prowess- college vs. vocational training or no further studies
- Bored in school, afraid of school, academic competency, fear of failure-fear of success
- Reading and writing papers are major issues



Emotional Symptoms Related to Adolescence

- Social difficulties, defining of the self
- Family/parent relationships: different attitudes, religion, friends, dress, music, sexuality, work



- Hypothyroidism
- Low blood sugar due to lack of food
- Weight control problems
- Delayed sleep phase syndrome

Adolescents do not eat well, either because they are busy or watching their weight. If taking stimulant medication, fatigue can be more pronounced due to poor eating habits. Blood sugar and undiagnosed hypothyroidism can appear at this age also. Depression is very prevalent in this case. Adolescent sleep patterns become similar to those of adults. Consequently, the child is not tired until 11:00 at night, which becomes problematic when having to wake up at 5:00 in the morning to get ready for school. Sleep deprivation often develops in this case. Last but not least, delayed sleep phase may emerge at this point. This is a circadian rhythm disorder that means the person's biological clock is out of sync with normal sleep patterns. Whether or not this tendency emerges depends upon environmental demands.

- Academic: college, vocational training, or nothing
- Bored in school, afraid of school, academic competency, fear of failure—fear of success
- Reading and writing papers are major issues

The adolescent is dealing with all kinds of issues. Having ADD only adds to these in terms of reading problems, low self-esteem, lack of organization, and procrastination. Probably the two biggest variables seen are that of avoidance and procrastination.

LIFE PATTERNS BEGIN TO EMERGE IN ADOLESCENCE

- Experiences of success versus failure
- Begin tasks at last minute, late for appointments
- Making promises that are not kept
- Pleasing others to avoid confrontation or criticism
- Sleeping patterns change
- Identifying life ideals and values: fighting for beliefs or giving up

Life patterns formed in adolescence can affect an individual's total lifestyle and their future in terms of continued avoidance and procrastination; examples are not taking a chance unless it is a sure thing, not trusting themselves, or not feeling competent to be successful as a self-fulfilling prophecy.

SUBSTANCE ABUSE

Over time, anxiety becomes extremely uncomfortable and leaves these individuals at risk for marijuana use. Although this may initially have a relaxing effect, it also results in a change in personality and total lack of caring about anything and everything.

ADULTS AND THE TYPICAL ADD SCENARIOS

- Undiagnosed in childhood due to being bright, able to compensate and get by
- Had problems in college but managed to compensate and/or found a profession that matched their assets, resulting in the enjoyment of school

ADD Takes on a Life of Its Own

- ADD is the reason for not studying
- ADD is the reason for poor grades
- ADD is the reason for not passing a test
- ADD is the reason for not reading
- ADD is the reason homework takes so long
- ADD is why school is not fun and rewarding

Just how bad is the ADD?

- Performed well in high school but burned out by college; did not work hard in college, getting failing grades for the first time
- Went into own business, had others do the paperwork, performed well at his job, specialized in the specific area that he had a knack for, while having other people handle billing, paperwork and follow up
- Went into own business and flopped because could not handle the paperwork, did not follow up, did not send out bills to bring in money and so on
- Married and became equal partner in support of household but did nothing else. Problem of follow through, taking care of kids, task follow through, keeping appointments, personal belongings left all over, highly distracted
- Married and not equal partner, anxiety and depression holds back any sense of autonomy or follow through on dreams for life, which limits job success; at risk for self-medication with alcohol or substance abuse

ISSUES FOR MEN AND ADD MEANS

In the home:

- The balance of time
- Resolving dilemma of how to take care of everyone else's needs as well as own
- Being a dad and a husband
- Lack of time
- Overwhelmed by tasks that need completion in the household involving children or hobbies
- Task avoidance and procrastination decrease self-esteem and can lead to arguments and the steadfast determination to be right all of the time

In the work setting:

- The balance of time: getting to work on time, allowing for traffic and unforeseen occurrences, managing time based upon prediction of time needed for task completion
- The paperwork
- Miscommunication on detailed information
- Deadlines
- Time management

BEING FEMALE AND ADD MEANS

- Having to handle ADD symptoms, while simultaneously fulfilling the role of being a woman, a spouse and a mother
- Multiple roles and multitasking, fix-it person and caretaker
- Greater risk for distractibility, anxiety and depression—need for routine
- Feeling overwhelmed and out of control much of the time. Compensation with obsessive compulsive traits and the need to be perfect all of the time
- Seems to be worse with menopause

ATTENTION SYMPTOMS INCREASE WITH SCHOOL DEMANDS AND GRADE PROMOTIONS

- *Math in high school and college:* Problems exacerbate when math concepts need to be integrated and are not explained logically, when rules or strategies are given without explanation or understanding—those with ADD need to logically understand things to remember them
- *Writing and output skills:* Handwriting worsens unless able to type—the problem with writing tends to be practice as opposed to skill, meaning they can do it and get better at it
- *Completing long-term projects like term papers:* It is helpful to separate the paper into component parts to avoid overwhelming the person to the point of total avoidance and/or increased procrastination associated with the anxiety of being able to produce an adequate paper

THE REAL IMPACT OF ADD IS THE EFFECT UPON LANGUAGE AND EMOTIONS

- Being distracted and not devoted to task completion—aimless wandering
- Avoidance and more avoidance
- Feelings of inadequacy, feeling incompetent and stupid—everyone else is better
- Lack of awareness of true intellectual potential
- Never giving 100% effort
- Fear of failure and fear of success

The Spatial Fallout

People with ADD have a tendency to use verbal mediation, whereby the individual relies upon logical reasoning skills to facilitate tasks. When unable to mediate with logical reasoning as the task requires more intact spatial functioning, performance problems increase.

A pattern has emerged over 15 years and been proven over and over on retesting 1 to 12 years later: the overbuilding of the logic area of the brain to work through ADD symptoms. Use of logic becomes important to work through distractibility (talking to yourself), to work through missing information (using logic and deductive reasoning to just figure it out, promoting the tendency to not read the directions and to work in a more hands on manner), and to work through speed issues (using logic to figure out a faster, better way to do things).

Spatial Issues May Appear in the Following Types of Symptoms

- Poor time management
- Right-left confusion
- Miss big picture: social difficulties
- Difficulty thinking in layers
- Problems integrating all factors
- Difficulty reading nonverbal expression
- Skipping lines on the page
- Difficulty with multiple choice questions
- Misreading fine print—reading a word wrong; e.g. “recipe” vs. “receipt;” “heir” vs. “hair”
- Reading only part of the sentence
- Leaving out words when reading, leaving out the “not,” “and,” “or”
- Changing “his” to “her,” “he” to “she”
- Omitting small words, which sometimes changes the meaning of the sentence
- Overall difficulty with decoding
- Decoding takes up so much energy while reading that comprehension remains problematic because one cannot read and comprehend what they are reading at the same time

Hypothetically, ADD begins in the spatial area of the brain. The impairment in this area is exacerbated by the overuse of the logic center of the brain by the individual in order to cope with ADD symptoms. What is the result? Attention symptoms are minimized, logic skills are maximized, and spatial symptoms are worsened. Some of the same issues can be seen on every test protocol when there is a genetic ADD disorder, spatial problems and the tendency to break words down into syllables as opposed to phonetics.

Realization of the problem of spatial functioning emerged when test after test revealed the same problem in the copying of two designs that had dots requiring specific spatial alignment. Historically no one had difficulty with those figures that did not contain any dots. Even artists have these types of difficulties. While documenting this problem of copying a design, there were symptoms of sounding out words on a reading recognition task by breaking down the word into syllables. Adults tended to break down the words on this reading recognition task in a similar manner regardless of their education or profession. Words such as “superfluous” became “super-fluous,” and “indices” became “in-dice-ez,” and so on. Even when it was obvious that the person was familiar with the word, there was still the tendency to substitute with another word such as: “banquet” for “bouquet,” “colonel” for “colonial,” and so on. In this manner, words that were obviously known were mistaken for other words.

Therefore, the reading problem lies in the decoding time taken to read the words (unless previously memorized) that makes people forget what they read.

Then the comprehension problem is not recalling the story sufficiently to accurately respond to the question given the time and energy spent on decoding and reading the passage correctly. The ADD person attempts to figure out the correct answer using logic as opposed to recalling the specifics of the story or passage, but this method is only successful a portion of the time depending upon the type of question asked and the skill of the ADD person.

COMPREHENSION PROBLEMS

- What is on the page and what one reads is not the same
- Leads to recalling or understanding the passage as very different from what it actually is
- The sentence changes with word substitution
- The meaning of the sentence changes as well

SPATIAL PROBLEMS CAN LEAD TO THE FOLLOWING

- Problems with time management, specifically the space of time, with time continually underestimated for a project while expectations of what one can accomplish is continually overestimated
- Difficulties with the organization and assembly of materials and equipment for home and school activities
- Overall right-left confusion
- Difficulty thinking from a whole perspective
- There can be a diminished ability to weigh the relationship among things, ideas, and/or events. This may eventually create participation in experiences that the individual did not expect and did not prepare for
- Problem of anticipating and thinking on one's feet socially: to know what to say and when; to anticipate and predict problems about to occur in a given social situation; to size up all the cues in the room and grasp the entirety of the social situation; to conceptualize it from a whole perspective
- Tendency to say the wrong thing at the wrong time, unable to predict an action that will occur as a consequence of their action (if I do this . . . then this must occur).
- There is a tendency to miss the whole point of things, to know where to stand in a social group. Walking in front of a group taking a picture. Missing the punch line of a joke
- Testing that uses a scanned scoring system becomes subject to errors due to missing the number spatially on the page and requisite hand-eye coordination.
- Language skill development is particularly impacted, specifically reading, spelling, and handwriting
- Difficulty learning and using phonetics as the blueprint of language for decoding and spelling while handwriting remains on a slant without proper use of spacing.
- Visual motor coordination, limited fine motor skills
- There can be difficulties with copying from the whiteboard, with a tendency to omit and/or substitute words or numbers
- An inability to understand and comprehend spatial relationships impacts future development of geometry skills and geographical knowledge

- May experience issues with being unable to organize material spatially on a page
- Spatial issues may create difficulties with recall of familiar routes to get from one place to another, especially if there are few landmarks
- Spatial issues can lead to the following: difficulties with driving, increased car accidents, problems in estimating parking spaces, people driving too close or too far relative to other cars, difficulty anticipating an accident by seeing the whole picture and not knowing how to prevent/avoid an accident, and lacking the reflexive coordination for quick movement or anticipation of an event
- Problems occur with applied tasks such as handwriting; the ability to express one's thoughts on paper becomes limited and/or avoided due to poor handwriting
- Difficulties with the use of perspective: confusion with orientation of objects, tendency to rotate and/or difficulty with rotation of objects and discrimination of size
- Cutting and drawing tasks are harder
- Difficulty manipulating the following: crayons, pencils, and objects
- Overall clumsiness, difficulty with learning motor tasks such as bike riding, sports activities, and so on

The symptoms and patterns cited above have been seen consistently over time using neuropsychological evaluation as well as self-report measures. Typically with ADHD inattention disorder, the main issues do not necessarily revolve around inattention; instead bright individuals easily compensate for deficit areas. Symptoms typically seen—that of poor reading comprehension, dislike of reading and of school in general, as well as avoidance and procrastination of any project termed “difficult” (thus negating the completion and/or turning in of homework assignments)—are the issues that truly comprise the deficit areas associated with this disorder of attention. Therein lies the problem and the tendency to under-diagnose ADD. The over-diagnosis typically occurs with hyperactivity and impulsivity. To truly understand ADD as the genetic biochemical disorder that plagues approximately 7% to 10% of the population, one has to comprehend that this disorder:

- Will run the gamut from mild to severe
- That other factors will impact the severity of symptoms
- While ADD by itself can be compensated for, the problem lies in the emotional response of anxiety, disbelief in academic prowess or success, and the natural result of procrastination and avoidance
- Different personality configurations or temperament styles (external vs. internal locus of control) will determine the reaction to ADD symptoms and whether the person easily gives up on reading or compensates by memorizing words and continually working hard to read fluently
- That attention symptoms will present intermittently depending upon academic demands, the will of the individual, developmental stages, intra-individual issues of an additional undiagnosed disorder, and additional environmental factors such as stress

Is the Combined Subtype Really ADHD or Is It Something Else?

Barbara C. Fisher

*Brain Evaluation/United Psychological Services, Washington Township,
Michigan, U.S.A.*

SYMPTOMS OF THE COMBINED SUBTYPE ACCORDING TO THE DIAGNOSTIC STATISTICAL MANUAL OF MENTAL DISORDERS

The Diagnostic Statistical Manual of Mental Disorders (DSM-IV-TR) discusses the combined subtype as primarily manifesting symptoms of being highly impatient and difficulty with inhibition. Both of these traits create the impulsive continuum that comprises the combined subtype manifested symptoms. From this perspective interrupting and intruding are behaviors that occur with either partial or negligible ability to restrain this impulsive response set.

The DSM-IV-TR discusses the tendency to have accidents, bumps, falls, and spills due to this impulsive and impatient behavior. Adults are seen as having more car accidents, their more reckless behavior leads to sports-related accidents, and/or work accidents while operating machinery. The tendency to interrupt or intrude relates to conversations, lectures, meetings, games, and group activities. These issues usually emerge during less structured group activities. The problem lies in that these traits really describe frontal lobe syndrome deficits, which may or may not be attention deficit disorder (ADD) related. If there is a head injury, sleep apnea in childhood, seizure disorder, or some type of brain injury affecting the frontal processes, these symptoms will emerge whether or not there is an underlying genetic attention disorder present. In addition, these symptoms may be seen in the garden variety ADD population (the inattentive type) if there is anxiety or stress during specific situations and/or if there is an additional disease process or event affecting frontal processes.

For example, if you have the inattentive type of ADD and are highly stressed, then you might have impulsivity as an emotional reaction, or compulsivity as in inappropriately interrupting a conversation. More simply put, if you are having a conversation and the person you are speaking with is not listening or is making a statement that you do not agree with—and you feel strongly about the situation—then you may interrupt them. Or, if you feel passionate and excited about something you may want to interrupt more. If you are feeling overstressed, then your patience is taxed and your ability to wait limited.

There is confusion in the field because research continues to attempt to adequately and reliably measure frontal deficits and executive reasoning problems and relate this to attention deficit hyperactivity disorder (ADHD). If you read these studies carefully you will see that the findings tend to be confusing, unclear, and mixed in terms of outcome. In other words, either a small percentage of the population actually shows up as having executive reasoning deficits that can be adequately assessed, or, more often, there is not substantial information to separate

this population as a viable separate entity. Consequently, this theory of executive reasoning deficits that changes the way we look at ADD/ADHD has totally confused our understanding of this disorder. As a result ADD/ADHD remains essentially invalidated by research despite the numerous attempts to measure and quantify this theoretical construct.

As a clinician, this theoretical construct has done little to shed light upon what ADD actually is, and, if anything, it has confused the field and made the process of diagnosis highly convoluted. It not only affects the world of psychology and neuropsychology, but also anyone attempting to research ADD/ADHD due to a problem with simply defining what the disorder is. The result is that all research involving this population remains highly controversial. One study says this; another disputes it and says something else. There is no truly agreed upon definition that actually works in real life.

The problem of using photon emission tomography studies and magnetic resonance imaging (MRI) to measure ADD/ADHD is the absence of neuropsychological evidence to match these findings. Take, as an example, the study done in 2002 finding that the smaller brain volume noted for ADHD and identified in MRI studies was related to an earlier brain insult—as opposed to ADHD—and the conclusion that there is not need of an MRI to be done in the routine diagnosis of ADHD in children and adolescents (1).

Typically when the time is taken to complete an in-depth evaluation using neuropsychological or neurometric tests, the outcome may be to identify attention symptoms in addition to language deficits and an assortment of varying symptoms, depending upon the presence or absence of another underlying disorder. Sometimes a genetic disorder is not present at all, and, instead, the primary problem is that of a brain injury. When the diagnosis is that of a genetic attention disorder without additional issues, more often there will be an accompanying reading problem, evidenced in either comprehension and/or reading speed, and decoding deficits. The degree of the problem depends upon whether the child has memorized words and/or reads often. Memory deficits and impaired language functioning can be seen when there is a birth injury, long term sleep apnea accompanied by periods of desaturation, and/or extremely poor sleep resulting in sleep deprivation. Characteristically, a traumatic brain injury impacts frontal, executive reasoning processes, thus the overlap and confusion with the diagnosis of hyperactivity, ADHD, and combined subtype. Parietal, spatial, and perceptual deficits may be exacerbated when there is a brain injury added to the presence of a genetic attention disorder. Therefore, if the new estimates are correct and accurate—meaning that at least 10% of the population is ADHD, which is considerable—and the assumption is made that by definition, the presence of ADHD means a problem with executive reasoning and diminished frontal functioning, what can we conclude about our society? That 10% of our society cannot make decisions, have difficulties with problem solving and generating solutions, have problems using feedback to ascertain if the application of a particular solution is incorrect, have problems with word retrieval, selective attention, integration, and perseverance; and the list goes on. This would suggest that ten percent of the population is inept in terms of organization, setting and completing long term goals, practicing inhibition, and restraint of impulsivity.

Doesn't it make more sense to think that 10% of the population has anxiety, or 10% of the population struggles with reading problems that they either compensate for or ignore, or 10% of the population may be distracted, but they move past

these symptoms using logical reasoning and functions? ADD is more readily diagnosed these days because school begins with preschool; the problems are seen earlier when school begins at an earlier age and more is demanded. The increased competition negates the previous afforded luxury of wandering around and exploring various classes prior to deciding upon the chosen career to tailor one's college education. These days, the student has to plan in advance, complete an internship, take pre-requisite classes, and meet stiff requirements for their overall grade point average and performance on standardized testing. The world is more fast paced and technological as well as competitive leaving less margin for error.

What this means is that we are likely seeing and diagnosing ADD due to the changes in our living patterns—as opposed to the prevalence actually increasing. For some reason professionals do not routinely think to diagnose ADD with neuropsychological testing, as would be routine for any disorder involving the brain. Although the brain is not impaired, ADD by definition is a brain/behavior disorder—a genetic biochemical imbalance that results in a specific set of symptoms that can be measured by repeated assessment. I read journals whereby professionals argue back and forth regarding the symptoms, definition and diagnosis of ADD, and I remain perplexed as to why neuropsychological evaluation has not been routinely accepted. Typically when children are diagnosed, in my experience, they have either been diagnosed by their physician based upon symptoms relayed by the parent, teacher, or both parties via completion of a self-report measure. When evaluation has been suggested, it usually consists of an intellectual assessment and achievement test, recently augmented by some type of visual spatial evaluation requiring the copying of designs. (I assume this is the result of increased awareness of handwriting problems and copying from the board.) Adults are routinely diagnosed by conversation, proof of previous diagnosis as a child, complaint of school difficulties, and current problems suggestive of attention deficits. Professionals often do not inquire about a brain injury or sleep apnea, critical rule-outs for ADHD combined type symptoms, especially impulsivity. Children are not routinely checked for brain impairment via memory testing. Parents are not queried for birth trauma, acquired brain injuries, snoring or mouth breathing, or frank apneic episodes. Evaluation that does yield evidence of disparities in functioning does not suggest the rule out of brain impairment, instead the variability is assumed to be related to attention deficits which these measures are not even designed to assess.

Thus, there are two worlds: one is self-report symptoms and the other is testing and evaluation. ADD remains an enigma. Why is it different?

If you have a reading problem you test for it.
If you have a learning disability you test for it.
If you have a language disorder you test for it.
If you have a head injury you test for it.
Why not ADD? Why do we not look for it?

My experience as a neuropsychologist, evaluating ADD for almost twenty years now, is that ADHD, as the combined subtype is the most likely of all three subtypes to reflect the presence of acquired attention symptoms and executive reasoning deficits, diminished frontal functioning resulting from some type of brain injury.

The ADHD combined subtype whether present in children, adolescents or adults, from my perspective is clearly a different breed and more often than not, represents some type of insult or impact upon brain functioning. In this group are your undiagnosed or diagnosed and forgotten, traumatic brain injuries. More often than would be expected, parents forget that their child has encountered a serious illness involving hospitalization and desaturation (loss of oxygen) or a significant injury to the brain resulting from an auto accident, fall or some type of trauma. It is understandable that parents would want to forget these traumatic times with their child and not provide the information when seeing a professional. Too often the professionals not understanding that definitive evaluation, in the form of neuropsychological testing actually exists, become buried in reported symptoms by the teacher or parent in the home setting. In the attempt to relieve the overwhelmed parent or rescue the child about to be thrown out of the school setting, the medical field becomes ensconced in finding the right stimulant medication to calm the child down and correct the problems which are predominately behavioral. In this manner, medication management is based upon teacher or parent reported symptoms, which typically indicates continued and escalating behavioral problems on the part of the child. My experience is that stimulant medications generally do not last in producing positive results or consistent changes in the child's behavior over time. Symptoms of impulsivity are only temporarily muted. Side effects have the propensity to create behavior problems related to a loss of appetite or increased emotionality. Medication that is meant to improve cognitive symptoms related to attention is being used to address behavioral issues with the combined subtype. When things do seem to be better, there is no clear reason identified as to why and similarly when things decline, the reasons are generally unclear. Unfortunately, these tend to be the children that give stimulant medication a negative aura and bad press. As the focus remains on attention issues, no one considers the question of a brain injury as a possible diagnostic reason for the behavior problems that are abundant and run rampant in the ADHD combined subtype.

ADD is the reason given for the child's total learning problems, which may include not remembering what they have learned (memory in ADD is not problematic and instead provides one of the two coping mechanisms used to battle attention symptoms), missing key learning from building block grades, or becoming totally confused in advanced classes that use constructs reliant upon earlier learning. No one understands why the child cannot learn. Often these children appear as if they are declining, their brain is deteriorating when they are only "growing into deficit areas," and problems related to the frontal processes become more apparent outwardly as tasks are dependent upon intact functioning. The main point in this discussion is that the focus remains upon the ADHD combined subtype as the diagnostic reason to explain the problems the child is having, which only exacerbates in adolescence and adulthood contributing to the disconcerting descriptions of ADHD as an adult disorder. The diagnosis of ADHD limits the treatment the child receives as well as the lack of treatment of an underlying disorder that may be progressive. In my practice, this problem occurs more often than not.

Brain injuries are only one causal factor that can produce symptoms of the combined subtype. Undiagnosed sleep apnea, especially when it is severe and occurs when the child is young, is another causal factor. Approximately 10% to 20% of my practice is referred for a sleep study and/or ear, nose, and throat

evaluation due to the problem of enlarged tonsils and/or adenoids. A narrow airway, high palate, mouth breathing, and subsequent loss of oxygen results in impact to the frontal processes and cognitive deficits related to diminished frontal functioning. It is this additional problem that creates the hyperactive behavior, the behavioral impulsivity of the combined subtype, learning difficulties, and memory lapses. There are far too many stories of a child being diagnosed as learning disabled who had undiagnosed sleep apnea. A recent very sad case was about a young man who spent his entire academic education from elementary school years through high school diagnosed with a learning disability. By the time that he was seen at 20 years of age he had developed a severe apnea condition indicated by changes morphologically in his face noticeable by all of the sleep specialists to whom I referred him. However, prior to this no one even asked about apnea symptoms. Imagine his mother's feelings in finding out about a problem that was so severe that he had to have jaw surgery. She had spent enormous amounts of time attempting to get the right care for her child, taking him from specialist to specialist trying to find out why he could not remember things, why he could not learn despite the apparent presence of higher level thinking skills and abilities.

Symptoms of the ADHD combined subtype are seen as more reflective of impaired frontal processes than any other brain area. The frontal processes provide the supervisory system in the brain, maintaining the decision-making processes, the inhibition processes, and the regulator of emotions, as the overseer of the brain. The frontal processes are responsible for making sure that the individual is able to think creatively and to make decisions, to inhibit responses when necessary to fit in with society, as well as the ability to determine what is appropriate versus inappropriate in any given situation.

The following common complaints on self-report measures while typically related to deficient frontal processes are often symptoms used to describe and diagnose ADHD combined subtype:

- Difficulty figuring out how to do new things
- Difficulty making decisions
- Difficulty planning ahead
- Difficulty figuring out or solving problems younger children can do
- Disorganized in their approach to problems
- Difficulty understanding explanations
- Difficulty doing things in the right order (sequencing)
- Difficulty changing a plan or activity when necessary
- Slow to learn new things
- Difficulty switching from one activity to another
- Thinking rigidity: black and white thinker
- Easily frustrated
- Difficulty speaking clearly
- Difficulty finding the right word to say
- Rambling on without saying much
- Jumping from topic to topic
- Difficulty understanding what they are reading for text well below their chronological age
- Difficulty writing or reading letters or words, highly distorted
- Severe difficulty with spelling or math despite tutorial work

- Distracted by everything, every sight, every sound, every physical sensation
- At risk to become preoccupied with a part of their body if there is something wrong, a foot itches, eye itch, piece of skin hanging, hangnail, clothes feel funny
- Losing their train of thought—totally forgetting what they were talking about before they went off topic
- Extremely poor sustained attention that does not last beyond several seconds of time
- Becoming easily confused or disoriented
- Forgetting instructions, especially if more than one thing
- Extremely poor fine motor control, writing is dyspraxic
- Odd movements
- Frequently complains of headaches or nausea
- Muscle tics or strange movements
- Headaches, nausea or vomiting
- Aggressive without regard to their environment
- A will of their own that does not include the wants or needs of the people around them
- Lacking in attachment or concern for the needs of others
- Difficulty being creative or spontaneous, very concrete
- Not abstract, difficulty getting the big picture
- Emotional lability, swinging from one end of the spectrum to the next, not predictable

Being in a group is difficult. In the home or in the classroom setting, the following types of behavioral symptoms tend to be typically seen:

- Using anger management skills
- Showing concern for the feelings of others
- Reacting to disappointments in a calm manner
- Considering consequences of behavior
- Expressing remorse for behavior that hurts or upsets others
- Accepting criticism
- Accepting responsibility for own actions
- Interacting positively with other children in the home
- Requesting support
- Admitting mistakes
- Respecting rights of others
- Sharing with others
- Complying with rules at home
- Apologizing when wrong
- Using appropriate language
- Discussing problems with others
- Identifying own feelings

The following emotional and behavioral symptoms tend to be common complaints by parents and teachers and/or spouses of adults:

- Uncomfortable with affection
- Bullying other children
- Hurting or teasing peers
- Not sharing with peers

- Difficulty making and keeping friends
- Not compromising in games, a poor loser
- Discipline problem in school
- Frequently sulks or pouts
- Uncooperative, disobedient, stubborn, defiant, irresponsible
- Demanding and manipulative
- Has to have their own way or else
- Frequently lies, cheats at games
- Unappreciative of efforts of others, does not keep agreements
- Blames others for mistakes
- Ignores rules, does not feel guilty for misbehavior, lack of loyalty
- Very poor eye contact or more likely, no eye contact
- Does not appreciate personal space
- Describes the details of an event, however misses the meaning of it

The following is an account of homework time by the mother of a son diagnosed with ADHD Combined Subtype:

7:30 PM: Spies the calculator on the kitchen counter, he is at the table, supposedly working

7:35 PM: Grabs calculator and plays with it, pretty soon he is tearing it apart

7:42 PM: Says he is hungry again. Now that he has seen the inside of the calculator he is concerned about it and begins to ask questions

7:46 PM: Refuses to pick up all the pieces of the torn-apart calculator, asks about deadly toxins that may have been inside the calculator, taps cup on the floor

7:48 PM: Asks about anthrax and how to get rid of it. Asks how long is our intestines?

7:55 PM: Tries on nail polish (mother has left the kitchen)

7:56 PM: Sits down to do homework

8:00 PM: Up and removing nail polish from finger

8:07 PM: Refuses to go to room, talks to his brother, plays with the cat

8:08 PM: Bugs his brother, jumps around, acts goofy, crawls around on the floor. He is done with math at 9:09 p.m., which is his best subject.

Does the above scenario describe ADHD Combined Subtype or is there a more accurate diagnosis related to impaired brain functioning? This particular child was diagnosed with sleep apnea as well as a seizure disorder. Clinically I find that the symptoms appearing to match the descriptive characteristics of the combined subtype are characteristic of a brain injury or a sleep disorder with accompanying sleep deprivation. In examining the overlap and similarity among the symptoms reported for this disorder, brain and sleep disorders certainly need to be considered as a high priority rule out. Examination of the symptom overlap points to the likelihood of over-diagnosing ADHD Combined Subtype while under-diagnosing the causal factors creating the diagnostic symptoms. Thus, the question of whether ADHD Combined Subtype represents a true causal entity.

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3

Disorders that Mimic ADHD Hyperactive Subtype

Barbara C. Fisher

*Brain Evaluation/United Psychological Services, Washington Township,
Michigan, U.S.A.*

PERIODIC LIMB MOVEMENTS, RESTLESS LEGS SYNDROME, INSOMNIA, SLEEP APNEA

If children do not get restorative sleep at night or they have insufficient sleep or sleep deprivation, daytime symptoms can easily mimic hyperactivity. By remaining active during the day, children can stay awake. Periodic limb movements disorder (PLMD), restless legs syndrome (RLS), insomnia, and sleep apnea can cause sleep deprivation and/or a lack of restorative sleep, thus creating daytime sleepiness. In order to stay awake, children move around a lot, shift often in their seat, fidget, and play with anything in their vicinity. These behaviors can lead to an inaccurate observation of hyperactivity. New research is identifying a substantial overlap between Attention Deficit Hyperactivity Disorder (ADHD) and RLS and PLMD in sleep. Recent studies are identifying the overlap between sleep apnea and ADHD. In some cases, treatment of the sleep apnea is resulting in cessation of ADHD symptoms. While this is not a frequent occurrence, what does happen regularly is the presence of significantly diminished overactive symptoms following treatment that in some cases warrants a reconsideration of treatment with medication.

A person affected by RLS or PLMD experiences discomfort to varying degrees in his or her limbs, and finds it difficult to sit down or to remain seated because he or she gets relief by walking or moving around. This becomes worse during certain periods of the developmental cycle, especially if the individual is going through a growth period such as in adolescence. When preoccupied by the feeling in their legs, it becomes difficult for them to remain in their seat, and they will walk around the classroom or staff meeting, hop, skip, or jump as opposed to walking, and have difficulty following a routine, especially if it means sitting down, generally appearing highly restless.

If continually sleepy or sleep deprived, the person may become highly irritable, emotionally reactive, or easily annoyed and upset at the slightest thing. They would naturally be less patient, more impulsive in their thoughts and behaviors, ignoring the consequences of their behavior because they are tired and no longer care about anything except wanting to sleep. During quiet periods, when more prone to go to sleep, they may talk to others to remain awake and alert, and move about appearing highly restless due to the nature of the activity.

ANXIETY

It is well-known that individuals with attention deficit disorder (ADD) are more anxious, but we do not think of ADHD as anxiety-driven. However, when

individuals are anxious, they move around a lot, they play with a variety of things, (e.g., twirl their hair or flip a paper clip), and if particularly anxious and really moving they will present themselves as hyperactive. A common phenomenon in my experience of diagnosing ADD/ADHD is the overlap of symptoms of anxiety and overactivity or hyperactivity. Individuals who I have seen as adults who display symptoms of anxiety, as well as reporting symptoms of anxiety, often indicate the diagnosis of hyperactivity as a child. The more anxious children are, the more they fidget, move around, shift in their seat, and play with anything in their vicinity; and the more they are apt to appear as overly active or hyperactive.

When anxious and worried, children tend to rush through projects and assignments just to get them done. Quality falls by the wayside in order to address the fear of finishing at all. So, they work quickly and say "done" just to be done. If anxious about completing tasks, the person may rush from one uncompleted task to another without regard to completion, just trying to accomplish something on everything. If anxious, the person becomes more impulsive and cannot wait his or her turn. The more worry the more impulsivity and a lessened ability to wait and be patient.

Anxiety and distractibility are closely related; the more anxiety the more distracted the person becomes. It is well-known that stress and distractibility are often seen together and increase or exacerbate one another. People tend to talk to themselves to calm down or to attempt to contain the distractibility, or they hum tunes to themselves.

BIPOLAR DISORDER

The highs and lows of bipolar disorder can easily look like overactivity, especially in the manic state. When in the manic phase of this cycling disorder, individuals can easily appear hyperactive. Bipolar disorder is often cited as a correlated disorder accompanying hyperactivity. The problem is identifying what bipolar really is. Too often, after completing a full psychological evaluation, individuals who were presented with the diagnosis of bipolar based upon outwardly displayed symptoms were not diagnosed with this disorder once the evaluation was completed. Brain injuries, seizure disorders, and sleep-related breathing disorders manifest frontal lobe symptoms that can easily be present with the expansiveness and grandiosity of the bipolar disorder.

When in the true manic phase, individuals cannot sit down, become highly impulsive, cannot refrain from blurting things out at inappropriate times, and simply cannot contain themselves in any manner. They are unable to adjust their behavior to any situation. They cannot contain themselves from impulsive actions and reactions. These symptoms do not singularly differentiate a psychiatric disorder from a disorder affecting the brain.

TRAUMATIC BRAIN INJURY, POST-TRAUMATIC STRESS DISORDER, BIRTH TRAUMA

Injury to the brain, as well as disorders specifically affecting the frontal processes, will easily be present with symptoms of impulsivity as well as hyperactivity. Deficits of selective attention (related to deficient frontal processes) will tend to result in the individuals selecting everything in their environment to pay attention to. As a result, they find everything novel as stimulating and thus tend to run from one novel stimulus to the next. The younger children are, the more overly active or

hyperactive they will outwardly appear, and often more behavioral problems are equally present. Deficits of selective attention, specifically related to impaired frontal functioning, result in children who often cannot control their overactivity or impulsive response pattern. Parental threats or promises of discipline are insufficient to stop behaviors related to impaired brain processes.

When the frontal processes are injured, symptoms related to lack of inhibition, selective attention, and perseveration predominate, creating the boy who calls across the gym, informing one of the girls that she has hairy legs. Symptoms typical of both hyperactivity and brain injury overlap in the descriptions of the child who cannot sit still, remains unresponsive to adult discipline, and cannot engage in a conversation due to continual distractibility that includes focusing on everything around them.

The boy in history class who is preoccupied with last night's television show and interrupts the teacher to ask a question about *South Park* or begins to talk about a scene from a recent movie as a totally unrelated topic to the history discussion presents classic symptoms characteristic of frontal lobe impairment as well as descriptors of hyperactivity. Distractibility related to Post-Traumatic Stress Disorder (PTSD), appears in the form of extremely poor eye contact and difficulty listening when someone is talking. The primary complaint of distractibility results in increased stress subsequent to the tendency to continually lose things or to have difficulty organizing tasks to get anything accomplished. Individuals are forgetful in daily activities, tend to interrupt others for fear of forgetting what they wanted to say, and blame others in fear of being blamed and ultimately physically harmed as a result. It is well-known that traumatized individuals will come after someone in fear, anticipating that they will be harmed and learning to attack first. They may immediately become defensive as a self-protective mechanism. My experience is that the presence of emotional trauma can create a whole different persona or personality from who the person was prior to the trauma. A person who has been traumatized tends to become hypervigilant, ever alert to avoid problems. Blame is

TBI: Early Signs at Home:

- Drastic personality changes, aggressive
- Periods of disorientation, lack of recall
- Changes in peer play, decreased activity
- Changes in relationship with siblings
- Fatigue easily, poor eating habits
- Noise, heat, touch, weather sensitive
- Continual headaches, sleep disturbances
- Short term memory problems
- Compulsive ritual symptoms & behavior (writing names of CD's)



TBI: Early Signs at School:




- Changes in handwriting, coloring, copying from the chalkboard
- Blank stares, lost moments in time
- Appearing vacant and spacey
- Falls, clumsiness
- Cannot recall recently learned information
- Failed tests, declining grades

TBI: Problems in Elementary School Years:



- Language acquisition, acquiring early reading concepts
- Cannot recall recently learned information
- Math facts, concept of money and time
- Classification: similarities and differences
- Problems understanding abstract concepts
- Blank stares, lost moments in time, vacant, clumsiness

typically placed upon others in an effort to avoid punishment that is likely to be harsh and well beyond the action. In this manner, the presence of trauma in a person's life can create a personality that, while looking like hyperactivity as we behaviorally know it, is truly incorporated to address real fears associated with the life he or she is living.



Teenage Years:

- Language deficits: expressive & receptive
- Inability to learn from mistakes
- Continually distracted by the irrelevant
- Learning contaminated by unrelated information
- Idiosyncratic substitutions in reading
- Failed tests, cannot recall material studied

Injury to the brain affecting the frontal processes produces individuals who do not have the brain capacity to restrict their behavior, so they cannot be patient, they cannot restrain their impulsivity, they cannot stay on task, or they cannot avoid blurting out what they think at the wrong time and in the wrong place. They have to have their own way because they cannot shift sets, and become stuck in their thoughts. They cannot comprehend the give and take of relationships; therefore, they do not keep agreements or appreciate the efforts of others, ignore rules, and do not feel guilty. They are easily frustrated, easily angered, and easily annoyed, with no capacity to damp down their emotions, which are frequently overly reactive, out of control and not commensurate with the situation. As such, they become overly excited and cannot follow the rules of the game. Finally, the feedback loop of sound is not present, so they are loud, far louder than the situation demands, and while easily upset if others are loud, they remain unaware of their own loudness.

Socially, these children do not share very well, they become stuck on certain objects and will not give them up, and they tend to bully other children, becoming highly demanding and manipulative to get their way. Without a social conscience in place, they have difficulty apologizing for their mistakes, feeling guilty when they have done something wrong, and they are difficult to reach with punishment, generally nonresponsive and seemingly immune to discipline.

HYPERTHYROID

When hyperthyroidism is active, the person can develop manic qualities that will appear as overly active. A child came in with those huge “bug eyes,” and I evaluated her for ADD. While displaying clear-cut symptoms (albeit mild, and none of her testing scores fell below average limits) of ADD, she also demonstrated

frontal deficits that made little sense given her history and the absence of any birth or subsequent causal factors that would be related to a brain injury. I suggested to the parents to wait for a confirmed diagnosis of ADD prior to ruling out thyroid issues. She ultimately was diagnosed with a hyperthyroid condition that was rather significant, significant enough to clinically be present as a feasible and probable causal factor. Once the thyroid condition was stabilized, which took several months, re-evaluation still revealed the clear-cut pattern of a long-term genetic ADD disorder, although her scores did not fall below average limits and her functioning in the classroom did not suggest the need for medication.

TYPE A PERSONALITY AND ALCOHOLIC PERSONALITY

The behavior of these two types of personalities can be present as an individual who is hyperactive, always on the go, and always moving. Individuals given the descriptor of type A personality tend to appear hyperactive simply because they are fast-paced, fast-talking and fast-thinking, which are the behavioral indices that we have come to see as ADHD. We typically associate any type of extremes or fast pace with hyperactivity. If on a tight schedule, type A personalities can become overly frustrated, impulsive, and highly impatient. Lack of time and feeling overwhelmed changes their persona, brings out the worst, and they seem more hyperactive by the minute. This may negate the following of a routine, the wait for things to happen, such as for the waitress to come to the table or the teacher to come to their desk. With a diminished wait time capacity, they get up to find the teacher or to track down the waitress if they need to leave the restaurant.

People with either or both of these personality types do not always comply with rules if they feel they are not correct or not appropriate to the situation. Feeling superior to others or used to the leadership role, they do not work well in group situations, taking over and becoming demanding and/or controlling. They do not follow rules, believing they know a better shortcut or a better way, and attempt to convince the group of this. They tend to become judgmental; judging their superiors or the teacher in the classroom or the authority figure, requesting rules to be changed "just this one time." They do not believe that consequences will actually affect them, so that they have the power to move around the situation, to move around the rule that has been made, and so on. They do not adjust their behavior to specific situations if they feel that it does not require it. For example: "So, you are in the library talking; there is no one else around who cares?"

Type A or alcoholic personalities tend to be more extreme thinkers, thinking they are right about something and refusing to back down on a point or to concede an error. If they are rigid thinkers, then perseverance or getting stuck may occur, thus promoting black and white thinking and negating consideration of any alternative response. When illness affects these individuals, such as cardiovascular disease or sleep apnea, these symptoms can become more pronounced.

The following symptoms can be true of hyperactivity as well as the above disorders:

- Nervous and high-strung
- Fidgety behavior
- Disorganized with possessions
- Changes from one uncompleted activity to another without finishing the first activity

- Rushes through chores or tasks with little or no regard for quality
- Begins tasks prior to completion of teacher's directions
- Cannot adjust behavior to expectations of different situations
- Makes excessive noise
- Runs in the house, does not sit appropriately on furniture
- Nervous when things do not go the right way
- Fails to follow a routine
- Hops, skips, jumps when moving instead of walking
- Handles objects, twirls pencils, plays with things in the desk, repeatedly sharpens pencils
- Talks beyond what is expected or at inappropriate times
- Does not wait appropriately for assistance from instructor
- Demonstrates inappropriate behavior when moving in a group
- Acts as if driven by a motor
- Excessive activity
- Cannot sit still even if told to do so over and over
- Cannot maintain appropriate position while seated in the car
- Runs in a shopping mall or wide area
- Cannot restrain the need to continually move
- Always plays with some type of object or thing if not moving
- Rushed speech, talks fast
- Flits through a room
- Cannot wait for their turn in a game
- Extremely short attention span^a

Symptoms of hyperactivity, while related to frontal lobe processes and over-activity, are characteristically less complex than the combined subtype and as such more likely to relate to sleep deprivation, heightened anxiety, psychiatric symptoms, even active temperament style, and perhaps emotional trauma, and less likely to be representative of frontal lobe syndrome and pervasive impact to brain functioning that would be more characteristic of the combined subtype.

^a Excerpts from the following checklists: Conners' Parent and Teacher Rating Scale, Children Symptom Inventory-4: Parent checklist, Children's Problems Checklist (CPC), Attention Deficit Disorders Evaluation Scale (ADDES 2nd Edition) Parent and Teacher rating scale, Child Behavior Checklist and DSM-IV-TR.

4

Adult ADD/ADHD: What It Is and What It Is Not

Barbara C. Fisher

*Brain Evaluation/United Psychological Services, Washington Township,
Michigan, U.S.A.*

In the 1990s, there was still the notion that adult attention deficit disorder (ADD) did not exist. The child who ran around, did not pay attention, and could not sit quietly was thought to disappear as young adulthood evolved. When diagnosing ADD during those days we had to try to convince physicians that adult ADD actually did exist. These days you go into the offices of the same physicians and there is an infomercial on adult ADD. I saw an adult that I had diagnosed approximately 10 years ago whose cardiologist had laughed at him, exclaiming, "there is no such thing as adult ADD." Apparently, a few years ago when seeing that same cardiologist, during a discussion regarding medications the cardiologist advised he had been "outed" by his wife and was now on medication himself for the treatment of adult ADD. In the early 1990s, we had the first adult ADD seminar in Ann Arbor and expected only a few people. Several thousands showed up, surprising all of us. The word had gotten out over the Internet and people swarmed to Michigan in search of help.

Not surprisingly, medical management revealed similar documented positive effects to the child population. In my experience, the adult population is more appreciative of medication that solves the problems in their life. For the first time they do not come home and channel surf, falling asleep in front of the television. They actually have the energy to complete the projects on their list. Adults are the ones who call me up on the phone thanking me for diagnosing them with ADD.

Adult attention deficit hyperactivity disorder (ADHD) is becoming recognized as an important health issue, a disorder that is not limited to childhood. Symptoms related to this disorder impact the adult's physical well-being and contribute to future decline limiting the ability to age gracefully. Approximately 30% to 60% of children diagnosed with ADHD reveal similar signs of the disorder in their adult life (1,2). Inattentiveness and the presence of symptoms of an attention disorder have been diagnosed in adults who were not previously identified as having attention problems in childhood. Generally, there is an absence of hyperactivity as a component in the adult manifestation of ADD/ADHD, and the male population is not overrepresented (3). Often this is the result of their adult life presenting greater challenges than childhood. In other words, they were able to get through school given the structure of the external environment, but when they had to provide their own structure and/or with the addition of their own children and stress from maintaining home, family, and work, attention issues emerged for both sexes. It is commonly seen that with the addition of stress in one's life, attention issues readily emerge.

The problem in the field of measuring adult ADD is the same one occurring in the measurement of childhood ADD. Studies are attempting to isolate the adult attention variables given the difficulty of relying solely upon checklists and the absence of a rating system such as the school setting. Too often the only reporting

individual assessing the attention behavior is the adult ADD person himself. Their report of symptoms can change and become more variable over time depending upon the life situations they are addressing at that time. The research being conducted in the field is yielding variable results due to the problem of attempting to measure a faulty entity. Studies addressing the presence of psychiatric comorbidities of disorders such as antisocial personality, anxiety and/or depression, reveal that such syndromes do not always accompany the diagnosis of ADD/ADHD; however, if present, such disorders can mimic ADHD symptomatology resulting in a false diagnosis (4,5).

When there are memory problems or executive reasoning deficits that appear on testing this more likely indicates either another disorder entirely and/or a genetic attention disorder plus an additional disorder, such as ADD plus sleep apnea or ADD plus cardiovascular disease. Structural imaging studies have typically identified frontosubcortical neural circuits in the pathophysiology of ADHD, however attempts to measure these findings clinically have not proved successful (6). Neuropsychological testing using measures of executive reasoning have not conclusively been able to match the findings seen on the imaging studies. Recent research specifically indicated the absence of executive reasoning deficits in a group of defined ADHD children (7). Language problems are being reported more frequently and seem to be the issue that adults have more difficulty compensating for in their lifetime (8).

Language difficulties can be one of the more positive signs of childhood ADD when interviewing adults. In evaluating adults for almost 20 years, the question of either reading difficulty or comprehending what was read, is one of the most powerful ways to ascertain childhood ADD and to separate genetic from acquired attention disorder. Commensurate with the assertion that the "real" ADD is the inattentive type, research points to extreme inattention as being highly inheritable and the primary symptom seen in adults accompanied by declining hyperactivity/impulsivity symptoms (2).

While isolating deficient information processing but not attention deficits, research continued to focus upon the presence of deficient motor output or poor response organization. Studies employing neuropsychological evaluation to measure executive reasoning problems, response inhibition, impaired vigilance, motor inhibition, poor response organization, as well as problematic verbal learning and memory have typically been less than robust yielding results that were not clear-cut (1–12). Predictably, these studies have not been successful in isolating a specific pattern that could be predictably and reliably replicated. Greater consistency was found with intra-individual versus group analysis yielding the conclusion that intra-individual analysis held greater diagnostic promise for ADHD adults (13). I would attribute varying research results and overall difficulties to the problem of diagnosing a disorder that by definition has become overly ambiguous, hampered by multiple etiologies. In my experience of evaluating this disorder, when there are deficits affecting the frontal/executive reasoning processes and/or memory, the problem is not solely that of ADD. In these cases, the ADD attention deficits pale in comparison to the frontal and memory deficits, which tend to be the result of some type of additional disorder involving brain impairment.

As the search for frontal deficits continued, neuroimaging studies attempted to confirm the prefrontal deficit areas and apparently were successful although there is no in-depth discussion about ruling out extraneous variables such as sleep apnea or some type of injury that could create frontal deficits over time in the

adult. Neuroimaging studies suggested circuitry involving the medial and left prefrontal cortices and anterior cingulate cortex, with an emphasis upon frontal dopaminergic hypoactivity (14–17). Some of these studies apparently did finally point to the additional involvement of systems more posterior in the brain, the parietal cortices and took the focus from dopamine to norepinephrine receptor dysfunction (19). Family studies support the validity of the diagnosis of ADHD in adulthood.

The anxiety seen in childhood and misdiagnosed as hyperactivity is sufficiently calmed by the time of adulthood to allow for greater prevalence of inattention to be seen and diagnosed. Inattention was found to be a more persistent variable seen in adult ADHD accompanied by a subsiding of symptoms of hyperactivity and impulsivity. The prevalence of the predominant inattentive subtype of ADHD in the adult population has been found to be present to an equivalent degree to the more commonly recognized combined subtype that incorporates both impulsivity and hyperactivity. The inattentive form was reported as being diagnosed at a later age of referral and onset. It has been suggested that the criteria defining ADHD be revised in the Diagnostic and Statistical Manual of Mental Disorders (DSM) with symptoms appropriate for the adult world, and that ADHD become a criterion-referenced diagnosis with the use of different age appropriate batteries to differentiate severity levels (1,2,18,19).

The National Institutes of Health (NIH) consensus statement regarding the diagnosis of ADHD included the need for more validity studies to support the existence of several diagnostic criteria.

These include the presence of severity criteria determining the impact of symptoms upon individuals throughout their lifespan, the presence of misdiagnosis, underdiagnosis and overall poor assessment and treatment practices, as well as the effectiveness of medication over behavioral treatment. Any of these would point to the necessity of understanding the diagnostic criteria of this disorder in the adult population (4).

In testing ADD adults the problems are clearer if you are looking in all the right places. The symptoms of sleep are readily seen in completing an Epworth Sleepiness Scale. Symptoms of cardiovascular problems become apparent as opposed to that of head injury and so on. Adults who exhibit the hyperactivity that they had as children generally represent a small percentage of the population. Generally, as adults these individuals are unable to maintain employment and are probably overdiagnosed with bipolar disorder. Otherwise, adults will tend to appear as inattentive, which is what we find when conducting research with this population. The self-report measures completed by the adult population reveal abnormalities, specific symptoms of distractibility, information processing deficits, mental restlessness, poor task completion, impatience, and forgetfulness. Studies have shown that adults are able to provide an accurate recall of childhood behavior and current behavior sufficient to rule in the diagnosis of ADHD, separating symptoms of inattention versus hyperactive-impulsive (20).

Adults have been successfully evaluated for ADHD with objective measures of various aspects of attention (Trail Making Test, Paced Attention Serial Addition Test, Stroop, Wisconsin Card Sorting Test, cancellation tasks to name a few), while test measures of other aspects of brain functioning continued to produce varying and inconsistent results (1–3,15,18). Studies have addressed the confounding issues of anxiety and depression affecting neuropsychological tests, indicating that symptoms related to ADHD emerged as the prevailing causal factor (3). Anxiety,

correlated with reduced neuropsychological test performance, declined following the intervention of methylphenidate treatment (19). Other adult studies reported mixed findings that may have been task dependent, as well as related to the severity of the psychological profile, for trauma, anxiety, and depression. For example, an oculomotor task, to identify ADHD in girls was subject to practice effects; sustained attention deficits were ruled out as a method to classify ADHD when found to be a common phenomenon across all major child psychiatric diagnostic groups (21). Traumatic brain injury and schizophrenia were identified as known disorders revealing substantial deficits and a similar profile to ADHD on attentional measures given the impact upon skills of executive reasoning although typically limited in the ability to discriminate ADHD from controls without substantial false negatives. A few of these measures revealed significant impairment when the siblings of ADHD subjects were compared to the siblings of controls (22).

Overall, research studies reflected the vulnerability of measurement of presumed deficit areas of executive reasoning to numerous extraneous variables, from sleep deprivation to structural brain damage. Results were found to increase in diagnostic power when used as part of a battery composed of multiple assessments. Consistent with the notion of ADHD as a developmental biochemical disorder, as opposed to a disorder involving brain injury, the most predictive power was found when the cutoff used was one standard deviation. The fact that many, if not most of these measures, commonly used to address ADHD symptoms can be impacted by a variety of additional variables would seem to account for the discrepancy in the literature as well as the difficulty in determining a clear nosology of ADHD.

Neuropsychological test findings have been explained by various theoretical constructs or models regarding causal factors to account for the symptomatology associated with ADHD, primarily targeting the frontal executive system. Substantially greater evidence indicative of brain abnormalities in the frontal striatal circuit presupposes the executive system as the causal factor to explain test findings. Terms of information processing and deficient coding of information are linked to frontal striatal dysfunctions as causal factors (23). More recent studies suggest the addition of posterior parietal and brainstem regions to account for symptomatology associated with the diagnosis of ADHD (24).

There is the identification of a posterior attentional system involved in the "where" component of attention. Copying of designs, the ability to view the whole or gestalt, and generally visual spatial tasks are seen as a primary function of posterior processes (25). The ability to maintain the integration of a design, the correct rotation, and the avoidance of distortion are all measures of intact visual spatial functioning. It has been determined that various aspects of figure drawing are primarily a process of parietal lobe functioning. In our own research, we took 150 Benders (copying of nine designs) on diagnosed ADHD patients and studied them, finding that two designs are generally more susceptible to problems in terms of copying them exactly, especially in comparison with the other drawings rendered by the same individual (within subject comparison). These results have not been specifically tabulated in a research format.

The trend in the re-evaluation completed on adult subjects in our facility thus far is that results are routinely replicated; in some cases revealing the exact same score 10 years later. In fact there is not one case in which results have not been replicated in terms of the same pattern seen on testing for either the children or the adults. This also includes individuals tested as children who have become adults.

Validation studies are ongoing at our facility and eventually these data will be formally published. Nonetheless, the trend is quite clear. There is a battery of tests for ADD/ADHD that holds up over time and can be used to define, test and evaluate adult ADD as well as separate out ADD from other additional disorders for children, adolescents, adults, and the aged population. In almost 20 years of experience, testing thousands of ADD individuals, this diagnostic evaluation process does accurately hold up over time, and can be used to rule in ADD and rule out the presence or absence of other co-morbid or co-associated disorders. In this manner, ADD as a genetic biochemical disorder can be ruled in, the affect of other disorders can be ruled in or ruled out, and the presence of other disorders as primary diagnoses can be ruled in. It is too bad that we have been led in a different direction from where we started with ADD, down a path that simply does not exist, to become so convoluted and confused in our thinking regarding this disorder.

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Part III: Reasons for the Overdiagnosis and Misdiagnosis of ADD/ADHD: An Introduction

Barbara C. Fisher

*Brain Evaluation/United Psychological Services,
Washington Township, Michigan, U.S.A.*

This section focuses upon the co-related disorders, the disorders that typically overlap with attention symptoms resulting in misdiagnosis of a disorder that is not present and the tendency to think the disorder is present far more often than it actually is. The first two chapters begin with a discussion of the diverse opinions as to what attention deficit disorder (ADD) actually is, followed by a discussion of the problems of self-report symptoms. There is an inherent tendency to misdiagnose any disorder based upon symptoms that are more abstract, less quantitative and more varied amongst the population. For example, restless legs syndrome (RLS) has four main criteria used to diagnose adults via a clinical interview and similar criteria that have been modified to diagnose children. A variety of checklists are not used, which range from approximately 12 items to over 60 items. It is no wonder that there is confusion in diagnosing a disorder that varies in symptoms from checklist to checklist.

The following chapters discuss the typically seen disorders mistakenly diagnosed as ADD. Emotional disorders are presented that commonly overlap or are masked by ADD and not diagnosed. One of the most common disorders that is not diagnosed as a result of the diagnosis of ADD/attention deficit hyperactivity disorder (ADHD) is traumatic brain injury (TBI). Any professional working in the field of head injury will tell you that the first diagnosis especially with children is ADHD hyperactive or combined subtype. The occurrence of this diagnosis tend to occur in that time period when the child returns to school immediately following the injury and is behaviorally out of control. Awareness of the diagnosis of head injury does not prevent professionals from immediately grasping onto the ADHD diagnosis especially when observing selective attention deficits that describe a child who rushes around the room in frenzied action grabbing one thing after another. My hypothesis is that in observing such behavior and being so attuned to "hyperactivity" as a diagnosis that clinical judgment immediately grasps onto ADHD as providing the clearest explanation of the child's extreme and bizarre actions. The disservice done to the traumatic brain injury (TBI) population unfortunately is significant, and at times highly damaging, especially when the brain injury symptoms remain overlooked and there is a progressive problem that is not diagnosed as a result. The chapter on electroencephalogram (EEG) diagnosis points to the need for accurate and intense assessment to rule out progressive disorders such as seizure, which tends to be a more common than uncommon occurrence in the head injured population.

The overlap between ADHD symptoms and sleep disorders is another crucial area, and when either of these disorders remains undiagnosed, especially apnea, children and adults can suffer life threatening consequences as a result of

poorly regulated sleep, sleep deprivation, and the impact upon the functioning of the brain as well as the heart. One of the foremost authorities on RLS cautions the tendency to negate a child's growing pains or complaint of leg discomfort by the adult given the significant overlap between ADHD and RLS. While cardiovascular issues places the adult diagnosed with apnea at risk, the impact to the brain due to a loss of oxygen and desaturation has been clinically seen as enormous, ranging from mild to severe. When the apnea is severe and has been ongoing for some time, treating the sleep apnea at that juncture does not return the functioning lost, ameliorate the learning problems or fix the diagnosed brain impairment. When the diagnosis is sleep apnea the child or adult is at risk to be affected by two major factors of sleep; deprivation and impairment to the brain. Far-reaching consequence of sleep apnea include its effect on other disorders, such as seizure, not to mention the significant changes that occur in the functional, physiological operation of the neurotransmitters, amino acid, and hormone balance.

The chapter completed by a very renowned cardiologist cites the overlap between ADHD and cardiovascular indices suggesting the need for anyone treating this disorder to be aware of the co-morbidity of these two factors, noting individual differences and that diagnosis of cardiovascular disease does not preclude treatment of ADD with medication. I have seen clinically that cardiovascular function improves with the use of stimulant medication in adults given the significant reduction of anxiety and stress that occurs post-treatment.

Finally, this section is completed by a discussion of another emerging disorder that threatens to be as confused with and over- and underdiagnosed as ADHD. More and more children are being diagnosed with disorders along the autism spectrum. Treatment spanning almost ten years of the combined efforts of a neuropsychologist and family physician has proven that the diagnosis of autism is a brain disorder. The documentation of seizure disorder among this population is significant and when treated with anti-seizure medication non-verbal children acquired language and began to function in the classroom setting no longer requiring an isolated academic learning situation. The timing of intervention for treatment with autism is essential. The earlier the better to diagnose and begin to address the myriad of causal related factors that affect brain function on a cellular level.

Barbara C. Fisher

*Brain Evaluation/United Psychological Services, Washington Township,
Michigan, U.S.A.*

Classification of attention deficit disorder (ADD) as a disorder has changed dramatically over time. Historically, ADD children were labeled as having “hyperkinetic reaction of childhood” or “minimal brain dysfunction.” The *Diagnostic and Statistical Manual of Mental Disorders* (DSM-III, a recognized diagnostic assessment process) in 1980 separated various symptoms formerly grouped under “hyperkinesis” into “attention deficit disorder” with hyperactivity (ADHD) or without hyperactivity (ADD). In addition, the DSM-III identified two distinct coassociated behavioral disorders: oppositional defiant disorder and conduct disorder. The DSM-III shifted the criteria from that of underlying brain dysfunction to a more behavioral construct for the diagnosis of ADD/ADHD (1).

The subtyping of attention deficits was criticized as being empirically unfounded and led to its removal in the DSM-III-R in 1987 (1–3). Two subtypes emerged from this change: ADHD and undifferentiated ADD. At that time the estimated occurrence of this disorder was approximately between 3% and 5%. The requirement for diagnosis was eight or more of 14 symptoms identified as essential features of the disorder. The problem with this approach was the possibility of making a diagnosis of ADHD without any symptoms of inattention as long as there were eight symptoms in the categories of inattention, impulsivity, or hyperactivity. As such, a child could be diagnosed with ADHD based solely upon unruly or overly active behavior. The DSM-IV introduced in 1994 attempted to correct this problem using a three-factor system (2–4):

1. ADHD primarily inattentive subtype (ADHD-I)
2. ADHD primarily hyperactive–impulsive subtype (ADHD-HI)
3. ADHD combined subtype (ADHD-C) (1–3)

The DSM-IV-TR emerged in 2000, estimating the prevalence of ADHD at 3% to 7%. This latest version of the DSM added two things: the diagnosis of those adolescents and adults who currently have symptoms but no longer meet full criteria (they can be specified as “in partial remission”) and a new category, ADHD not otherwise specified. The latter diagnostic category was specifically designed to document those disorders that do not meet the criteria for ADHD while displaying prominent symptoms of either inattention or hyperactivity. Specific examples would be those individuals whose age of onset is beyond 7 years and whose symptom pattern, while presenting with symptoms of inattention, do not meet the full criteria for the disorder while displaying behavioral signs of sluggishness, daydreaming, and hypoactivity (5).

FOCUSING ON BEHAVIORAL SIGNS TO DIAGNOSE ADD/ADHD NEGATES THE INTENDED CHANGES OF THE DSM-III-R TO THE DSM-IV

The result is the continued focus upon "hyperactivity" and anterior or frontal systems in the brain which remains unproven in the research despite numerous studies. The focus upon overactivity as a primary symptom easily leads to overlap with a myriad of disorders manifesting this behavioral trait. Disorders creating behavioral hyperactivity, such as sleep apnea or brain injury involving the frontal processes, therefore remain undiagnosed because the focus is on the diagnosis of ADHD and the search for the "right" medication takes precedence. The "right" medication remains elusive given the lack of proper diagnosis. Everyone begins to look ADHD given the numerous disorders that can present with symptoms of hyperactivity.

Parents and practitioners often became frustrated and confused in considering hyperactivity as a key element in all ADHD cases. The inattentive form of the disorder is often forgotten or overlooked. Assuming ADD to be ADHD means that a number of parents will rule out the presence of a genetic attention disorder if able to keep their child sitting while watching television and/or if the child does not exhibit those symptoms that we associate with ADHD: impulsivity, defiance, and various behavioral symptoms revolving around the child's ability to listen, take direction, and sit still for longer than a few seconds at a time. Parents assume that if their child can accomplish the above, or they are not seen as having a behavioral problem, they do not have ADD or ADHD as we know it. No one is thinking about the cognitive issues associated with ADD or the primary problem of inattention, which was the reason for rewriting the diagnostic categories in the first place.

Commonly missed is the quiet child who has undiagnosed ADD. This child has difficulty reading in school, and does not understand why he or she is not catching on as quickly as the other children. Parents are unable to comprehend what is happening as their child becomes angrier and is outwardly and inwardly more depressed. The child who does not complete homework or in-class assignments, who may be failing classes but does not create a problem in the classroom and even helps the teacher; is not seen as ADHD. The child who has a reading problem and fails tests due to not reading the question properly is seen as dyslexic, triggering the search to find the right reading solution. The solution remains elusive, as too often the problem is the result of the long-term consequences of an underlying, undiagnosed attention problem.

As a clinician, reading problems typically accompany the diagnosis of the genetic ADD disorder. The reading problems seen in the garden variety of ADD (ADHD inattentive type) are solely the result of the overbuilding of logical reasoning to the demise of spatial functioning. When the ADD child has a reading problem, the parent or school usually seeks extra help via tutoring or some other means. This may or may not be successful because the problem within the brain has not been addressed. It may appear successful because the child has worked very hard to memorize words and not because the problem of decoding has actually been resolved. In this manner the child is able to continue to function and to attain good grades although the problem remains and resurfaces with multiple choice test questions and/or when reading demands are greater such as in college or graduate school.

When reading remains problematic, eventually school becomes taxing, a place where the child is continually forced to read and to be responsible for what

they have read. A lack of motivation sets in. School is no longer enjoyable. At this point many children give up, declare reading as boring and place their energies into "getting by" by developing a number of coping mechanisms to meet the required obligations with the least amount of effort possible while decreasing the now painful and laborious experience of reading. Anxiety as a typical accompaniment to the genetic inattentive attention disorder manifests itself with the studious practice of avoidance and procrastination maintaining the belief that it is easy to put off today what can be accomplished tomorrow.

As indicated, spatial problems have a huge, albeit unseen, effect on the individual diagnosed with ADD. Reading is just one area. Math is another area prominently affected by symptoms related to a genetic attention disorder. Difficulties with math classes tend to increase as greater complexity, knowledge, and understanding of basic math principles become necessary during junior high and high school and into the college years. In discussing various treatment options, one of the cognitive training programs that we have been successfully using at our facility has literally created a vast improvement in spatial functioning with the result being improvement in reading and math skills. This is not to say that the child or individual does not need to spend time learning to read or to understand math operations; the point is that they are now capable of learning and learning comes easier to them. Recent research is finally looking at spatial functioning and its relationship to ADD symptoms, although unfortunately, the focus remains predominantly upon frontal, anterior brain symptoms that I believe has created untold confusion in the field among the professionals. When professionals remain in disagreement, how can we expect the parent or ADD individual to understand this disorder and what ADD truly is?

ADD/ADHD is vastly different as it applies to a child who has additional brain issues. If brain issues manifest early in the child's life, such as birth trauma, sleep apnea, or a traumatic brain injury, the primary symptom tends to be the lack of and/or extensive difficulty of developing language skills. The development of language becomes an arduous process, characterized by a lack of intelligibility and profound deficits that remain resistant to the typical efforts of treating professionals. The relationship of more extensive reading problems or even language acquisition are historically seen as the result of this undiagnosed "plus" issue. Children may be unable to acquire language due to problematic brain processes that subserve language function. This enters the spectrum of autism and the likelihood that early brain injury damaged the areas necessary to acquire language. In these cases to learn language the child must be taught in a manner that specifically compensates for impaired brain areas. Too often the problem is the lack of a correct diagnosis due to the primary focus of ADHD. These are the children that I categorize as "children at risk" who have an entirely different disorder such as a brain injury or a genetic attention disorder plus an additional disorder.

Children at risk or adults with extreme tendencies are easily identified with ADHD. As a result of additional undiagnosed disorders ADHD has become associated with learning problems, substance abuse, Type A personality, lack of maturity, and social deficits. Maintaining steady employment or attending college become unattainable goals. The inattentive type is often not diagnosed or masked by depression and anxiety symptoms. Typically, ADD without hyperactivity was seen as the more mild disorder, and ADHD presented as the more severe problem. It was commonly believed that a person would "grow out" of this attention problem and emerge into a strong, well-ordered adult. The latter scenario actually

does occur, however the variables are different. Generally, the young adult/adult discovers a niche or area of interest—something that ADD does not interfere with or where their motivation is so strong and overrides their attention issues—they find another person to fill in the gaps. Things now work for them and success fills their lives. The attention disorder is not resolved, it is not gone, life has been altered to accommodate the problematic symptoms.

For many years ADD has been a kind of “catch-all” diagnostic basket for a number of symptoms that are actually symptomatic of another disorder that remains undiagnosed. Unfortunately, one of the first diagnoses of a child who has sustained a brain injury is ADHD. The focus upon ADHD becomes predominant, often taking precedence even when the brain injury is a known entity resulting in hospitalization. Medication may or may not work, or it may work temporarily and effects are paradoxical as opposed to a predicted treatment effect. Acquired attention symptoms emerging from a brain injury are misunderstood as symptoms of a genetic attention disorder and the controversy continues, often with a bewildered parent lost amid a sea of disagreeing professionals.

Unfortunately in attempting to streamline or better define this disorder, in recent years the scientific community has given the entire spectrum of attention disorders the ADHD label. A disorder that was already greatly misunderstood is now even more confusing. This reclassification has not had positive effects for those affected by it; seemingly overnight, ADD as ADHD became a bad word. Having ADD as ADHD became synonymous with being stupid, a target for teasing. Parents are hesitant to respond to a teacher’s suggestion for testing in fear of their child being assigned the ADHD label, the connotation it carries for them and their child. This delay in action can be devastating; by the time action is taken a child can be entrenched in failure with low self-esteem. It is often poor grades or behavior problems that lead to consultation with the family physician and a trial of medication instead of formal testing. The diagnosis of ADD remains an unspoken entity because parents are so reluctant to apply this label. In many cases the child is not made aware that they have symptoms of an attention disorder in order to avoid the stigma associated with it.

Recent research is pointing to the diagnosis of sleep apnea and/or sleep disorders, such as restless legs syndrome or periodic limb movement disorder, mimicking attention and overactivity symptoms in children. The affected child is unable to remain seated in the classroom due to discomfort in their legs and the relief they get by moving around. The child may also appear overly active in order to stay awake due to a sleep disorder that is eroding their slow wave sleep or restorative sleep for the body. The presence of “plus” issues in addition to attention symptoms and/or the lack of diagnosis involving the brain too often results in the hyperactive ADHD adult who rushes headlong into a rocky road of substance abuse, criminal activities, and/or personal mishaps. Symptoms of the “plus” issue confused with attention issues remain unresolved due to lack of correct diagnosis and treatment. On a positive note, some of these extreme symptoms that we have labeled Type A personality may provide helpful traits to start and run a successful business operation. Success comes in the form of perseverance, pushing forward through impossible odds.

In summation, children diagnosed in preschool and immediately thought to be manifesting symptoms of ADHD are more often those impulsive, out of control children that will not behave nor respond to an adult request. While meeting the hallmark symptoms necessary to qualify for the diagnosis of ADHD, too often

there are additional issues that remain undiagnosed (such as a brain injury, seizure disorder, and sleep apnea, to name a few) while the search for the correct medication remains a primary focus of treatment. The diagnosis of underlying conditions that either create and/or exacerbate attention symptoms remain undiagnosed and untreated. It has become easier to label a child ADHD and to trial medications than to search for the true causal problem. Polypharmacy based upon teacher and parent reported symptoms provides the impetus to raise or lower medication. Problems remain unabated, parents become angry and eventually hopeless, the professionals keep trying to solve an elusive problem that would not be elusive if time was spent upon proper diagnosis. Consequently, it becomes paramount that every professional treating or seeing individuals diagnosed with attention problems leave themselves open to the presence of additional undiagnosed disorders that may exacerbate and/or cause the displayed attention symptoms.

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6

Diagnostic Concerns When Using Self-Report Measures as the “Gold Standard”

Barbara C. Fisher

*Brain Evaluation/United Psychological Services, Washington Township,
Michigan, U.S.A.*

The reliance on self-report measures as a primary means of diagnosis for attention deficit hyperactivity disorder (ADHD) combined with a lack of standardized testing has proven insufficient in accurately assessing the individual presenting with symptoms. A learning problem as a significant difference between the cognitive and achievement functioning is not a regularly seen phenomenon associated with the true genetic attention disorder. Consequently using achievement and intellectual assessment would tend to lead to misdiagnosis and more often a lack of diagnosis of attention deficit disorder (ADD). A wide disparity exists among diagnosing and treating professionals as to the correct method more likely to result in accurate assessment. Typically the standard administration of IQ and achievement tests as accepted assessment of ADD has yielded confusing and contradictory results, leading to the accepted gold standard use of symptom-based self-report measures completed by the parent, or the affected adolescent or adult. While there is more acceptance recently in the use of neuropsychological testing to diagnose an attention disorder, test measures are not uniform. The lack of belief in the existence of a test battery that accurately assesses ADD, while ruling out the presence of disorders, does not promote the routine use of neuropsychological testing. An additional complication is the lack of agreement as to what specific brain areas are affected by attention symptoms and the unproven yet widely accepted belief that anterior brain symptoms or impaired frontal processing is the culprit.

The problems inherent in relying upon self-report measures to diagnose ADD are numerous. The individual may not recognize the existence of a symptom in a particular setting or that person may already be compensating for an attention issue without realizing it. The symptom may be masking another symptom or masked by another symptom or disorder. The person may under- or overestimate their symptoms. It is obvious that many issues can undermine an objective diagnosis.

The gold standard to diagnose ADD/ADHD at this point in time is via use of self-report checklists, which are based upon Diagnostic Statistical Manual of Mental Disorders characteristics. The following are symptoms taken from the standard checklists currently being used by school professionals, physicians, and psychologists. The problem with the use of these checklists is that a number of different disorders (only one of which is ADD) can produce the same symptoms.

On self-report measures parents typically report the following symptoms in children diagnosed with ADD, as a genetic biochemical disorder

characterized primarily by inattention and formally diagnosed as ADHD, inattentive type:

- Distractibility or attention span as an overall problem
- Avoids or expresses reluctance about, or has difficulties engaging in tasks that require sustained mental effort (such as schoolwork or homework)
- Gets distracted when given instructions to do something
- Fails to give close attention to details or makes careless mistakes
- Difficulty sustaining attention in tasks or fun activities
- Does not listen when spoken to directly
- Does not follow through on instructions or fails to finish his or her work
- Does not direct attention or fails to maintain attention to important sounds in his or her immediate environment
- Needs oral questions and directions repeated
- Difficulty concentrating
- Disorganized with possessions
- Does not remain on task to do homework
- Does not listen or follow verbal directions
- Moves from one uncompleted activity to another
- Starts but does not complete homework
- Does not independently perform chores or responsibilities
- Does not remain on task to study to prepare for tests or quizzes
- Does not organize responsibilities
- Does not prepare for school assignments
- Rushes through chores or tasks with little or no regard for quality
- Does not read or follow written directions
- Difficulty with time and date
- Poor sense of direction
- Difficulty with right and left
- Does not have good common sense
- Difficulty understanding what he or she is reading
- Difficulty writing or reading letters or words
- Difficulty with spelling or math

The following are symptoms frequently seen and identified by teachers when there is only ADD, a genetic biochemical disorder that is characterized primarily by inattention:

- Inattentive, easily distracted
- Short attention span
- Poor concentration
- Problematic organization
- Poor test preparation
- Difficulty completing papers and reports
- Poor handwriting
- Not getting assignments done on time
- Not always careful in checking his or her work
- Underdeveloped vocabulary
- Difficulty understanding concepts
- Poor reading speed and comprehension
- Difficulty with spelling and math as weaker subject areas

- Poor grades
- Fails to finish in-class assignments
- Switches from one uncompleted task to another
- Frequently loses objects necessary to complete work
- Easily distracted by other activities in the classroom
- Does not hear all of what is said (misses word endings, key words, and so on)
- Does not direct attention or fails to maintain attention to important sounds in immediate environment (teacher directions, etc.)
- Is unsuccessful in activities requiring listening
- Attends more successfully when close to the source of sound (when seated next to the teacher)
- Requires eye contact to listen successfully
- Does not complete or perform classroom assignments during class time (does not use class time successfully)
- Does not perform academically at his or her ability level
- Rushes through assignments with little or no regard for accuracy or quality of work
- Begins tasks prior to completion of teacher directions
- Difficulty concentrating, following a conversation or staying on task
- Loses place when reading, leaves out words, lines or sentences
- Omits, adds, substitutes or reverses letters, words or sounds when reading
- Fails to copy letters, words, sentences and numbers from a textbook or chalkboard
- Omits, adds, or substitutes words when writing
- Fails to complete homework assignments and return them to school
- Is disorganized to the point of not having necessary materials, losing materials, failing to find completed assignments, failing to follow the steps of the assignment in order, and so on
- Completes assignments with little or no regard to neatness
- Fails to perform assignments independently
- Does not prepare for school assignments
- Does not remain on task, more interested in other activities
- Does not listen to or follow verbal directions
- Fails to make appropriate use of study time
- Fails to follow necessary steps in math problems
- Does not read or follow written directions
- Changes from one activity to another without finishing the first, without putting things away

The following self-report symptoms were more frequently endorsed with regard to social relationships when inattention is the primary symptom:

- Seems withdrawn or spends a lot of time alone
- Poor loser in games
- Shy socially
- Withdrawn in class and shy

The following are more frequently seen symptoms associated with behavior problems when inattention is the primary symptom, accompanied by genetic anxiety issues:

- Working hard and not giving up
- Increased symptoms of anxiety and nervousness

- Fidgets with his or her hands or feet or squirms in his or her seat
- Refuses to sleep alone
- Not interested in learning
- Does not give his best effort
- Gives up easily
- Does not finish homework
- Does not like school
- Gets poor grades
- Nervous habits such as twirling hair
- Afraid to go to sleep unless near parent
- Handles objects; twirls pencils, plays with things in his or her desk, repeatedly sharpens pencils

The following symptoms are frequently identified by parents when there are additional issues, such as a brain injury or sleep disorder, which results in increased symptoms along the ADHD continuum:

- Leaves seat in situations in which sitting is expected
- Feels restless
- Has difficulty engaging in leisure activities or doing fun things quietly
- Difficulty organizing tasks and activities
- Talks excessively
- Loses things necessary for tasks or activities
- Difficulty awaiting turn
- Forgetful in daily activities
- Interrupts or intrudes upon others
- Easily frustrated
- Refuses to follow requests made by parents
- Grabs things from others
- Interrupts others while talking
- Impulsive, turn taking difficult, reacts without thinking
- Easily angered, annoyed, or upset
- Ignores consequences of behavior
- Cannot follow rules of game
- Cannot adjust behavior to expectations of different situations
- Becomes overly excited
- Climbing on things
- Moving about unnecessarily
- Makes excessive noise
- Behaves inappropriately while riding in the car
- Runs in the house, does not sit appropriately on furniture
- Forgetful in daily activities
- Difficulty remaining seated when asked to do so
- Talks excessively
- Blurting out answers to questions before they have been completed
- Interrupting people or butting into other children's activities
- Loses temper
- Arguing with adults
- Blaming others for own misbehavior or mistakes
- Difficulty controlling worries
- Refuses to do as told by adults

- Angry and resentful
- Difficulty falling and staying asleep
- Complains of physical symptoms for no apparent cause
- Difficulty figuring out how to do new things
- Difficulty making decisions
- Difficulty planning ahead
- Difficulty figuring out or solving problems younger children can do
- Disorganized in the approach to problems
- Difficulty understanding explanations
- Difficulty doing things in the right order (sequencing)
- Difficulty completing an activity in a reasonable period of time
- Difficulty changing a plan or activity when necessary
- Slow to learn new things
- Difficulty switching from one activity to another
- Difficulty speaking clearly
- Difficulty finding the right word to say
- Rambling on without saying much
- Jumping from topic to topic
- Difficulty recognizing objects or people
- Problems concentrating
- Becomes easily confused or disoriented
- Not feeling very alert or aware of things
- Forgetting where he or she has left things
- Forgetting events that happened recently
- Forgetting what he or she is supposed to be doing
- Forgetting instructions
- Poor fine motor control
- Frequently complains of headaches or nausea
- Fails to demonstrate short-term memory skills (recall of two and three step directions)
- Fails to remember sequences (days of the week, months of the year, daily routine)
- Does not follow school rules
- Begins assignments before receiving directions or instructions or does not follow directions
- Impulsive (reacts immediately to situations without thinking, impatient in class, fails to wait for turn or assistance from teacher)
- Argues and talks back when corrected
- Impulsive, reacts immediately to situations
- Fails to comply with teachers, refuses to do as he or she is told
- Ignores consequences of his or her behavior
- Fails to follow a routine
- Leaves seat without permission
- Does not work in group situation
- Hops, skips, jumps when moving instead of walking

The following symptoms are frequently identified by teachers when there is an additional issue such as a brain injury or sleep disorder, which results in increased symptoms from the ADHD continuum:

- Difficulty memorizing information
- Poor grades

- Talks beyond what is expected or at inappropriate times
- Does not wait appropriately for assistance from instructor
- Engages in nervous habits
- Failure to complete the tasks that he or she began
- Becoming restless and fidgety
- Impulsive behavior and acting without thinking
- Messy work
- Talking out of turn
- Failure to carry out assigned tasks
- Talks to others during quiet activity periods
- Makes unnecessary comments or noises in the classroom (talks to other students without permission, interrupts, makes fun of others)
- Impulsive (reacts immediately to situations without thinking, impatient in class, fails to wait for turn or assistance from teacher)
- Problems following a sequence of instructions
- Extremely overactive and out of the seat
- Over-reactive
- Impulsive, acting or talking without thinking
- Restless

The following are more frequently seen symptoms noted with regard to social relationships when there is an additional issue beyond that of ADD and/or a diagnosis driven by disturbed brain processes unrelated to ADD:

- Does not adjust behavior to expectations of different situations
- Engages in inappropriate behavior while seated
- Becomes overly excited
- Demonstrates inappropriate behavior when moving with a group
- Moves about unnecessarily, walking around the classroom, leaving the seat, rocking, shaking head, and so on
- Does not behave positively with peers
- Verbal communication unclear and not connected
- Nonverbal communication inaccurate
- Following group norms and rules
- Not skillful at making new friends
- Not approaching situations with confidence

The following are more frequently seen symptoms associated with behavioral problems when there is an additional issue beyond that of ADD and/or a diagnosis that is driven by disturbed brain processes unrelated to ADD:

- Hard to control in malls or while grocery shopping
- Needs close supervision to get through assignments
- Only attends if it is something he or she is very interested in
- Runs about or climbs excessively in situations where it is inappropriate
- Restless in the "squirmy" sense
- Deliberately does things to annoy other people
- Difficulty remaining seated
- Often interrupting or intruding
- Often losing things necessary for specific task completion
- Uses baby talk
- Misnames things

- Forgets things
- Confused easily
- Acts impulsively
- Difficulty getting organized and planning activities
- Loses interest quickly and changes his or her mind
- Uncooperative
- Often interrupts adults
- Difficulty following rules
- Stubborn and resentful
- Has to have his or her own way
- Does not respond to punishment
- Does not complete assigned chores
- Does not feel guilty after misbehaving
- Unappreciative
- Ignores rules
- Does not keep agreements
- Poor hygiene, soils at times, does not wash, sleeps poorly, difficulty getting to sleep, frequent nightmares, overweight, messy eater, eats dirt or other nonfood material, not concerned with appearance, poor manners, frequent headaches and stomachaches, complains of being ill

It is clear that ADHD is being diagnosed by behavioral indices with a lesser focus upon cognitive symptoms. Diagnosis based upon self-report symptoms in my experience has typically resulted in confusion, misdiagnoses and over diagnosis.

7

Specific Emotional Disorders that Commonly Lead to Overdiagnosis

Barbara C. Fisher

*Brain Evaluation/United Psychological Services, Washington Township,
Michigan, U.S.A.*

There are a number of disorders that mimic attention deficit disorder (ADD) symptoms or at the very least exacerbate attention symptoms, resulting in a muddled diagnosis. Bipolar disorder is commonly seen as overlapping with attention deficit hyperactivity disorder (ADHD) hyperactive and combined subtypes. The same is true of the addictive personality or antisocial personality. Obsessive compulsive personality features typically develop as a means of bringing order to a sometimes chaotic ADD world and are evidenced more in “real ADD;” however, these are traits whereby symptoms do not take on the pathological significance that would be seen in a disorder. Instead these obsessive compulsive traits are adopted as coping mechanisms to help the overwhelmed ADD individual attempt to structure their world. The ADD individual thrives on structure and creates specific procedural routines to carry out mundane tasks of hygiene, completing chores, taking a shower, completing homework, and so on. There is a specific shower routine that must be followed. If someone had a bad day because they wore a specific outfit, or some specific issue occurred, then the compulsivity is turned towards avoiding any type of a reoccurrence, which may mean never wearing that outfit again.

The hallmark emotional disorders that I typically see as overlapping with the “real ADD” are the following:

- Anxiety
- Depression
- Posttraumatic stress disorder (PTSD)
- Schizoaffective disorder
- Borderline personality disorder

Anxiety and depression by far, in my experience, represent the most frequent overlap. There may be a genetic history, which is usually the case with anxiety, the disorder that typically accompanies the “real ADD.” The anxiety appears to be highly internalized from a young age onward and pervades the person. Manifestations of anxiety may appear in the form of insomnia, as well as fear of success and fear of failure, ultimately affecting motivation and drive to perform well in the academic setting. Anxiety continually lies beneath the surface directing decisions to avoid and procrastinate difficult school tasks. Generally, individuals are more at risk for depression if there is a genetic history of it; however, eventually ADD individuals become depressed due to continual encounters with failure that they feel helpless to change. In this regard the depression is a situational factor. When present from younger years onward (due to attempting to cope with attention symptoms that remain problematic despite various interventions that have

been tried) leaves the person at risk for depressed feelings and the negative attributions that accompanies such feelings to become long lasting and ingrained in their persona. From a general perspective the determination of whether the depression becomes an ingrained pattern or remains situational depends upon the child's ability to overcome attention deficits and to attain success. When their efforts continually meet with failure because they expect failure to occur (whether due to past experience or an attribution system commonly seen with an inherited form of depression) a cyclical spiral begins. The longer the spiral continues, the more that situations result in failure to the degree that the person enjoys few successful moments in their life, the more the tendency to conclude that they are "not smart." Conclusions of incompetence and comparisons made to peers resulting in the assumption that "everyone performs better than they do" leads to low self-esteem and decreased sense of academic prowess.

In this manner, symptoms of anxiety and performance fears ultimately lead to depression and prediction of the worst case scenario. The picture becomes complete with adopted negative thinking patterns, low frustration tolerance, and anger as the child predicts the worst and the worst occurs, plummeting them into a negative self-fulfilling prophecy that too often remains impervious to intervention. The child refuses to complete their homework or to study for tests, maintaining that they do not care as their grades decline to an all time low. Sadness over their current situation, wondering how things got so bad, only serves to create more symptoms of depression and even lower frustration tolerance, resulting in the tendency to become angry and to refuse to continue with any task once encountering difficulties. The spiral becomes worse and less apt to be changed as the individual immerses further and further into depression and negative thinking.

PTSD presents a combination of emotional and physical symptoms. Emotionally, it results in the tendency to become hypervigilant, hyperaroused, and overly reactive to everything in the environment, like the minute men of colonial times, always ready for action. Emotions are repressed, there is a disconnection or disassociation from their surroundings (remaining walled off and tucked away internally), no one is trusted, personal relationships are subject to attack, and misconceptions as the pain of the past infiltrates the present. If the trauma involves abuse, this is repeated in new relationships especially when the trauma remains unresolved. Individuals run headlong into relationships unaware of their similarity to the past often triggering painful emotions that have remained repressed up to this time. It is common for someone who suffers from trauma to remain blissfully removed from their past while unknowingly working from the process of homeostasis and the comfort produced by what is familiar, as they surround themselves with personalities similar to people who have been significant in their life, usually their parents. Thus, in naturally seeking the familiar the person finds themselves in the same battleground they grew up with, only the players are different. Upon realization of this situation, they awaken horrified, often stymied by the encounter with the traumatic figure in their life whose characteristics are now represented by their spouse. They are at great risk to become "numb" overwhelmed with the pain, worry, and deep wounds of both the past as well as the present. The more traumatized, the more the person is at risk to have cognitive symptoms related to diminished frontal processes exhibiting far more distractibility (characteristic of selective attention deficits) as well as symptoms of perseveration, difficulty with problem solving and decision making, poor sequential analysis and integration skills, and difficulty understanding abstract concepts.

Typically, neuropsychological evaluation reveals compromised memory functioning and cognitive deficits related to impaired frontal processes. One of the primary issues seen in their behavioral dyscontrol is the impact of selective attention (resulting in the tendency to attend to everything in their environment and an inability to sit still, which compounds their tendency to be hypervigilant, a symptom that is directly related to the presence of trauma in their lives). The problem of word retrieval negates their ability to communicate their thoughts, resulting in the tendency to withdraw more and talk less. Physical issues are reported as stress induced, compromised immune system, and sleep difficulties (fragmented sleep, nightmares, flashbacks, anxiety arousals) clearly requiring the intervention of functional medicine. When ADD is present, the symptoms of distractibility are noticeably enhanced. When ADD and posttraumatic shock disorder are combined, the result is the tendency to appear as ADHD hyperactive subtype.

Schizoaffective disorder is perplexing if attempting to diagnose via symptoms; however, it is easily documented and recognized with the use of evaluation. I first became aware of this disorder over 15 years ago when I was involved with a case whereby a mother poured oil over herself and lit a match. She was not supposed to live but she did, with rather grotesque burns all over her face and body. She lit the match because she was depressed, had been for some time, and “the voices told her to do it.” Schizoaffective disorder has a range of symptoms, hallmark characteristics consist of the combination of depression and a fragile persona. This combination remains stable; however, additionally symptoms vary based upon individual personality and temperament traits as well as additional life experiences. Symptoms can range from being mild to severe, especially when combined with other issues. Here are some case examples:

- A 14-year-old high-school student is depressed and very fragile. She thinks too deeply. She is far too sensitive to the statements made by others and her nighttime thoughts are extremely dark.
- A young man 24 years of age has difficulty socializing, going to work, and dealing with people. He requires frequent periods of time alone to recoup from feeling so overwhelmed by people who are disturbing just because they exist. People become more disturbing if they talk loudly, walk nosily, or even chew too loud.
- A 13-year-old boy diagnosed with schizoaffective disorder as well as ADD and symptoms related to impaired frontal processes revealed a more frightening aspect of this disorder. Let me explain. Fragility resulted in his having difficulty coping with people, initiating the tendency to withdraw especially if he became uncomfortable for one reason or another. If pushed too hard, he stood his ground and never gave an inch, determined to have control in order to protect his own internal fragility. He was not attached to people and therefore never budged on his decision not caring about the pain that he created for those around him. Depression created an accompanying anger and meanness to the fragility internally present in this young man. This was seen in his continual hitting of his father who tried to hold him when he refused to let go of his mother’s arm. He refused to participate in the evaluation or to do anything that he did not want to do, becoming literally abusive if one of his parents tried to make him do something. His antisocial conduct and lack of conscience is seen as the result of the impact of impaired frontal processes

(the inability to appreciate the feelings of others, perseveration, and rigid cognitive thinking) in combination with the depression and fragility seen with this disorder. Prior to leaving my facility, this boy managed to carve up my mahogany testing table.

Fortunately, this disorder in my experience responds rather well to a specific medication. The problem is that prior to figuring out the presence of this disorder, other medications will either exacerbate the condition and/or not treat it fully.

Individuals diagnosed with borderline personality disorder are the people that pervade the divorce court, accuse personal friends, family members, and professionals they come in contact with of all sorts of actions that “deeply wound” their narcissistic, rather fragile persona. The key here is that people are thought of as objects, pieces to be moved and manipulated as if they were part of a chess match. There tends to be a history of disorganized and intermittent attachments to significant people in their life. In other words, they did not grow up in a sturdy, safe environment to develop an internal sense of self, thus their dependency upon those around them for self esteem and their demands for needs that can only be filled by others. Dependent upon others, lacking their own “sense of self” they remain highly fragile and emotionally reactive to people especially if they feel that someone is attacking, criticizing, or somehow not convinced that they are truly wonderful. It is when they no longer feel important or central to another person that evidence of the well known rageful anger connected to this diagnosis emerges. A hallmark symptom is a tendency to twist and turn the truth to their own belief system. Individuals are placed on pedestals and taken down just as quickly. These individuals are rarely happy, rarely satisfied, insisting that things run the way they want (with only minimal regard for the welfare of others) remaining very needy and dependent upon the affection and admiration of those around him. Their world is divided into black and white thinking—good versus bad, with no gray areas or room to compromise. This personality easily creates trauma in a child. Their willfulness and determination to be in total control are the type of variables that can have far-reaching effects for everyone around them. The borderline personality types are rarely satisfied, any satisfaction they have tends to be short. They are very controlling, totally determined to have their way and intimidating when this does not occur. If they have a genetic attention disorder in addition to this personality, the symptoms typically become blurred by the emotional issues. ADD symptoms may remain hidden due to the need to be perfect and above reproach.

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Symptoms of Traumatic Brain Injury and ADD/ADHD

Barbara C. Fisher

Brain Evaluation/United Psychological Services, Washington Township, Michigan, U.S.A.

Symptoms of traumatic brain injury (TBI) tend to be primarily related to cognitive deficits involving the frontal and temporal brain areas as a result of biomechanical forces involving the bone and soft tissue of the head. Motions of acceleration and/or deceleration can result in tissue strain, leading to hematomas and diffuse axonal injury. Alterations in blood flow, metabolic dysfunction, disruption of the blood-brain barrier, calcium dysregulation, free radical formation, excitotoxicity, axonal damage, apoptosis (neuronal cell death), cerebral edema or brain swelling, and ischemia are possible factors involved in the pathophysiological cascade that can be initiated by TBI (Jain 2006; Mendez and Ardila, 2006; Sinson and McIntosh, 2006; and Stein, 2006). Focal TBI results from either contusions, or bruising involving these two brain areas, coup–contrecoup contusions, or penetrating injuries. Contusions tend to be involved as part of a larger picture of deficits from diffuse TBI although they can occur independently. Delayed neurobehavioral deterioration can occur following brain injury as a result of changes that occur from intracranial hematomas, diffuse cerebral swelling, considerable axonal injury, and further cellular changes resulting from the brain's increased sensitivity to secondary ischemic insult. Molecular events, such as the elevation of cytokines and changes in neurotrophic factors resulting in increased oxidative stress, can occur in even mild TBI.

Symptoms would be seen as a result of impaired or diminished functioning of the frontal area of the brain, whose job duties are the following: supervisory system, communication manager, and director of operations. Symptoms of impaired temporal processes would relate to problematic short- and long-term memory, more specifically, if the information is registering in the brain, getting into the memory compartments for retrieval (recall), recognition, or storage (long-term or delayed memory recall) to occur.

The following are symptoms commonly present when there is traumatic brain impairment affecting the frontal processes:

- *Difficulty making decisions.* Any kind of decision, from what to order in a restaurant to setting priorities for the tasks that need to be accomplished that day.
- *Difficulty with starting something.* The lack of initiative, decreased spontaneity, decreased productivity, loss of ambition, and general apathy occurs as a result.
- *Problems with prioritizing attention.* Difficulty determining the importance or relevance of any given event often results in an inability to make decisions. Selective attention issues can lead to knowing what you want to do, but are unable to accomplish the designated task; you often end up doing something else instead.

- *Tendency for misconstrued or misperceived conversations.* The person is easily overwhelmed by too much information, unable to selectively attend to multiple stimuli in their environment. As a result, they are constantly being bombarded with too much information. This leads to confusion. A person might be speaking to them, but they are thinking of something else and cannot separate out what they thought and what the person actually said to them.
- *Selective attention deficits result in the tendency to bounce from one uncompleted topic or sentence to another,* making everyday conversation rather confusing and frustrating.
- *Easily confused and overwhelmed, distracted by irrelevant information.* This is exacerbated with increased task complexity and/or the amount of stimuli in the external environment. Incoming information becomes confused by irrelevant information and being distracted by everything around them.
- *Difficulty in determining the relevance of something,* the relevance of a statement made or passing remark, the relevance of an action or inaction, what is important versus what is not important in one's day-to-day life. This applies to the relevance of any event that occurs, emotions, relationships, and so on. The adult can spend the day focusing on small inconsequential items while missing major problems. The adolescent can focus on being angry or upset with something while negating everything else that is going on. The child can focus on one event at school or an incident with another child, and spend the entire day upset. The person can become singularly obsessed with one idea, one event, one object, one thought, thinking of nothing else and unable to shift their thinking.
- *This leads to the diminished ability to regulate emotions,* to modulate or control internal emotions or drive states, leading to increased emotional lability (reactivity) responding impulsively on a reflexive level without the ability to employ the higher order reasoning processes that humankind is capable of.
- *Increased emotional fragility.* Children are mislabeled oppositional and defiant or impulsive. They may become overly aggressive at times and yet very compulsive. All of these changes occur without rhyme or reason due to their emotional vulnerability, fragility, and overreactivity. While developing a hard core outside shell, there is a very sensitive, easily hurt person inside.
- *Difficulty differentiating reality from one's internal thoughts.* Frontal processes provide the reality of what we think. We wake up in the morning look in the mirror and say, "Wow, I look awful." We go to work, someone says, "You look great!" What happens to our earlier thought? It disappears because someone said something different. This is the way we are able to put reality into our own internal thoughts. If this system is not working properly, the person is subjected to their own internal thoughts without the opportunity to inject those thoughts with a dose of reality. Things get out of proportion in this manner. While all this is going on internally, the person is actually very fragile and easily hurt or wounded, misconstruing the actions of others. Outwardly the people around them become more wary, more apprehensive, waiting for the moment of sudden irrational, nasty accusations, and aggressive comments.
- *Sundowner's syndrome.* As the sun goes down things become worse. This happens to children, adolescents, adults, and particularly the aged population. Cognitively and emotionally things get much worse. One child I was testing turned from a mild, well-mannered child in the morning to something quite different in the evening, what I affectionately termed, "the Shining."

- *Idiosyncratic or obsessed thinking leads to outward actions that are not predictable.* People around the child, adolescent, or adult would be hard pressed to recall the singular event, the casual remark that the person is focused upon, nor place the emphasis upon the event that equals the brain injured person's obsessed thought process.
- *Diminished ability to benefit from new learning, to use feedback* received from others or the task itself (indicating that the current solution is not working) to continually change, reassess, and in essence, monitor and adjust behavior for accurate learning and/or problem solving or task completion.
- *Problems doing things in a specific sequential order,* especially when tasks need to be accomplished in a sequential order to be completed correctly. It becomes difficult to learn novel sequences of action, becoming quickly overwhelmed by the various steps involved in any new learning process.
- *Anticipating consequences of one's behavior,* planning ahead for events, thinking about the future and predicting what could occur; if I do this... then this may happen...
- *Racing thoughts, resulting in the tendency to interrupt others,* to blurt out statements or answers to questions before someone has finished their sentence, to change the topic mid-sentence, to have difficulty completing a thought or sentence. The distractibility is so excessive that it literally interrupts task completion.
- *Difficulty with new learning.* If the task has sequential parts this becomes even more problematic, such as riding a bike, figuring out the coffee pot, traveling from one place to another. Difficulty learning any complex action until routinized.
- *Deficient self-awareness and inability to appreciate the impact you have upon others.* Especially when right frontal processes are involved, the ability to process emotional information, to take the perspective of the other person to understand their feelings, or to put yourself in their place. Individuals lose the give-and-take that is necessary for positive social relationships. They do not understand what they have done to make someone upset with them, instead responding reactively with their own upset.
- *Diminished ability to think in a flexible manner* leads to becoming stuck or perseverating. Once becoming stuck, the person is hopelessly entwined in their thinking, preoccupied with certain thoughts, unable to consider alternative thoughts or unable to shift their focus. As such they may redo tasks or rethink decisions, remaining stuck in a perseverative pattern, which negates (minimizing at the least) task completion and goal attainment.
- *When perseveration is present in one's thinking processes, it limits creativity and the ability to think flexibly.* This leaves the person at risk to rely upon previously proven methods of problem solving, applying such methods without the ability to ascertain whether the solution aptly fits the problem situation. The presence of mental rigidity can leave the person stuck in one solution, unable to use the feedback that their solution is not working, and unable to think of another one.
- *Cognitive rigidity, black-white thinking, difficulty making mental or behavioral shifts.* The tendency to maintain assumptions, once made, without the ability to consider any different perspectives or perceptions of any additional given event or incident that has occurred.
- *Difficulty with the integration of concepts,* problems conceptualizing, generalizing information, and/or realizing how the parts fit into the whole, difficulty

assessing a situation from the whole perspective. This can leave the person unable to use a whole perspective, to see the big picture, to correctly interpret events in their world. This can leave people confused, socially naive, and definitely lacking in the understanding of events occurring in their environment. The learning of concepts requiring the understanding of a greater whole (such as math or language) becomes difficult and at times, impossible. There is a more concrete attitude and difficulty with the abstract.

- *Children grow into their deficits.* Things become worse with time to the degree that it appears as if the injury is getting worse when the child is growing into the deficits involved with the executive reasoning area of the brain, the frontal processes. It is when we expect them to understand the social nuances, when and when not to do something, to think abstractly, that deficits associated with the frontal processes become more glaring and outwardly apparent.
- *Fatigue becomes a daily factor* given the resources that need to be mobilized to battle deficit areas. In other words, the use of the whole brain to accomplish tasks that specialized brain areas usually handle.

When the temporal brain areas have been affected by trauma, the following type of symptoms are seen clinically and on neuropsychological testing.

- *Forgetting day-to-day things* such as appointments, where you put something, and relying more upon notes to remember things. Forgetting to turn items off from the lights to the stove or the iron. Missing directions, forgetting a turn in a route you take everyday, losing direction in a store, or skipping a step in the completion of a routine task.
- *Memory loss for short-term memory* results in difficulty remembering details, not remembering appointments, where you were going, what you needed to take with you, who you were going to see and so on.
- *Memory loss at work* leads to questions regarding which papers were sent, promises not kept, jobs not done, pieces of orders that are missing, tasks are only partially completed, mistakes are frequent, instructions are forgotten.
- *Memory loss on testing* results in either no recall or confusion in recall (combination of both memory problems and efficiency of memory (frontal processes) the lack of compartments or ability to place information in memory compartments for recall, problems in registering information (loss or confusion) problem in retrieving information (recall of information) and confusion with recognition (recall confused). There is a difference in learning visual versus verbal information (it is usually easier to tag information for visual recall than verbal). It helps to rewrite things.
- *Word retrieval.* Loss of a word to complete sentences or thoughts, to express oneself adequately. While searching for the correct word to describe what you want to say, you lose the entire thought that you wanted to communicate in the first place.
- *Not aware of time and poor time management,* how events fit into the greater whole. There is a problem temporally sequencing or structuring occurrences in one's life. It is difficult to provide continuity—this occurred 10 years ago versus a few months ago; discriminating what is recent, fairly recent, and long ago. This creates a difficulty comprehending behavior over time, recalling the history of events and understanding its importance.
- *The difficulty temporally integrating events and actions limits decision-making skills using the future.* Planning events and executing the necessary steps that need to be done based upon a time perspective becomes problematic.

- *Problems with the sequential aspect of time.* Lack of awareness of the self through time, the ability to understand what the self is doing now compared to before, compared to the future, the consequences of behavior in the present and its impact upon the future. This skill is a necessary component to create and maintain lifetime goals.
- *Memory loss creates loss of connection* to the past and who the person is, and associated emotions from the past; in short, a loss of who they are, leading to a loss of a sense of self.
- *Memory problems and academic learning.* When there are problems with memory in the first three building block grades it tends to have the most effect upon later learning dependent upon the acquisition of those early concepts. There is an uneven loss of information and/or lack of retention of learned information leading to gaps in learning that often remains hidden. This results in unexplained learning difficulties later (difficulty learning a new concept when based upon the assumption that a previous concept had been learned). There may be confusion in registration of newly learned information, confusion during the retention process, or the loss of newly learned information when attempting to learn additional information. This results in global confusion: confusion during the learning process, confusion with the initial intake of information, confusion in notes taken during class, lack of understanding, pairing relevant with irrelevant information, problem of both memory, and symptoms of frontal processes for use of information and the efficient recall of information.

Emotional symptoms that are commonly seen accompanying a brain injury:

- *Overall deepened emotionality.* Bizarre behavior, bizarre thoughts, peer relationships become highly problematic, isolation by peers and isolation by the person themselves occurs. There may be events of disorientation and emotional outbursts that are not recalled. The child awakens as if from a dream only to find that they have done something "really bad." Seizure events that are from the frontal or temporal area of the brain can take on all types of odd emotional expressions.
- *Depression:* When depression is present accompanying a brain injury, it takes longer to develop, therefore the signs of depression are not seen immediately following the injury and the depression is more resistant to treatment with the following common symptoms seen:
 - Loss of pleasure
 - Punishment feelings
 - Self-criticism
 - Agitation
 - Indecisiveness
 - Worthlessness
 - Change in sleeping patterns
 - Irritability
 - Tiredness or fatigue
 - Negative predictions
- *More emotional, emotionally labile.* Changing from one emotion to the next without warning. Reactivity, very emotionally sensitive, everything bothers them.

- *Easily frustrated* and upset whereby the reaction does not fit the incident.
- *Feeling restless and agitated.*
- *Difficulty waiting* for their turn or waiting for anything.
- Not feeling satisfied with anything in their life, sometimes they care and sometimes they do not.
- *Becoming more quiet and introverted*, wanting to be alone, having more private conversations, talking to people less and less.
- *Anxiety or nervousness*, feeling fearful to the point of paranoia, thinking everyone is out to get them, not feeling safe at all.
- *Dreams related to the trauma of the injury or accident*, poor sleep, difficulty falling asleep or getting to sleep, pain related to the injury only exacerbates this.
- *Feeling sad or depressed*, "life stinks," negative thinking with nothing to look forward to.
- *Thinking about death* or what it would be like to no longer live their life.
- *Feeling highly stressed*, like they cannot handle one more thing in their life, like things are just "too much"
- *Feeling as if nothing matters anymore*, not caring about anyone or anything.
- *Feeling like they have no friends*, they feel lonely at times, and sometimes it does not matter.
- *Going out less* as they feel uncomfortable in social situations, not liking crowds of people goes along with increased paranoia.
- *Acting in a more immature manner*, thinking or acting like a kid, doing inappropriate things in public like belching, poor table manners, toilet papering the neighbor's house.
- *Feeling very different* from everyone around them as if they have different feelings, thoughts, moods, attitudes, opinions, and beliefs.
- *Disliking their job*, being afraid of being fired or laid off, feeling bored on the job, no idea what type of job you would like better.
- *Not being able to budget money*, spending money on anything that they want even if they do not need it, buying things they do not need and did not want until they saw it.
- *Feeling abandoned by God*, no longer believing in religion, the presence of a higher power or a being larger than yourself.
- *Not being able to relax*, having little enjoyment in life, not able to enjoy hobbies or activities that they used to love, not having any interest in things.

TRUISMS SEEN OVER TIME WITH BRAIN INJURY

- The first sign of a brain injury in children is their behavior, which appears hyperactive and impulsive, oppositional and defiant.
- The children do not outgrow a brain injury and it can become worse.
- Deficits may not be seen immediately and instead may appear several months' post-injury.
- Brain injury in children has devastating consequences over time, the earlier the injury the worse things can become.
- Brain injury in the older adult or aged person leaves them at risk for early onset dementia.
- Medication can make a difference, early diagnosis of seizures, and cognitive rehabilitation/brain training.

- Symptoms of a seizure or the emotional consequences of a brain injury can be misdiagnosed as bipolar disorder.

Impairment in the frontal and temporal brain areas typically result in the following cognitive (thinking) and behavioral deficits:

- Lack of inhibition, poor impulse control, and poor personal regulation.
- Loss of insight and understanding of consequences of behavior, the whole picture, abstract thinking limits ability to see how things relate and the subtleties of social conversation and the effect of one's words.
- Lack of inhibition
- Problematic social interactions, poor social skills, lack of knowledge how to relate, and problem of empathy (limited ability to feel how someone might feel, to place yourself in the other person's shoes).
- Over- or under-emotionality. Blunting of emotions versus being too emotional and dramatic, emotionally reactive to everything.
- Becoming overly critical of others while unable to see one's own faults.
- Blaming others and not taking responsibility for behavior.
- Loss of a sense of self—one's history, how one would define oneself through time, goals, values, direction, loss of political ideations, family values, and religious beliefs.
- Limited thinking, lack of creativity, rigid thinking, difficulty generating new solutions to problems, becoming stuck in same solution even though it does not work
- Tendency to take things very literally, often seen in the language used (such as the word, photographer is picture taker or photo taker).

Physical symptoms commonly seen as related to traumatic brain impairment:

- Headaches on a daily basis or every other day.
- Excessive tiredness, feeling like you have no energy, fatigued all of the time.
- Waking up tired and going to bed tired.
- Feeling like you are constantly dragging yourself around.
- Fluctuating appetite due to lack of taste for foods.
- Muscles tiring easily and quickly, your legs feel like concrete blocks you have to drag around rather than lift.
- Loss of hearing or difficulty hearing, ringing or buzzing in your ears on a continual basis.
- Balance problems.
- Inability to play sports like you used to, less coordination and poor reaction time.
- Problems seeing on one side or seeing all the parts of things, one-sided neglect.

BRAIN INJURY SCENARIOS

Case I. *Woman incurred head injury at work.* A woman at work goes to grab something but trips over her chair and falls on the desk. She hits her head but she does not remember hitting her head, she is only aware of her arm, which is badly damaged and requiring numerous surgeries. The focus remains on her arm, she never thinks of problems with her head; however her memory is getting worse and people around her are noticing it. Her personality changes, she becomes

angry, abusive towards her husband, accuses him of all sorts of things, which are blatantly untrue. She becomes more suspicious, forgets things, more confused, can no longer work because of her arm injury, while not recognizing cognitive, thinking, and emotional problems. She becomes more depressed and even angrier. She comes to the author for hypnosis to address the pain in her arm. In meeting with her husband to discuss treatment, he asks the author what can be done to enhance or rehabilitate her memory. An initial testing is completed and surprisingly reveals significant memory problems. Unable to get the help she needs, she eventually leaves her very tolerant husband and runs off to another state. The author received word that the woman remains mentally and emotionally incapacitated since divorce.

Case II. *A woman had an aneurysm in the right frontal area of the brain.* Following this injury, she divorces her husband of 32 years, gets on the Internet, and looks up an old boyfriend, and goes to live with him in another state, leaving her two daughters and their new babies. When asked if she had any problems to discuss upon completion of the neuropsychological evaluation by the author, she indicated that she did not have any problems, however, her family (meaning her ex-husband and daughters) had lots of problems; she, on the other, hand was fine.

Case III. *Child has an injury at six weeks of age after being bounced around in the car when not buckled in her car seat.* She is brilliant. Although there was evidence of a skull fracture and seizures immediately following the injury, there were no signs of problems in school until approximately the sixth grade. She attended a private school with small class sizes and received continual parental intervention and academic help. Consequently, she functioned well in school until the sixth grade. It was then that her teachers assumed that some additional injury had occurred. They did not understand what had happened, that this child had actually "grown into her injury". Problems involving impaired frontal processes are often not seen until those processes are demanded for use in school. The ability to think abstractly, to remember complex information and to integrate newly learned information into a schema to understand the "big picture" concept is not required until later elementary years. Today, she is more confused than she has ever been. Her hard work that sustained in her in earlier years is no longer effective. Maintaining social relationships is hard, she does not understand things despite repeated explanation. A repeat electroencephalogram (EEG) revealed seizures involving the whole brain well beyond the original site of the injury.

Case IV. *A girl had a skull fracture at the age of three from a fall down the stairs, which everyone forgot.* The girl is now in the fifth grade, she cannot read or write. She cannot remember her letters and their specific sounds, she cannot put the sounds into words, and she does not understand how a sentence is formed. Socially she does not fit in, says the wrong thing or she says nothing; she has fits of anger and depression.

Case V. *A little boy is run over by a truck at the age of three years:* The child was in coma for three weeks and came out of the coma, but he had to re-learn how to walk again. He lost his speech and had to re-learn how to talk. Today at age 13, he cannot read or write, he has been home schooled since the third grade after being thrown out of school due to "bad behavior." He feels that no one likes him, he does not understand that if you tease people they will not like you. He wants to "get even" holding onto grudges from the past. He is afraid to let others get close to him for fear of being hurt. He has problems learning, he cannot remember things, he cannot organize learned information, he has problems

comprehending, and he typically associates only with adults, feeling confused about how to act socially. Since approaching adolescence he lives in fantasies more, making up stories to avoid the reality of his life. He cannot always separate out reality especially when he tells too many stories. He is easily upset, gets stuck on issues and cannot let them go.

Case VI. *Another child injured at three years of age fell out of a three story apartment building when the railing broke.* The child is evaluated periodically up until the age of 13 years. Over the 10-year span the effects of his aberrant learning is continually documented on testing. That he has paired unrelated facts as belonging together becomes apparent on intellectual assessment. In response to being questioned as to the definition of the word "boast," this child, at the age of eight years, responded, "sword and the stone." He repeated this definition when assessed at the age of 10 years and again when assessed at 12 years. When I tested him at the age of 12 years and asked why he thought this was the definition of "boast," he replied that he had been watching the movie, "The Sword and the Stone," and the young man had been called "boastful" when he pulled the sword out of the stone. The above type of learning is often seen with diminished frontal functioning. The presence of seizure disorder and brain impairment was not diagnosed until the age of 12 years for several reasons. Prior testing did not use a sufficient amount of testing to assess the impairment that was present all along. The child was bright enough to overcome deficits with compensatory strategies to produce overall average functioning. Finally, the injury affected an area of the brain whose deficits could not be fully observed until adolescence, in other words, he had to grow into his deficits. Therefore, it was not until adolescence that the diminished functioning of this supervisory system would become observable in his outward behavior and thinking processes.

It was in adolescence that the following symptoms became obvious:

- The lack of inhibition, characteristic of injury to frontal processes resulted in the child's calling out in class excerpts from his favorite movie, "The Titanic," or television show, "The Simpson's," while the teacher was attempting to teach history to the class.
- Aberrant patterns of learning were highly apparent in his learning process as well as in his use of language. For example, he thought that the urpose of senators and congressmen was for them to "live in nice houses and drive fancy cars." He apparently learned this information while watching a television news program and observing their entrance into nice houses and fancy cars. He retained this idea despite obviously learning different information in social studies and government while in school. When evaluated at the age of 8, 10, and 12 years, respectively, he indicated the same statements noted above.
- He continually misspelled words to the degree that they could not be understood and he substituted words that had no relation to one another.
- While in conversation, he tended to stop mid-sentence, unable to think of the right words to complete his sentence, ultimately forgetting what he had wanted to say.
- Emotionally he was becoming highly paranoid and suspicious of everyone. His behavior often made no sense. He was as compulsive as he was impulsive. He started fights on the playground, saying things to his peers that were clearly inappropriate and mean. He later expressed feeling hurt and

abandoned when no one wanted to play with him. He had no understanding of why people were angry with him; he rarely recalled the exact sequential events of such incidents.

BRAIN INJURY IN CHILDREN

The types of symptoms noted in research and seen clinically as more typical of children and adolescents diagnosed with severe brain injury comprised a syndrome dominated by potentially severe affective instability, aggression, or disinhibition/ markedly impaired social judgment, and occasionally by apathy or paranoia.

Symptoms were sufficiently severe to constitute a change in personality, primarily related to deficient frontal processes. Research has isolated the following emotional/psychiatric issues: personality change (57% of the population studied), affective instability (49%), marked shifts from normal mood to irritability (41%), recurrent outbursts of aggression or rage, grossly out of proportion to any precipitating stressors (38%), markedly impaired social judgment (38%), disinhibited vocalization/verbalization (41%), and perseveration (35%). Explosive personality traits (32%) and uninhibited/disinhibited acts (32%) occurred to a lesser degree. Even less commonly found, although present, were the following: pathological crying (19% revealed symptoms such as crying when someone did not agree with them or crying when corrected at school), marked shifts from normal mood to depression (8%), marked shifts from normal mood to anxiety (5%), rapid shifts between sadness and excitement (11%), sudden euphoria and elation (8%), lack of tact or concern for others; not sensitive to feelings of others or their reaction (22%), inability to plan ahead, lack of foresight, inability to judge consequences of actions (27%), sexually inappropriate (16%), marked apathy or indifference (14%), suspiciousness or paranoid ideation (5%), echolalia (3%), and immaturity (24%) (1). The notion of personality change accompanying TBI is not a new concept. Much of the recent research points to the presence of emotional lability or instability; emotions drastically increased in intensity that become out of control, following TBI. Continual moodiness is an apt description. Dramatic and rapid shifts in behavior frequently occur, more often unrelated or certainly not commensurate with the causal event. It is not unusual for the child who has sustained a brain injury to become more irritable, whiny, and upset with the smallest issue. When the frontal lobes are directly involved it becomes a problem of inhibition, the inability to stop a behavior from occurring, or to curtail the behavior once it has started.

One young child that I recently evaluated became upset and started to cry. He would cry without stopping, which quickly escalated to screaming and uncontrolled sobbing, lasting for no less than one hour. He managed to somehow calm down for a few minutes before the "storm" approached again. It was not long before he became upset about another issue and the process repeated itself. These children have no idea how to tolerate frustration. They become upset about a myriad number of issues that cannot be predicted or anticipated. Once upset, these children have no idea how to turn the faucet off, and their parents remain just as perplexed. Even if the problem that originally upset the child is resolved, they still continue to cry and scream. It is as if the brain did not compute that the problem was fixed. None of this type of behavior was seen prior to the TBI.

These children have little or no ability to soothe themselves or to be soothed. Crying becomes pathological in the extreme response to common everyday events: disappointment over anticipated family plans such as a trip to the store,

a movie, or outing; upset if corrected in school or at home for mistakes and/or inappropriate behavior. The adolescent who has sustained a brain injury responds with such intense emotion that the parent hesitates to reprimand them, aware that a simple parental correction could become a daylong argument and/or initiate a tantrum. The behavior of the TBI child or adolescent, lacking in inhibition, is an immediate response, often emotionally reactive, out of control, sudden, and short-lived. The public, consisting of trained and untrained professionals, upon observing such behavior, all too quickly arrive at a diagnosis conclusion that does not consider brain injury and only describes the behavior they are witnessing at the time. The critical analysis of a child's behavior needs to include detailed information and observations of what the child was like prior to the injury.

Examples of behavior changes clinically seen following TBI:

- Post-accident inability to get along with siblings
- Post-accident changes in play habits
- Post-accident changes in coloring and handwriting
- Post-accident changes in understanding and following parental direction and instructions
- Post-accident changes in former attainment of developmental milestones such as bedwetting following injury when pre-injury a child had been trained
- In infants, significant changes occur in sleeping and eating habits

Pediatric brain injury does not just affect the child, but it impacts the entire family in the following ways:

- The focus of the family is automatically on the child who has sustained a brain injury
- The care, time, and energy, necessitated by the child suffering from the consequences of TBI, results in the exclusion of the needs of the other children. For example, baseball practices are missed, school plays are not attended, and birthday parties are put off to another time
- The care and time devoted by the parents to all of the children in the family results in the natural exclusion of their own needs as well as their marital relationship
- Time becomes a commodity that no one has
- The natural consequences of the above leads to parental guilt, feelings of failure, and overall unhappiness, as well a overall diminished quality of life for the entire family system
- Post-traumatic stress disorder can emerge as the diagnostic consequence of TBI. Symptoms related to trauma can affect the brain injured child as well as the whole family

A neuropsychologist who is unfamiliar with the signs of frontal deficits would tend to diagnose the child as a behavioral disorder and rule in the presence of attention deficit hyperactivity disorder (ADHD). Measures available to explicitly assess frontal processes are minimal; although the experienced neuropsychologist is aware of how to assess such deficits and the necessity of examining all test results for characteristic patterns. Therefore, what might appear to be a minor deficit or difficulty at the age of four years may in fact prove to be highly detrimental, 5 or even 10 years later. Children who are gifted and of higher levels of intelligence will be able to compensate on general types of evaluation such as intellectual

assessments and therefore appear to be developing normally. It is not uncommon for radiological tests, administered several years post-injury to reveal abnormal findings not seen initially at the time of injury or immediately post-injury. Mild brain injury can often be overlooked, misdiagnosed, and confused with symptoms of childhood developmental disorders, such as attention deficit disorder (ADD/ADHD), learning disability, or depression.

Pediatric brain injury has provided an even greater challenge to prove evidence of injury for several reasons. Academic problems typically do not emerge until the child has been attending school on a formal basis for a sufficient amount of time. Report cards and progress reports generally do not begin to show problematic performance until the later grades of elementary school. Frontal injuries do not become completely understood or seen in the child's thinking abilities until adolescent years. The brighter the child, the longer it will take for deficits to become observable, signifying that the child is no longer able to compensate with asset areas as school becomes more complex and demanding. Unless the pediatric neuropsychologist spends a sufficient amount of time with the child, they will tend to make assumptions that have a greater likelihood of being incorrect. It is only after spending time with the child, watching their reactions and performance on various types of tasks while providing a sufficient amount of tests to determine impairment patterns, that the evaluator will be able to arrive at valid, scientific assumptions regarding the degree and depth of the child's injury.

Children suffering from pediatric brain injury suffer quietly, unaware of the rather profound changes that have occurred in their thinking and behavior. Life is one continual unending attempt to keep up with the pace of their peers and avoid getting into trouble with the significant adults in their life.

Typically seen problematic behavior in the school setting and scenarios that predictably occur when there is a brain injury, specifically cognitive deficits related to impaired frontal and memory processes:

- Defiance on the part of the child when confronted with new material, activities, tasks which were new (such issues result in evoking tremendous fear to which the child responds with defiance, oppositionality, and avoidance)
- Difficulty with increased stimuli, such as noise, increased numbers of people, visual and/or auditory stimuli, such as assemblies. It is best at this point to simply avoid such situations when possible
- The act of intense crying, the inconsolable emotional status that the child can move into rather quickly without much provocation, the faces that the child makes, and intense emotional expression is definitely a problem interfering in his/her ability to learn in any school setting
- The child may become overly attached to some object, pencil, crayon, book, chair, and so on. If attached, the child will require access to the object and not rest until this has occurred. This phenomenon, more often than not, tends to be the result of brain issues and not under the control of the child

The following case examples illustrate the critical role that neuropsychological assessment can play in the proper diagnosis of the child's problems. The behavior of brain injured children is often so extreme and so problematic—escalating quickly for no reason, thus prompting defensiveness and protective isolation from those close, for fear of getting hurt by the rages and lack of empathy. This is the child who does not stop when asked to, and who lives in their own world with their own interpretations of conversation. While at times sweet and

sensitive, this can easily give way resulting in abusive yelling or uncontrollable rages that may or may not be remembered later. These children can be sweet and sensitive or they can be violent and angry. Behavior and emotions are intense, changing without warning or an apparent reason. Thus, the tendency to become focused upon the behavior as parents and professionals attempt to fix the "immediate" problem that is creating untold difficulties. The problem is that the behavior is often so extreme, so intense and so bizarre that the causal factor, more often than not, is the ignored and/or forgotten brain injury.

Examples of: The misdiagnosis of changes in personality and psychological status post-injury:

- I. A deaf child, who was a pedestrian in a motor vehicle accident, sustained a fracture directly affecting the frontal area of the brain, the area responsible for behavioral inhibition and emotional control. Following the brain injury, teachers observed drastic personality changes, and a child who had been the delight of the classroom during pre-injury years, the hardest worker, the one who enjoyed school, and who loved learning new information, became a totally different student. She was described in post-injury as one of the more aggressive children, defiant, and unmotivated in class. The teaching staff uniformly described this child post-injury as so oppositional and resistant to learning that they believed she could no longer benefit from their teaching. At the time of the first neuropsychological evaluation, the teaching staff was in process of searching for a residential deaf school for her to attend to complete her schooling. By this time, the teaching staff had become convinced that her problem was her failure to accept her deafness.

When I evaluated her extensively, the neuropsychological test data clearly identified cognitive consequences matching the site of the brain injury and did not confirm learning problems that were the result of either her deafness or her out of control behavior. This was confirmed by other professionals who evaluated her as well. Following explanation of the thorough neuropsychological evaluation, the school staff revisited their thoughts regarding the issue of brain injury. For a period of time she received accommodations in the school, allowing her to function better. However, eventually her behavior became so problematic and so central to her academic functioning that once again the focus turned to behavior problems as primary, and the presence of cognitive deficits paled in comparison. Two years later, she no longer had any friends, she could not ride the bus, and she was becoming more and more isolated in the classroom. Her primary special education teacher asked for my help to explain to the teachers why the presence of brain injury would produce such extreme behavior. The teachers at this point were ignoring this child and giving her passing grades to move her out of their classroom. A second evaluation and staff meeting was scheduled in her home area. The focus remained upon her deafness and her out of control behavior, the teachers had literally forgotten about the injury. Her behavior superseded everything and any deficits emerging from this rather traumatic brain injury remained a distant element in the minds of the school staff as well as her immediate family members. This child was seen as a rebellious, over-empowered, catered to child who had been spoiled by her parents. No one considered the idea that if they

refused to give in to her demands that she would persist in a relentless manner until she had been granted her wish. The story of the red suitcase emphasizes this point. One day she was shopping in the local Wal-Mart store and saw a red suitcase. She was with her father and asked if she could have the suitcase. Her father indicated that she already had a suitcase. Following this interchange, she managed to create a scene, tearfully sobbing that all she wanted was the red suitcase, which continued from the store and into the family car. She continued to sob and talk about the red suitcase. It happened to be Mother's Day and while at the family gathering she managed to corner each and every family member to discuss this red suitcase. She was still talking about the red suitcase to her mother that evening, over 12 hours later. Such is the power of behavioral dyscontrol. The unfortunate result of damage to the frontal processes usually tends to be the mistaken emphasis upon the child's behavior. The treatment path is usually targeted to reducing unwanted behavior rather than addressing the impact to brain structures and the neurological sequelae as well as the cognitive deficits associated with brain injury.

- II. The child diagnosed with reactive attachment disorder (RAD). His behavior had become so problematic that when seen initially plans were already underway for him to be sent to a treatment program in New Mexico for two years. No one had considered the possibility of a brain injury although he had been adopted by his parents at the age of five years following a year spent as the youngest of 1000 children in an orphanage in Russia and subjected to physical abuse.
- III. The child who at the age of 13 was having bowel movements in class, who could not socialize or relate to any peers, who was initially diagnosed as a behavior problem. His previous diagnosis of encephalitis at the age of eight years was not considered even though he had a history of learning problems. A neurologist subsequently diagnosed him with seizures relating the bowel movements to the seizure disorder. Bowel movements stopped once he was on medication.
- IV. The boy from Canada who was in a coma for one month at the age of five years, following a car accident in which he was a pedestrian. By the age of 12 years he was thought of as oppositional and noncompliant. At the time of neuropsychological evaluation, I learned that he had not been receiving any treatment for the brain injury that had occurred approximately seven years prior. The medical professionals that he was seeing did not acknowledge the presence of a brain injury as a causal factor for his behavioral problems or his learning problems. At the time that I evaluated him, he was having significant difficulties writing and reading despite being in the 6th grade. His problematic behavior was seen as the primary problem for his learning difficulties. However when evaluated by positron emission tomography (PET) scan, the findings indicated that a substantial portion of his frontal lobe was not active, his temporal lobe was highly impaired as well. He had one leg that was more developed than the other, which could easily be identified by the naked eye.
- V. A little boy from a small town in the midwest, is thrown out of his nursery school after he destroyed all of the children's potted plants. He had returned to school following an injury in a department store where he had been pinned underneath a display that fell on top of him. He was four years

old at the time and following this incident he was labeled ADHD and oppositional defiant disorder (ODD). He attempted to choke the family cat until a family member managed to stop him. When not acting out in this manner, this child is sweet, sensitive, and loving. There was an incident that occurred during his neuropsychological evaluation which demonstrates why behavioral issues readily rise to the surface and are typically seen as problematic prior to the consideration of thinking or cognitive problems significant of a brain injury. On one particular test measure this child was getting so many correct answers that the test had to be administered in full due to a lack of ceiling (or sufficient number of errors obtained) to stop the test. It was explained to this child that he was doing so well, performing just as well as a child who was many years older. The example was given that he was doing as well as a child twice his age, 12 years old, (he was six years at the time and still in kindergarten). Perseveration, becoming stuck on the idea that he had to continue the test, literally stopped him from hearing the point that I was trying to repeatedly make that continuing the test meant he was smart. He continued to cry uncontrollably, which moved into sobbing and finally screaming. There was absolutely no intervention that worked to stop this emotional outburst which continued unabated for at least fifteen minutes until he wore himself out. The testing was discontinued for the day and the measure was completed the following day without difficulty. It did not even appear that he recalled the outburst the previous day and he did not appear to recall the reason for his upset. Outbursts such as this are typically seen in the brain injured population. No one knows why they begin. No one knows how to stop them and the child rarely even remembers if they occurred or why. He hit his cousins for not giving him the toy that he wanted. Children played with him less and eventually not at all. Social relationships at school were difficult, there were some inappropriate behavioral incidents in the boy's bathroom. One day he became attached to an aqua color crayon and would not allow any of the children to use it except him. When any of his classmates unknowingly picked up the crayon to use it, this little boy went after them and dragged it out of their hand. Different types of stimulant medication were trialed with equally disastrous results of increased emotionality and even more behavioral dyscontrol. This child had numerous incidents until finally a PET scan indicated the presence of bilateral frontal lobe damage. His family physician prescribed anti-seizure medication and the behavior outbursts initially subsided ultimately stopping.

- VI. A 10-year-old boy from the southern states fell in a department store fracturing his nose to the degree that it was literally moved to the side of his face, was never seen as exhibiting signs of brain injury. He was very bright and did not demonstrate school problems until the age of 12 years and tasks of writing and reading became overly difficult for him. His behavior in the classroom was escalating as he alternated between being painfully shy and talking to himself or highly impulsive becoming disrespectful with the teacher. Professionals alternated between diagnoses of conduct disorder, ODD and/or psychosis. He had developed a pattern of waiting at the end of the lunch line every day with the goal of wanting to see this girl walk by who was in a different class. He never spoke to her, he just watched her day after day.

No one suspected a brain injury although it was becoming more obvious that his ability to recall newly learned information was definitely declining. No one suspected injury to the brain; they simply saw him as a weird child.

- VII. A beautiful blond-haired six-year-old girl from the southeast, who was very compliant and docile most of the time, when left alone for a few minutes while her stepmother left the barn to get some water, brutally harmed a prize mare. The stepmother returned after only a few minutes to find blood dripping down the nose of her prize mare and a comb in the hand of her stepdaughter. When her stepmother reappeared at the door of the barn, the child dropped the comb and walked out of the barn. She returned a short time later to inquire if she could ride the mare that day, having no apparent recollection of what she had done. She was diagnosed with carbon monoxide poisoning.
- VIII. Everyone described this 13-year-old boy as highly behaved, well mannered, and extremely nice. Following an electrical injury, no one could understand why he had periods of moodiness during which he could let forth a volley of words that surprised the adults around him, who had no idea he even knew of such words. No one could understand why he kept falling and injuring himself, never thinking that his legs were giving way, although that is what he described. He had been certified prior to the electrical injury for special education services and diagnosed with an attention disorder. Following the injury, his teachers became quite frustrated and their treatment was sufficiently problematic for the mother to secure considerable funds for private school placement. It was only following a PET scan which identified mid-brain structures as suffering from damage and lack of use, that school authorities finally recognized the child as having some injury to the brain.

These highly variable, idiosyncratic, behavioral outbursts, these moments of lost control, are more often unpredictable than predictable and, in addition, shocking in their extreme and intense nature. The word “no” can lead to physical or verbal outbursts, unleashed torrents of anger or abuse that is certainly not commensurate with whatever they have been denied. The event, in my experience rarely fits the reaction. This results in the labeling of this sensitive child as ODD or conduct disorder when they really meet the criteria for schizophrenia or Schizotypal personality. In other words, these children are like sandpipers, highly vulnerable, easily broken, easily reactive to the anger they trigger from others, despite their outward appearance of being “tough.” I cannot quantify how many arguments I have held with parents who indicate that their child is defiant, which at times they are and quite difficult to have around; however, underneath is this highly fragile person who despite wreaking havoc, does not really want anyone angry or upset with them. They will tell you that they do not care, when actually, if anything, they care too much.

These are the children who do not show improvement with behavior modification programs; they only succeed in perplexing and, more often, frustrating professionals, whose response gradually becomes that of more anger and increased frustration. The child is thrown out of preschool or labeled as bad and not fixable, the parents are either ostracized and/or reprimanded for not controlling their child. No one understands and the parents are left alone at the mercy of these children—who actually can be quite endearing and sensitive, are tired—often unable to resolve their own differences, which at times results in the family unit

dissolving. Brain injury may often remain unseen to the naked eye. However, brain injury is powerful, with enormous far-reaching consequences, especially for children and adolescents. Its power should never be underestimated.

TAKE HOME POINTS

1. Children misdiagnosed as a behavior problem never receive the help he/she needs to cope with the cognitive consequences of the brain injury. The behavior is often so overwhelming and problematic that the cognitive consequences pale in comparison. Emotional outbursts, impulsivity, out of control behavior, and aggressive behavior, as well as selective attention problems can be symptoms or consequences of TBI. Unfortunately, many of these children suffering from a brain injury are being mislabeled as a behavior problem and misdiagnosed as oppositional; problematic behavior is not seen as directly related to the brain injury. A differential diagnosis of a behavior problem should include the exclusion of TBI. There are countless examples of missed opportunities to provide immediate treatment for the child suffering from the consequences of TBI that resulted from the failure to recognize the important diagnostic criteria of behavioral changes observed post-injury.
2. Neuropsychological testing, when completed by a pediatric neuropsychologist who understands and appreciates the complexity of pediatric brain injury, can discriminate a discipline problem versus the consequences of TBI. Children suffering the consequences of TBI often times do not have any control over their behavior and when accused of a specific incident, they cannot recall exactly what their behavior was or precisely what they did. The result is that they do not tend to admit responsibility or wrongdoing, leading to the false impression of a lack of remorse or caring and the diagnostic criteria of anti-social, oppositional, and/or defiant personality features. The behavior problems for the above diagnoses are qualitatively different from the consequences of brain injury, which can be identified by comparing the pre- and post-injury behavioral descriptions and observations of the child.
3. It is not unusual for the brain-injured child to be mislabeled with some type of pre-injury childhood developmental disorder, such as ADD, given that these children typically show outward symptoms of poorly sustained attention and concentration, as well as significant overactive behavior.
4. Attention is not a simple, unitary concept that relates only to the child's ability to focus and concentrate. The inattention of the ADD child is substantially different from the inattention of the child who has sustained frontal lobe injury. Attention and concentration problems are commonly seen following brain injury. The concept of attention involves several elements: the ability to take in information from the environment, the ability to process that information, and the ability to send the information for use to the correct area of the brain. The element of distractibility can affect all of the above elements and the child who is continually distracted internally or externally will tend to miss information solely due to this particular element. All of these elements can and are, routinely impacted by a brain injury. In a synergistic manner, one element affects another element and so on, as all of these elements are necessary for the coordinated effort of sustained attention and focus to complete any given task in one's everyday life. The far-reaching consequences of TBI are immense, with the potential to totally alter anyone's life.

5. Neuropsychological evaluation is a powerful tool. When employing competent and proper tests for the pediatric population, it provides an excellent method to identify the cognitive consequences of TBI. When behavior becomes the primary focus, one of the goals of neuropsychological evaluation is to isolate the factors of brain injury from other diagnostic labels. Unfortunately, the conscientious attempt of the family physician to secure help for the child results in the referral of the child to an adult neuropsychologist instead of a pediatric neuropsychologist.
6. Despite the false notion that children have a better opportunity for recovery from brain injury than adults, the fact is that the theory of plasticity remains unsupported. Children can and do experience significant disabilities and cognitive problems, which may not become apparent until adolescence or several years following the injury. What appears to be only a minor deficit at the age of five years may in fact have a major impact upon the educational, social, and emotional development of the child during adolescent or teen years as different parts of the brain become more challenged. Tasks in the educational setting naturally increase in complexity, taxing the system even further. Testing completed in later years following the injury, for this reason, tends to reflect deficiencies and problems not seen in earlier years.
7. It is important to understand that the grades attained in school during the early years do not provide an accurate basis for determining whether the child has suffered from TBI because the academic work completed in these early grades does not challenge the entire brain. Parts of the brain that may be damaged are not called upon for use until later years. For example, output skills do not become critical until mid-elementary school grades. It is not until the latter years of elementary school and beginning junior high that the child has to function more independently; organize his/her own homework, complete book reports, and write papers, as well as to respond to essay test questions.
8. The finding of a normal computed tomography scan, normal magnetic resonance imaging, or normal EEG does not rule out the presence of significant brain injury. The PET scan is emerging as the state-of-the-art method to view the functional effects of TBI. A child does not need to lose consciousness in order to suffer from a significant injury, whether it is sports related, occurs on a school playground, from a fall, or from a motor vehicle accident. A short period of time whereby the child is dazed following injury is sufficient to induce changes in the brain that can lead to significant consequences affecting the remainder of his or her life.

The developing child is caught in the continual dilemma of attempting to relearn the information they lost while trying to maintain the pace of their peers and acquire new learning. The result is that they are caught in a world of confusion; ill equipped to learn in a manner similar to their age mates, while having to relearn and to continue to learn at the same time. The very equipment that they need to depend upon to correct learning problems, malfunctions, handicapping the child who has sustained a brain injury even further. Consider that the very skills we naturally take for granted to function on a daily basis, results in the loss of 5 minutes per hour. Each day the child is behind 35 minutes of a seven-hour school day and by the end of one week, they are behind 175 minutes. There are no time outs in life for pediatric brain injury where unseen deficits become profound problems later in life.

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Secondary Attentional Disturbances Following Traumatic Brain Injury

Ronald C. Savage

North American Brain Injury Society (NABIS), Lash and Associates Publishing and Training, and Graduate, Program in Traumatic Brain Injury, The George Washington University, Washington, D.C., U.S.A.

Problems with attention, memory, and executive functioning after mild, moderate, or severe traumatic brain injury (TBI) are common in children and adolescents (1). Our brain is the organ that controls these functions and when the brain sustains significant injury, these functions, as well as many others, may be disrupted immediately and/or permanently. While children are diagnosed with “developmental” attention deficit disorder (ADD) or attention deficit hyperactivity disorder (ADHD), there is another group of children who acquire secondary attentional disturbances after TBI. For these children with secondary-ADD (S-ADD) or secondary-ADHD (S-ADHD), the severity of their attentional disturbances is often related to the severity of their TBI (2). This section discusses the neuromechanisms of attentional disturbances after TBI and strategies to help children with TBI and attention disturbances succeed in the classroom.

NEUROMECHANISMS

After a TBI, a child may lose consciousness that may result in coma. Severe brain injury along with swelling and bleeding in the brain puts severe pressure on the brain stem which houses a collection of nerve fibers and nuclei called the reticular activating system (RAS). The RAS modulates a child’s arousal, alertness, concentration, and basic biological rhythms (3). In the early stages of recovery following TBI, children experience significant problems with basic arousal and alertness, as well as problems with attending and sustaining concentration. Professionals working with children after TBI use various medical and rehabilitation therapies to stimulate responses from the children, along with maintaining a very controlled environment so as not to overwhelm the children. The goal is to help the child emerge from coma and through the early stages of recovery without being overly stimulated or frightened. All the child’s sensory systems are stimulated everyday with a primary focus on increasing arousal and alertness. For children with severe injury to the frontal and prefrontal regions of their brains, this process is even more complicated.

The frontal and prefrontal regions of our brain manage our “executive functioning.” Executive functioning refers to the processes required for conscious control of thought, behavior, emotion, and action (4,5). In particular, prefrontal executive dysfunction results in impaired regulation of initiation, inhibition, processing speed, shifting sets, focusing, sustaining, and stabilizing attention for execution (6–8). These attentional disturbances are often found in children with mild, moderate, or severe TBI since it is likely that the frontal areas of their brains sustained the

brunt of the trauma. In addition, the "arousal related" problems found in the early stages of recovery often later develop into fatigue and sleeping disorders. Fatigue and cognitive endurance after TBI is common and children often require naps or rest periods during the day for many months and sometimes even years (9).

Thus, children with TBI may demonstrate long-term residual disturbances in their ability to encode, shift, focus, execute, sustain, and stabilize their attention due to the severity of the TBI, the child's age at the time of injury, and the regions of the brain impacted. Max et al. (10) studied 50 children aged 6 to 14 years and found that the changes in attention deficit/hyperactivity symptomatology in the first two years after TBI was significantly related to severity of injury (10). Ewing-Cobbs et al. (11) studied 34 children after "mild-moderate" TBI and 57 children after severe TBI. Attention was evaluated five to eight years after TBI in children ages 0 to 15 years at the time of injury. The children with severe TBI performed more poorly than children with mild-moderate TBI on focus, execution, and shift constructs. In addition, the younger children scored more poorly than older children on several attention subtests (10). Konrad et al. (12) looked at 27 children with TBI children with developmental ADHD, and 26 matched controls. While the children with TBI and the children with developmental ADHD showed similar deficits in many areas (e.g., inhibitory control processes), the children with TBI also suffered from significant problems with slowed processing speed as a result of the brain injury (12). Finally, Yeates et al. (13) in a study of 41 children between the ages of 6 and 12 years with severe TBI, 41 with moderate TBI, and 50 with orthopedic injury (OI), found that the children with severe TBI displayed significantly more attention problems than the OI group at four years postinjury (13).

A further compounding issue is that, unfortunately, many children with developmental ADD may sustain TBIs because they were not able to attend to the busy street before darting out into traffic or they may have been climbing on playground equipment and not paying attention to their own safety. For these children the TBI will only exacerbate preexisting attention problems (14). Yeates et al. (13) found group differences in behavioral symptoms significantly larger for children with premorbid symptoms than for children with fewer premorbid problems, especially for executive functioning problems (13).

TREATMENT STRATEGIES

Understanding that children with TBI will most likely have residual disturbances in their attention processes, especially those children with frontal region injuries, helps us to plan effective treatment strategies. Further understanding the various neuromechanisms that facilitate attention functioning and then matching that with specific treatment strategies will support children in strengthening existing neuropathways and compensate for compromised neuropathways. Finally, many of the existing treatment strategies for children with developmental ADD can be equally effective for S-ADD children as long as the other compounding problems from TBI (e.g., executive functioning, behavior, sensory-motor deficits, etc.) are taken into practice (14).

For example, stimulant medications that target the attention-arousal mechanisms of the brain may also be helpful to children with TBI. Methylphenidate (MPH) has been effectively used for many years with children for the treatment of ADHD. Hornyak et al. (15) reviewed 10 children with mild to severe TBI treated with MPH. The introduction of MPH improved attention, cognitive function, and behavior as measured by teacher and parent report for eight children in school and

improved arousal in two children who were only minimally responsive and still hospitalized long term (15). Other similar medications that positively influence the underlying neuropathways for attention functioning also demonstrate efficacy with this population.

Specific teaching strategies for children with TBI and attention disturbances often follow one of three general approaches: externally focused interventions aimed at changing the environment so that the effect of the dysfunction can be minimized, internally focused interventions aimed at improving the underlying cognitive ability, and compensatory interventions aimed at teaching children to use alternate strategies that lessen the impact of the dysfunction (16). While supporting data exists for all three approaches, the most effective strategy or combination thereof depends on the strengths and needs of the child. In addition, these attention disturbances in the school setting often may appear as “inappropriate behaviors” rather than as cognitive issues. The chart below summarizes some of the attention problems that may be seen in the classroom, as well as treatment strategies.

Selected aspects of cognition	Possible problems following brain injury	Illustration of problems in a school setting
Attentional processes	<ul style="list-style-type: none"> ■ reduced arousal, sleepiness; fatigue, ■ difficulty focusing attention and filtering out distractions ■ difficulty maintaining attention ■ difficulty shifting easily from topic to topic or class to class ■ difficulty dividing attention between two or more topics or activities 	<p>1) A student may fail to follow the teacher’s instruction or comprehend a lesson, not because of a willful failure to attend or an inability to understand, but rather because of an inability to filter out environmental distractions or internal feelings or thoughts.</p> <p>2) Attentional problems may result in the student talking out of turn, introducing irrelevant topics or responding inappropriately.</p>

Selected aspects of cognition	Possible instructional and compensatory strategies
Attentional processes	<p>Gain student’s initial attention by connecting new learning to prior knowledge,</p> <p>Use clearly defined objectives that are meaningful for the student,</p> <p>Use short and concise instructions and assignments;</p> <p>Reward on-task behavior; avoid punishing behavior that results from extreme distractibility,</p> <p>Use novel, unusual, relevant or stimulating activities;</p> <p>Provide well-placed rest periods, breaks, or physical activity to minimize the effects of mental fatigue or stamina problems,</p> <p>Closely monitor time of day, medications and fatigue factors; confer with physicians to determine the feasibility of adjusting medication times so as not to conflict with instructional times,</p> <p>Be alert for attentional drifts and redirect the student to task when necessary,</p> <p>Explore a variety of cueing systems (e.g., verbal cues, gestural cues</p>

(Continued)

Selected aspects of cognition	Possible instructional and compensatory strategies
	<p>or signs at the study site that remind the student to stay on task), Remove unnecessary distracters in the classroom, Use verbal mediation strategies, such as inserting questions within a lesson, directing attention to the task and topic, In therapy sessions, use tasks specifically designed to help the student focus his/her attention (e.g., simple maze learning tasks or letter/number cancellation tasks, emphasizing speed, accuracy, and the self-instructions that might promote heightened attention to task), Help the student to transfer this improved, self-directed attending skill into the classroom environment</p>

Source: From Ref. 17.

CONCLUSION

Acquired S-ADD after TBI is commonly found in children. Depending upon their age at the time of injury, the severity of their injury, and the neuromechanisms impacted (e.g., frontal regions), children with TBI may have life long attention challenges. Professionals can draw from the literature on developmental ADD and ADHD to search out treatment strategies with the caveat that children with TBI will most likely have other cognitive, behavioral, and motor deficits that will also need to be part of the treatment plan.

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Barbara C. Fisher

*Brain Evaluation/United Psychological Services, Washington Township,
Michigan, U.S.A.*

As a clinician tracking symptoms of both sleep apnea and attention deficit disorder (ADD), I have found that sleep apnea has the potential to have a severe impact upon the cognitive, emotional, and academic development of children, which increases in a stepwise manner as they age. Risk factors and related problems are further detailed in the chapter by Drs. Huang and Guillemineault. From a neuropsychological perspective, younger children carry greater risks and are more affected on tests of memory and frontal processes. The more severe the undiagnosed or unresolved apnea, the greater the impact upon the developing brain. Rauch describes the normal variants of sleep in her chapter and the significance of specific sleep determinants. Variables of desaturation, apneas occurring in rapid eye movement (REM) sleep, and the length and duration of the apneic event are additional determinants whose impact matches the severity seen on neuropsychological evaluation. The pervasive effects of oxygen deprivation are well known and well documented. When occurring within the first year of life, the impact seen on neuropsychological evaluation is pervasive. These are the children who historically experience difficulty acquiring language and are at risk to develop seizures.

In completing neuropsychological evaluations on these children for several years, trends show the most impact occurring with the frontal processes, given the vulnerability of this particular brain area to oxygen deprivation. The degree to which the child is cognitively affected depends upon the severity of the sleep apnea and the variables noted above. The more accurate the sleep study is, whereby the study is analyzed using pediatric norms and events carefully noted with all of the accompanying data, the more information is available to analyze the effects upon the developing brain. My experience is that a well documented sleep study provides the opportunity to analyze the degree to which the neuropsychological test findings are representative of sleep apnea or apnea plus the effects of some additional disorder. There are differences seen on neuropsychological evaluation when sleep apnea is the only additional diagnosis to ADD, sleep apnea is severe and there is a seizure disorder present in addition to ADD, and/or there is a brain injury or severe apnea and no evidence of ADD. Deprivation of REM sleep typically results in deficient memory functioning, while long apneas and desaturation typically produces frontal deficits, with a range depending upon the severity of these variables.

It has been my experience that when the impact is severe and has been ongoing for a long time in the child's life, especially since birth, that the cognitive deficits related to the frontal processes remains more significant and more resistant to treatment. Thus despite the intervention of a tonsillectomy or adenoidectomy, the child remains compromised, and behavioral and academic problems continue. Often, there is a short "honeymoon" period following the surgery before the

pre-surgery symptoms return. There may be additional complications such as an airway problem and structural issues that were not resolved by surgery, and thus sleeping remains problematic, compromised by bouts of apnea, oxygen de-saturation and disturbed, non-restorative sleep. Neuropsychological evaluation presents a different picture for the child suffering from sleep deprivation than from the child who has cognitive deficits related to impaired frontal brain processes.

Selective attention, poor sequential analysis, perseveration, cognitive, or thinking rigidity, are some of the cognitive deficits seen on evaluation that pervasively affects the child's ability to acquire language, develop math skills and learn enough in the building block grades to build the conceptual foundation necessary for further academic development. In addition to cognitive deficits, impaired frontal processes also affect the child's emotional and social development. Rigid thinking negates their ability to be empathetic and to place themselves in someone else's shoes. Impulsivity and lack of inhibition often the result of impaired brain processes and not subject to the will of the child, results in bizarre, out of control behavior that negates positive social relationships. The child is unable to predict problematic behavior and is just as surprised as others when unexplained actions occur carrying far reaching consequences. Eventually this child is isolated and alienated in the school setting as behavior tolerated in younger years becomes unacceptable in preadolescent and adolescent years.

Moral development and development of a conscience is hindered by cognitive deficits of poor sequential analysis and lack of understanding of the integration of temporal events. As this child grows into adolescence the child has difficulty formulating a sense of self with goals and values, is unable to comprehend the whole social picture and the impact of their behavior upon others. It becomes difficult to communicate with them emotionally and for them to understand the error of their ways when they call someone names or are mean beyond that of punishment. Consequently they may refrain from inappropriate behavior, not because they understand that their behavior is not appropriate but because they want to avoid the anticipated discipline.

These children resemble what the world thinks of as the hyperactive or combined subtype, due to symptoms related to deficient frontal processes. As such, they become judgmental, live in a world that is black/white versus gray. They hold grudges, they have a concept of how things should be, and demand that things happen that way. There is a rigidity that negates change or flexibility. So, if the parent changes plans, the child will hound them, demanding to know why and when "this wrong" will be corrected. They are not forgiving of others while expecting everyone to be forgiving of them. They do not have many friends because friends grow weary of acquiescing to their demands and playing only the games they want to play. They become aggressive, getting "even" with one of their peers, based upon their righteous thoughts and belief system that is etched in stone, and are not subject to being swayed by the opinion of another person.

In elementary school years, the primary problem is that of acquiring language—as noted in speech problems, intelligibility, and difficulty comprehending the use of phonetics as the blueprint of language. Further language development is hindered by integration issues and difficulty acquiring an understanding of correct semantic or grammatical use of words. Difficulty with abstract reasoning limits the development of pragmatic language skills, creating misunderstanding of the subtleties of words, what they mean, and when to use them in a conversation. Poor word retrieval limits the spontaneous communication

necessary for adequate social conversation and maintenance of dialogue for conversation to remain ongoing. The loss of words or time spent continually searching for a word to express one's thoughts will definitely negate the natural ebb and flow of conversation. Children naturally avoid other children when this occurs, finding them odd or "weird." Lack of understanding of proverbs and analogies, limited ability to use descriptive words or even slang terms or adopted expressions, often results in more concrete conversation that becomes boring. In teaching these children at our camp how to introduce themselves and say a few opening sentences, they had difficulty thinking of what to say beyond, "Hi." If we introduced a suggestion giving them a specific phrase to use, they adopted that phrase exactly even though we had provided it as an "example." They then proceeded to use that same unaltered phrase over and over with every new person they met. Conversations are further negated by the tendency to become distracted, not momentarily confused or lost as would be characteristic of ADD, but distractibility characteristic of selective attention. This means wandering off topic to an entirely new—often unrelated topic—without completion of the first topic. It means telling a long story full of detail while missing the common thread lacking a beginning, or ending, or middle.

A 12-year-old boy who had very large tonsils that were finally removed (his father was diagnosed with sleep apnea) had a history of frontal lobe cognitive deficits identified on evaluation. I saw him originally for evaluation for ADD at the age of 5 years and diagnosed the presence of a genetic attention disorder, as well as a concern with regard to the presence of additional brain issues. By the time I saw him again at the age of 9 years, school problems were abundant, and he was falling farther behind despite the over-involvement of his parents with school and homework. The presence of sleep apnea was never confirmed by a sleep study. However, there was no history of birth trauma, a car accident, or any event suggesting a brain injury. This child continues to suffer from frontal lobe cognitive deficits to this day. Unfortunately, the diagnosis of ADD is the only diagnosis that he has been given due to the lack of further evaluation from the medical field, although his issues are clearly not seen as the result of ADD within the school setting which currently provides numerous services.

The following symptoms can be observed in children diagnosed with sleep apnea or a sleep-disordered breathing problem:

- Behavioral disturbance
- Hyperactivity or overactivity
- Highly reactive and overly emotional
- Difficulty with language
- Impulsivity
- Poor sustained attention
- Aggressive behavior
- Problematic verbal comprehension
- Developmental delay
- Inappropriate socially
- Inappropriate giggling and overly talkative
- Difficulty with abstract thinking, problem-solving tasks, being creative, higher order math operations
- Dentist report of overbite, malocclusion, maxillary problem
- Structural changes in face

- Chronic runny nose, upper airway infection, earaches, increased allergies, and asthma
- Difficulty getting up in the morning (children should be able to bound out of bed to start their day and not be dragged out or reminded several times to wake up)
- Headaches
- Daytime sleepiness, falling asleep in the car on the way to the doctor, dance class or hockey game
- Failure to thrive-poor appetite (possible consequence of sleep apnea)
- Growth changes
- Weight gain

The following night time symptoms are common when there is a sleep disordered breathing problem or frank sleep apnea:

- Restless sleep
- Unusual sleep positions
- Mouth breathing
- Choking, snorting, and snoring
- Increased breathing effort
- Apnea-breathing stops
- Frequent awakening at night
- Unusual sleep patterns
- Sweating or perspiration
- Enuresis
- Refusal to go to bed at night (toddlers)

It is well-documented that a loss of oxygen affects the frontal processes. There is a plethora of research with babies who have a loss of oxygen at birth that result in deficits in acquiring language, as well as the clear demonstration of frontal symptoms and associated later consequences of social difficulties, difficulty learning, and continued academic problems. The autism population has been cited with oxygen loss and breathing problems as one of the causal factors leading to this disorder.

Clinically, the presence of a sleep-disordered breathing problem is one of the first things that I rule out when questioning cognitive symptoms related to the frontal lobe. The hallmark symptoms of upper airway resistance syndrome are snoring and mouth breathing. Research is now examining the overlap between attention deficit hyperactivity disorder (ADHD) and sleep apnea, finding an overlap—as well as either improvement and/or resolution of ADD symptoms—following resolution of the apnea. Factors of sleep deprivation, poor restorative sleep, and oxygen deprivation, result in the cluster of symptoms seen associated with this problem. Generally, I see sleep deprivation creating moodiness and emotionality in children, as well as overactivity and aggressiveness. At times, a short term memory problem accompanies these symptoms. When there is desaturation and/or the problem is longstanding from birth or early years onward, the frontal processes are more at risk. The adult population tends to show more memory problems unless they have a history of being a mouth breather, which often produces the combination of memory and frontal lobe cognitive symptoms. The severity and/or length of time the apnea goes untreated, especially if complicated by less than graceful aging and/or an additional medical problem, can result in disabling cognitive deficits.

Many children are helped by a tonsillectomy and adenoidectomy which may result in total resolution of problematic symptoms.

For example: I confirmed the ADD diagnosis when I evaluated this child at the age of five years. Continuing problems and school difficulties that were not resolved by stimulant medication resulted in his return several times, from the age of five to eight years, in search of the causal factors that were exacerbating the attention symptoms beyond the control of medication. Further evaluation revealed a pattern of subtle deficits that—while not declining below that of average limits—certainly were not commensurate with evidence of far higher intellectual capacity within the superior range. The intervention of our cognitive training program—while successful in reading and writing skills and decreased attention deficits on evaluation—did not deter the behavioral issues seen in class that were alienating him from his peers. We turned to sleep for undiagnosed causal factors. A sleep study revealed some apneic events sufficient for the diagnosis of mild sleep apnea. His mother took him to a number of specialists who either did not believe in sleep apnea for children, and saw no problem with enlarged tonsils, nor with a sleep study that documented apneic events. His tonsils continued to grow and the snoring escalated. His mother went to another specialist demanding removal of the tonsils. When the specialist operated, he was surprised by how large the tonsils actually were and how occluded the airway. In addition, the adenoids were quite large and removed as well. Despite some difficulty with his speech following the surgery (he had refused to swallow while ill) he returned to school following Christmas vacation as a new child. The teacher could not get over the difference. There was no evidence of the behavioral issues seen previously in the classroom. He was no longer wandering around, his social skills had dramatically improved, and the problematic events seen prior to Christmas were absent. The teacher reported improvement in social relationships, in understanding and comprehending conversations around him and basically getting the abstract concept. He has continued to flourish and where once no one would choose him for their team, he is now one of the most popular children in the class. Where at one time he was blunt and aggressive, he is now caring and empathetic. Where he used to be the identified problem child in the home, he is now fitting in.

The question for any child with the dual diagnosis of sleep apnea and ADD, is to what degree symptoms are the result of a sleep disordered breathing problem, an attention disorder, and/or represent the overlap between the two disorders. In my practice when I find exacerbated ADD symptoms, I complete further evaluation of the memory and frontal processes. If findings are significant and I have a clinical history of snoring, mouth breathing, difficulty getting up in the morning, behavioral problems of hyperactivity in school, and academic difficulties of learning. Children who are having extensive behavioral and learning problems generally are dealing with issues beyond ADD, especially when there are memory issues and frontal lobe signs. Having decided that test findings point to a concern of injury to the brain, the first place to rule out causal factors is sleep, especially if there are some of the symptoms noted. At the same time functional medicine (addressed in Dr. Smith's chapter) needs to analyze the possible impact of factors of nutritional inadequacy, nutrient insufficiency, and factors that may be responsible for increased oxidation in the brain.

There is a decision tree approach based upon test results, clinical history, and severity observed in learning and behavior that relates to: sleep deprivation versus sleep apnea versus desaturation versus restorative sleep versus nutritional inadequacy.

To summarize, the presence of sleep apnea in children has the potential to:

- Make ADD symptoms worse
- Create cognitive deficits related to impaired frontal processes

- Impact the child behaviorally
- Impact the child's ability to learn in the academic setting
- The earlier the problem, the greater likelihood that acquisition of language will be problematic as well.

The Relationship of Restless Legs Syndrome and Periodic Limb Movements Disorder in Sleep to ADHD

Arthur S. Walters

Center for Sleep Disorders, Treatment, Research and Education, New Jersey Neuroscience Institute, JFK Medical Center, and Department of Neuroscience, Seton Hall University, School of Graduate Medical Education, Edison, New Jersey, U.S.A.

Restless legs syndrome (RLS) is a disorder primarily experienced by adults but can also afflict children. RLS is characterized by a compelling need to move or rub the legs. Patients also often complain of pain or discomfort in the legs; indeed, many children with RLS have been misdiagnosed as having “growing pains.” Most often, the greatest discomfort occurs soon after lying down for sleep. The pain and uncomfortable sensations that are part of the RLS symptomatology can have a bad effect upon sleep quality.

Children usually get some temporary relief by walking, stretching, bending, or rubbing their legs. RLS is often associated with iron deficiency and may respond partially to iron replacement.

Many patients with RLS also have involuntary kicking movements in sleep called periodic limb movements in sleep (PLMS). Hundreds of these movements may recur like clockwork every 30 seconds or so in sleep. The treatments for PLMS are the same as for RLS.

Both RLS and PLMS occur more commonly in attention deficit hyperactivity disorder (ADHD) children than in the population at large. The reverse is also true. ADHD occurs more commonly in children with RLS, PLMS, or both, than it does in the overall population. In the only study to date on adults with RLS, they also demonstrate more symptoms of ADHD than either normal adults or adults with insomnia. The parents of children with ADHD also are more likely to have RLS themselves as adults, particularly if their ADHD child also has PLMS.

The possible reasons for these relationships are the following:

1. The sleep disruption of RLS/PLMS results in a decreased quantity and quality of sleep and daytime fatigue. A tired child is a hyperactive and inattentive child.
2. Other scientific evidence suggests a defect of the chemical dopamine in the brains of those diagnosed with either ADHD alone or RLS/PLMS alone. Perhaps this dopaminergic deficit can lead to either symptoms of ADHD or to symptoms of RLS/PLMS. Further evidence in support of this idea is in a recent study, which showed that in children with both ADHD and RLS/PLMS, all of these conditions respond to drugs that promote dopamine in the brain.
3. The idea that when both disorders are present, perhaps ADHD and RLS/PLMS are actually inherited together.
4. There is a causal relationship. Children, who cannot sit at their school desks due to leg discomforts related to RLS, develop symptoms of ADHD. They have

to get up and walk around the room to relieve their symptoms and cannot pay attention to their school lessons.

5. ADHD may lead to symptoms of PLMS. If children move around more in the day, why should they not move around more at night? Perhaps the PLMS are just coincidentally periodic because the child is moving around more in sleep in general.

Further studies will have to be done to distinguish these possibilities.

S. Korotkin

Cardiology Associates of Birmingham, Bingham Farms, Michigan, U.S.A.

The connections and interactions between attention deficit/hyperactivity disorder (ADHD) and the cardiovascular system have some tantalizing associations and verifications.

Treatments for ADHD have recognized cardiac and cardiovascular side effects, symptoms, and implications, but these are often mild, inconsequential, or treatable, although there are incidences and effects for which treatments need to be altered or stopped.

Increased survival in babies born prematurely has been of benefit for many social reasons, but has also provided more babies who manifest problems associated with prematurity. ADHD is a disorder of awareness with impulsivity and, in 1996, was characterized as a dysfunction of the striatum (predominantly the putamen) (1).

This finding concurs with the findings in adults published in a Canadian study in 1997 (2). This study used both single and dual attention task performances on patients who had suffered cortical strokes more than one year before testing compared with controls. The poststroke patients had significantly impaired attention compared to controls.

The striatum samples information from almost the entire cortex. Both genetic and acquired factors can influence its performance. In premature infants, circulatory insufficiency with loss of autoregulation and (systemic) hypotension (possibly causing cerebral hypoperfusion) may produce vulnerability of the putamen and other watershed regions. This localized ischemia may be related to the development of ADHD (1).

Lifetime ADHD has been shown to be significantly more common in (a study of 29) children with focal stroke lesions as compared with controls (3). These patients, even later in life, exhibited "impaired neurocognition" and "attention apathy." The anatomic characteristics with convergent glutaminergic afferent synaptic transmissions from the cortex contribute to the vulnerability in ischemic-induced liberation of glutamate. As repeated hypoxic-ischemic events are known to be more common in prematurity, this may explain the higher association between ADHD and prematurity (1).

A study in Taiwan showed that lenticulostriate vasculopathy (shown sonographically and associated with ischemia) had association with increased incidences of ADHD by the age group of seven to nine years (4). The University of California at San Diego studied 25 patients with focal pediatric strokes and lesions within the putamen and the increased incidence of ADHD with 15 showing definite traits (5).

ADHD occurs more often in conjunction with congenital heart defects (6). How this interacts with brain deformities, susceptibilities, or effects is unclear.

Other environmental factors have influenced the etiology and pathogenesis of ADHD. High dopamine receptor availability—the so-called empty receptors—was linked with increased reaction times and reaction time variability, supporting the idea of a dopaminergic role in the symptomatology. High dopamine receptor availability was predicted by low neonatal cerebral blood flow, which also supports the hypothesis of cerebral ischemia, a contributing factor in infants with general susceptability to ADHD (7,8).

It is also interesting that a study in Japan found that 18 patients who had ADHD compared with controls had similar heart rate, rhythm, and variability in response to tone stimuli, but exhibits less respiratory sinus dysrhythmia at rest (9). Whether this, too, is related to effects from abnormalities of the striate nucleus or not is not determined.

Adults with ADHD may also experience an increased incidence of supraventricular dysrhythmias, bradyarrhythmias, and sick sinus syndrome. This tends to have an impact on treatment and side effects of treatments. Memantine (~Namenda) with glutaminergic effects have not been used to treat ADHD as of yet. Tricyclic antidepressants (desipramine, nortriptyline, amitriptyline, etc.) have been used. There are many reports of hemodynamic effects on children receiving tricyclic antidepressants for treatment of ADHD. Whether this was just the effect of the medications, or enhancement of underlying predispositions is not clear. Usually, these effects are quite benign, but whether there is an increased risk of sudden cardiac death is not yet known (2).

Methylphenidate has been used to treat ADHD. There was concern about side effects from this medicine, but methylphenidate is useful in treating ADHD without cardiovascular side effects of significance (5,10). Treatment of supraventricular dysrhythmias depends on the underlying cardiac substrate, symptoms produced, and the desirability to continue treatments for ADHD. The therapies are usually the same as those used when patients do not have ADHD and are not taking treatment for ADHD. There are times when treatments need to be halted. Usually symptoms resolve, but there are instances when symptoms have been apparently initiated by treatments for ADHD that do not resolve when the treatments have been abolished. Sometimes this just represents an unmasking of an underlying predisposition.

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Using the Electroencephalogram to Rule Out Seizure Disorder

Bharat M. Tolia

Comprehensive Neurology, Headache and Pain Center, Bloomfield Township, St. Joseph Mercy Hospital, Pontiac, and Department of Neurology, Wayne State University, Detroit, Michigan, U.S.A.

The electroencephalogram (EEG) is a complex tool that, if used correctly, can be very powerful in ruling out a disorder of seizures from attention deficit disorder (ADD)/attention deficit hyperactivity disorder (ADHD). A small portion of the ADD/ADHD population has seizures related to another disorder in addition to a genetic attention problem. The caregivers' goal is to make an accurate diagnosis which obviously helps to improve the success of any treatment program.

Seizure is an involuntary, abnormal activity of the brain that may or may not produce physical clinical signs. Nonphysical signs include a funny sensation in the chest, stomach, head, or anywhere in the body. The most common tends to be in the head or the stomach. Someone in this situation is unable to describe these events because they have a lack of knowledge about seizures and do not know how to relate the symptoms to them. This makes it difficult for those in the medical field who do not specialize in neurology to correctly interpret the information provided by the patient and relates it to a seizure disorder. Some examples would be a funny feeling in the stomach (which is not necessarily nausea) or unsteadiness of gait and/or dizziness that occurs in episodes (as opposed to over long periods of odd time).

For example, a mentally challenged man who at 30 years of age had traveled to many physicians looking for help for the treatment of nausea. He had been diagnosed with an unexplained refractory (untreated) nausea. He had not attained success in treatment with a gastroenterologist, due to an oversight in diagnosis for the actual problem. This man was diagnosed with partial visceral seizure (supported by the documented EEG changes). His symptom manifestation of nausea turned out to be a kind of seizure and part of the symptom cluster of this particular seizure phenomenon.

Other examples are olfactory seizures characterized by a funny sensation of smell. There are seizures characterized by a funny taste sensation. There can be visual symptoms of micropsia or macropsia (whereby things are visually seen as smaller as or larger than they actual are) as well as farther and closer (teleopsia). Many times a person can have an amnesic episode in the form of ictal phenomena, such as laughing or running, which may be additional symptoms of a particular type of epilepsy.

A common physical symptom of seizure is dizziness. This symptom is largely ignored and unattended by the medical community at large manifests as episodic recurrent dizziness with or without vertigo (symptom of spinning sensation in a subjective or objective form). Many physicians, even specialists in the field do not evaluate dizziness as part of a symptom complex that represents seizure phenomenon. Instead, the patient is told that there is nothing wrong with them and they are sent to psychiatrists, when in fact the dizziness may represent seizure

phenomenon. These symptoms of dizziness could be spontaneous phenomenon or a residual symptom of stroke, head injury, tumor, or even multiple sclerosis.

On an EEG there are ictal and interictal discharges. A physical sign seen during the ictal phase is a conventional grand mal seizure which is a generalized tonic clonic phenomenon. Ictal phenomenon is an active process of seizure. Ictal discharges can appear as the following:

- In the form of generalized spike and slow wave complex,
- Paroxysmal fast activity,
- Slow spike and wave complex, and
- Epileptiform bursts.

All of the above can produce clinical and subclinical seizures. Clinical seizures can be generalized, partial focal, with and without complex features.

Interictal epileptic discharges are the electrical activity of the EEG, which manifests in the form of localizing patterns and include the following list of localized discharges:

- Spike
- Sharp wave
- Poly spike complex
- Multiple spike complex
- Spike and slow wave complex
- Sharp and slow wave complex
- Rolandic discharges
- Multifocal independent spike discharges
- Independent multifocal spike discharges

The following are a list of generalized interictal discharges:

- Three per second spike and wave complex
- Atypical spike and slow wave
- Slow spike and wave
- Petit mal variant
- Fast spike and wave
- Poly spike and slow wave complex
- Multiple spike complex
- Spike and dome complex
- Hypsarrhythmia
- Secondary bilateral synchrony

The purpose of providing this classification and symptomatology is to educate and remind the reader of the existence of nonconventional seizure types. One of the problems with reading EEGs is that over- and under-reading occurs. Abnormalities noted in the chart are not used to look closer at the EEG as a diagnostic tool, when the goal is to find the causal factor for the problem being presented. If the EEG is under read, the opportunity is lost to treat an undiagnosed condition successfully. When carefully read, the EEG can be a tool that matches the clinical data and presenting symptoms. Abnormal EEGs may have different causal factors: dizziness, confusion, dementia, and migraines. An abnormal EEG does not mean epilepsy; there may be some type of subcortical disturbance that is not necessarily paroxysmal, which may not be clinically correlated. Similarly, a normal EEG does not rule out the possibility of seizure.

Tips in Reading the EEG

- There are some normal EEG rhythms which include alphas, beta, delta and theta. Do a frequency analysis. Be mindful of the patient's status during the EEG: alert, drowsy, or asleep?
- Check the level of consciousness: stupor versus coma?
- Look at brain rhythm alertness
- Focal versus diffuse abnormality?
- Cortical versus subcortical process: diffuse is subcortical, focal, or generalized is cortical process
- Is the rhythm consistent with an epileptopathic pattern throughout the recording against those which are indeterminate in nature?
- Epileptic pattern sharp and slow spike activity?
- Is there an arrhythmic burst of slow frequency theta and delta range?
- Remaining aware of underlying electrocardiogram (EKG) artifacts presenting as a sharp wave form leads to confusion with seizure diagnosis
- EKG artifact is more predominant for the left hemisphere than the right due to the heart being on the left side
- EKG time is locked compared to seizure activity and spike
- Something asymmetrical difference on the two sides of cerebral activity one should be careful not to miss this diagnosis

Common Reading Errors

- Diagnose the artifacts of different kinds of eye blinks, muscle tension, eye movement, electrode popping, or slipping electrical interference.
- A common error of under-reading and missing the diagnosis is to miss the voltage asymmetry or to miss the diagnosis of a subdural hematoma sitting between the brain and the skull where the volume is smaller than normal.
- Seizure can be mistaken as muscle tension movement artifacts, localized abnormality as electrode artifact.

With the availability of computed tomography (CT) scan, as well as the availability of the magnetic resonance imaging (MRI), the EEG can be used in an equivalent manner, determining if there is ongoing damage to the brain. The EEG is a functional tool, measuring the ongoing activity of the brain, answering the question of whether damage identified on a CT scan or MRI is affecting the brain on a daily basis. The EEG provides evidence of an additional disorder emanating from a brain injury that carries the risk of further impairment as well as progressive decline.

The fact that learning to read EEGs takes an enormous amount of commitment, effort and years of training to learn all of the EEG components (what is relevant and what to pay attention to), may be one reason why it is under utilized. The EEG reading is not a precise science, requiring both skill as well as experience. You can teach a student in less than a week how to read an EKG but the EEG is an art form. Owing to the lack of homogeneity of interpretation it is not considered as reliable a tool as the MRI and subject to more disagreement. Yet, with the right eyes, you can see a localized process or the presence of impairment too subtle to appear on the MRI. In this manner, the EEG has the power to reveal the presence of a physiological process that no radiological procedure can match, allowing for the diagnosis of disorders that would otherwise remain undiagnosed until problematic enough to be seen on our available radiological instruments.

Surface EEG is becoming more advanced and diagnostic in its intraoperative form. EEG studies can range from 24 to 72 hours of study or from five to seven days study in a lab. The EEG takes time, but its data are invaluable if done correctly.

When there is symptom description of being unable to focus in the work or school setting, when the person is described in a trance-like state or exhibiting staring episodes or moments of partial confusion, there is the need to rule out the presence of undiagnosed seizures. An hour screening EEG helps to rule out or to evaluate abnormalities that are cortical or subcortical, asymmetry, or to reveal paroxysmal seizure activity. However, a routine one hour normal EEG does not exclude the diagnosis of epilepsy. Some physicians do refer patients for a sleep-deprived EEG to get a better yield for the diagnosis of seizure. However, even when these two EEGs are normal, and if clinical impression for seizure diagnosis is high (via history and symptoms noted above), then a 24-hour or up to a 72-hour ambulatory EEG is routinely recommended.

Autism, Asperger's Syndrome, and Frontal Lobe Syndrome

Barbara C. Fisher

Brain Evaluation/United Psychological Services, Washington Township, Michigan, U.S.A.

G. Avci-Wolf

Avci Medical Center, Waterford Township, Michigan, U.S.A.

There are certain factors called the "Red Flags of Autism" alerting any professional to the need for diagnosis and treatment:

1. Communication concerns (response to name, expressing need, delayed language, following directions, and verbalizing less).
2. Social concerns (smiling socially, very independent, poor eye contact, in own world, and no interest in peer play).
3. Behavioral concerns (tantrums, hyperactive, uncooperative, oppositional, stuck on things, lines things up, oversensitive to texture and sounds, and no idea how to play with toys).
4. Lack of language development.

Immediate evaluation becomes necessary when there is:

- No babbling or gesturing by 12 months,
- No single words by 16 months,
- No two word phrases by 24 months, and
- Any loss of any language or social skills at any age.

There are syndromes that present as "Autistic look alike" such as attention deficit hyperactivity disorder (ADHD) (due to the signs of activity) and Tourette's syndrome (chronic motor or vocal tic disorder) due to the compulsive symptoms. The Diagnostic and Statistical Manual of Mental Disorders, 4th edition, Text Revision (DSM-IV-TR) notes that individuals with autism may have a range of behavioral symptoms including hyperactivity, short attention span, impulsivity, aggressiveness, self-injurious behaviors and temper tantrums accompanied by sensory abnormalities (oversensitivity to being touched, high pain tolerance, food/texture sensitivity, oral sensitivity, reactivity to light, odors, and external stimuli) sleep, eating, and affect/emotional abnormalities. Prevalence is noted as five cases per 10,000 with rates ranging from 2 to 20 cases. The onset must be prior to three years of age, following a continuous course through the child's lifetime.

According to the DSM-IV-TR, most autistic children have some type of mental retardation ranging from mild to profound as well as abnormalities in the development of their cognitive skills. Despite the acknowledgement of this uneven cognitive development the DSM-IV-TR diagnostic criteria is established by the

presence of specific delays and/or abnormal functioning in at least one of the following areas: social interaction, language used for social communication, and symbolic or imaginative play. Onset must be prior to three years of age and disorders such as Rett's disorder and childhood disintegrative disorder must be ruled out, (the latter disorders are characterized by severe and profound mental impairment with a highly distinctive, progressive course of deterioration following initially normal development) (1).

Autism was first identified in the early 1940s and seen initially as a disorder of psychological or psychiatric origin, a problem that remains to date, deterring accurate diagnosis and treatment (2). Despite the vast amount of literature and research currently pointing to the autism spectrum as a brain disorder affecting the ability to communicate, reason, and interact with the environment, parents generally still reference it as a psychological problem. Two theoretical concepts aid and abet this process; lack of joint attention and theory of mind, hypothetical constructs used to explain the pervasive lack of social interaction and communication. A lack of joint attention references attention-sharing behaviors and the treatment of others as objects, while the theory of mind references the child's lack of understanding of the feelings, needs, and perspective of others, that they have a separate mindset.

The idea being promoted here is that these children are unable to focus or share attention, becoming obsessive and overly focused upon one thing or focused upon everything in their environment (explaining their fascination with motors, things that click, move, and make repetitive noise, like the vacuum cleaner, and so on). In addition, the other central problem of not being able to engage socially (referencing their inability to maintain eye contact, their lack of interest in those around them, and outward lack of connection or concern regarding the feelings of others sufficient to enforce discipline as they remain in a world of their own engaging and disengaging their attention and interest at will).

Given these concepts, parents naturally seek psychiatrists more than neurologists to help address this problem medically. Psychotropic medication, drugs used to treat psychosis, are dispensed more often than medication to treat a seizure disorder or problem with the brain.

Recently, in presenting an abstract at the International Neuropsychological Annual Meeting, it was surprising that many professionals in the various disciplines treating the autism spectrum (psychology, psychiatry, and neurology) had not considered seizure disorder as a rule out for the autistic child. There were many comments reflecting a lack of awareness of the use of anti-epileptic drug (AED) (anti-seizure) medication for autism and even greater surprise that the use of such medication would be successful. The primary problem of the autistic child is a failure to develop language and one of the initial "red flags" signaling a need for professional intervention. The failure to develop language is pervasive, affecting verbal and nonverbal communication; their babble lacks the quality of intonation depicting social communication, nonverbal mimicking is absent or limited. Even if the child manages to acquire some linguistic skills, their pragmatic or social language ability (the ability to carry on a meaningful and reciprocal conversation) remains significantly impaired. Spoken language may be limited to repetition of sounds or television commercials that the child is able to surprisingly repeat perfectly (underscoring the problem of true language understanding and acquisition) while spontaneous speech remains abnormal in usage of words, pitch, rate, rhythm, and intonation.

Often these children are quite loud, lacking the feedback loop as to how they sound. In our experience, seeing the autism spectrum representing frontal lobe dysfunction, creative play is not always limited (and sometimes overtakes the child's life as pretend play becomes reality (they truly are *Buzz Light Year* as they robotically walk around) to stereotyped action, whirling, rocking, and flapping behaviors. These repetitive compulsive actions are seen as the result of either the perseveration so common with frontal lobe syndrome and/or the lack of feedback provided by frontal processes (to enforce the stop sign).

A study assessing the results of neuropsychological evaluation and physician notes on the use of Lamictal in an autism spectrum population of children aged 4 to 17 years indicated its success seen on various memory measures (64% of the patients assessed) as well as improvement in symptoms manifested in the home and academic setting. Improvement was more evident and robust when the physician notes were tabulated than the results seen after memory post-testing. Results were confounded by additional medications and the difficulty of completing retrospective research. In the documented physician notes there was a 79% improvement in sleep (documented in previous research) and 79% of the parents indicated improved awakening in their child. Increased attention and decreased moodiness were noted in 95% of the population studied (this medication was recently Food and Drug Administration (FDA) approved for bipolar disorder). Surprisingly, in 100% of the population, parents noted improvements in their child's social functioning. Many of these children prior to being examined were on medication that included a stimulant, an antipsychotic medication, or a combination of the two. Historically, these medications had not provided the significant improvement seen in the child's functioning that the AED, Lamictal, revealed once correctly titrated (3).

Consequently, despite the research and causal factors given for the presence of the autism spectrum that involves physiological processes—which is supported by organizations that specialize in providing support for the diagnosis and treatment of the autism spectrum, such as the Autism Society of America and National Institute of Health (NIH)—many parents of autistic children remain misinformed, having somehow been provided with more convincing evidence suggesting the emotional or psychiatric causal factors as primary. Unfortunately, this has led to years of unsuccessful treatment in remediating the significant cognitive disabilities associated with the presence of this disorder.

The neurology community references autism as a neurodevelopmental disorder whereby there are uneven cognitive skills, and deficits in verbal versus performance skills, involving the frontoponto-cerebellothalamo-cortico loop. More than one-third of this population fall into the range of profound mental retardation, and 80% of the children have some type of intellectual impairment. Recently presented autism facts point to a substantial increase in diagnosis, incidence rate ranges from 3.4% to 5% of every 10,000 children, one of every 250 babies born, seen in 10% to 17% of the population as a spectrum disorder with varying degrees (4). Labeled one of the fastest growing disabilities in the United States, the question becomes whether this is a really fast growing disability only recently discovered or are we tending to see more problems as related to autism and dumping children into this diagnostic category because it is easy to do, similar to the criticism of the diagnosis of attention deficit disorders (ADD)/ADHD?

The autism spectrum, according to a recent NIH consensus, is seen as a complex developmental disability appearing in the first three years of life that is

neurological in origin and the result of dysfunction within the brain superficially affecting social interaction and communication skills. It begins at birth and does not follow a period of normal development. A recent study evaluating the long-term outcome of epilepsy found that approximately 40% of children with autism have epilepsy, continuing to evidence active epilepsy through adulthood. The most common seizure type was partial complex, with 38% of the patients diagnosed with autism or autistic-like condition evidencing epilepsy at some point in their lives. Of those diagnosed with epilepsy, 60% had severe mental retardation while the remaining 40% had mild mental retardation of close to average functioning. Only one-third of the epilepsy population had their seizures diagnosed prior to two years of age. The authors note the presence of greater deficits in this latter population. Thus, the lack of epilepsy diagnosis may be the result of deficits that were mitigated by higher levels of cognitive reserve and consequently were not outwardly manifested (5).

Autism is one of five disorders under the category of pervasive developmental disorder (PDD), three of which carry significant impact to the brain (autism, Asperger's, childhood disintegrative disorder, Rett's, and PDD-not otherwise specified). Autism is described in the DSM-IV-TR with characteristics of stereotyped behaviors, interests, activities, impaired social interaction, communication, and imaginative play before the age of three years (1).

Asperger's, often thought of as a "lighter" version of autism without the language impairment, carries the description of less impaired social interaction, restricted interests and activities without the significant delay in language, and average and above average intelligence.

In our opinion, Asperger's likely represents childhood schizophrenia or schizoid personality, a fragile emotional status that leaves the individual highly vulnerable to their external environment, thus requiring the need for protection by retreating inward emotionally and socially as a defense mechanism to protect the excess internal sensitivity. Asperger's syndrome (referenced as Asperger's disorder) did not appear as a separate entity until 1980 and debate remains as to whether the two disorders are actually separate or represent a continuum. The primary distinction of Asperger's is the lack of cognitive impairment or significant fluctuations in their neuropsychological functioning. This latter disorder is not seen as the result of significant language impairment, rather the symptoms manifested are primarily emotional or the absence of outward emotional manifestation. The two hallmarks of impaired function related to significantly impaired social interaction and restricted repetitive patterns of behavior (6). The DSM-IV-TR establishes the primary issues as significant impairment in social and occupational areas of functioning while noting the absence of a significant cognitive impairment or language delay or lack of age appropriate self-help skills (1).

Causal variables given for autism are wide ranging; from abnormalities in the brain structure or function, to genetic factors (siblings are 50–100 times more likely to have autism), environmental factors (viral infections, metabolic imbalances, and chemical exposure), prenatal stressors, symptoms of a separate medical condition (fragile X, tuberous sclerosis, congenital rubella syndrome-German measles, phenylketonuria, Down's syndrome, deLange syndrome, Williams syndrome, Noonan syndrome, and infantile spasms), and there is an ongoing debate of the impact of mumps, measles, and rubella vaccines. Gastrointestinal abnormalities have been cited, leaving the child more prone to immune system dysfunction and dysregulation. Enzyme dysfunction, evidence of metabolic

disturbance, lowered homocysteine levels, and toxicity have been established as factors differentiating autistic children from controls. Magnetic resonance imaging studies have revealed abnormalities in the cerebellum, amygdala, and hippocampal areas of the brain which affect skilled movement (including apraxia and speech), control of emotions, learning, and memory.

IS IT AUTISM SPECTRUM OR FRONTAL LOBE SYNDROME?

The prefrontal cortex has been implicated in studies that we see much of the time, hence our study of the autism spectrum as a manifestation of frontal lobe syndrome. We successfully treated these children with AED mediation (Lamictal) revealing documented changes in their behavior and functioning, although the impact upon learning was more difficult to measure and requires more rigorous rather retrospective study. Nonetheless, in our clinical practices, separate and combined, we see symptoms of frontal lobe syndrome regularly in this population—selective attention, integration deficits, poorly regulated emotions (leading to impulsivity and inability to remain inactive for longer than a few seconds of time), efficiency of memory processes, perseveration (tendency to become stuck), all of which rather effectively limit the acquisition of language, which requires all of the above skills. These children are no different—from our perspective—than the child with proven frontal lobe damage, periventricular white matter, via an early birth injury, loss of oxygen, or anoxia.

Defining the Frontal Lobe

Termed the "organ of civilization," this large brain area is what differentiates humans from animals and allows thinking and decision making to occur by attending to the relevant information, and sufficiently integrating information received to think coherently, formulate hypotheses, make plans and execute them, make thoughtful decisions, and monitor and modify one's own behavior. In this manner, the frontal processes determine the person's sense of self, who they are, how they respond to a given event, and what they think internally; and in a virtually cyclical feedback loop; affecting what and how they respond to stimuli in their external and internal environment.

The Frontal Lobe Has Three Main Jobs:

The Supervisory System:

- Decision making
- Inhibition system, creative thinking
- Regulation of emotions

The Communication Manager:

- Selective attention

The Director of Operations:

- Integration
- Perseveration
- Ability to use feedback and learn

The frontal area of the brain occupies approximately 40% and is the largest brain area. It is responsible for modulating information coming in and going out of the brain.

Specific Job Functions of the Frontal Lobe:

Decision Making:

- To use feedback to learn and improve the ability to make decisions by learning from one's mistakes.
- Cognitive flexibility, the ability to change expectations once formed and to shift from one mind set to another.
- The ability to use new information to see things differently and to integrate newly learned information with past learning.
- To remain fluid in one's thinking patterns not rigid and to avoid perseveration.

Selective Attention:

- To separate the relevant from the irrelevant.
- Ascertaining what is important from what is not important.
- Selecting specific stimuli to focus upon while excluding other stimuli for the necessary attention needed to make sure that things do not become confused.

Regulation of Emotions:

- Regulation of internal thoughts and emotions
- To maintain reality by continuing allowing for the expression of emotions and feedback from others
- Maintaining control over emotions to avoid becoming overly emotional, emotionally reactive and subject to misperceiving things in relationships and daily encounters with people.

Communication: Continual Talking to Other Brain Areas:

- Taking in and using information from all brain areas.
- Word-finding deficits when there are problems preventing adequate communication of thoughts and feelings.

Understanding the Job of the Frontal Processes:

The frontal area of the brain (specifically the prefrontal area) is essentially responsible to take all of the information coming into the brain and to make sense out of it by:

- Coordinating it with other known information.
- Coordinating and correlating all of the information received from various sources (external and internal information, conscious, and unconscious information).

Commonly seen day-to-day symptoms when there is impaired frontal lobe functioning:

- Difficulty learning any novel sequence of action.
- Difficulty recalling a conversation, any information received from one minute to the next, problems using the information that is received, resulting in increased dependency upon past learning.

- Any type of complex action is difficult unless over-learned and part of a regular routine.
- Information will tend to become confused due to the inability to store and compartmentalize the information in an accurate manner.
- Cognitive rigidity present in thinking processes and difficulties in making mental or behavioral shifts.

The tendency to make assumptions without the ability to consider any different perspectives or perceptions of any additional given event or incident that has occurred.

- The difficulty in continually prioritizing attention, the regulation of attention and intention factors, and resulting in continuous distractibility of irrelevant thoughts and impulsive actions.
- Difficulty communicating thoughts. Selective attention deficits result in the tendency to bounce from one uncompleted topic or sentence to another, making everyday conversation rather confusing and frustrating.
- Easily confused and overwhelmed, distracted by irrelevant information. This phenomenon is exacerbated with increased task complexity and/or the amount of stimuli in the environment.
- The diminished ability to accurately determine the emotional relevance assigned to various thoughts or events, which can create illogical thinking and periodic statements that often do not make sense, or are out of context to the conversation.
- The diminished ability to modulate and control internal drive states, increasing emotional lability and reactivity, and the inability to control impulses that emerge internally.

The tendency to become bound to one thing, obsessed, and overly preoccupied with objects, thoughts, or events that have occurred and/or compulsively driven to act, without thinking of the consequences. Actions may seem to occur without rhyme or reason.

- Difficulty starting something. Problems with decision making and prioritizing attention. The difficulty determining the importance or relevance of any given event often results in an inability to make decisions.
- The lack of initiative, decreased spontaneity, decreased productivity, loss of ambition, and general apathy
- The diminished ability to always think in a flexible manner results in perseverative tendencies, the potential to become stuck and hopelessly entwined, and preoccupied with specific thoughts, literally unable to shift focus to something else.

The tendency to think and rethink about specific topics, erase and reerase, to redo tasks over, and over, remaining stuck in this perseveration pattern, which obviously minimizes or negates any goal attainment or task completion.

- The diminished ability to temporally sequence or structure occurrences or events can result in the lack of ability to provide continuity and coherence of thought, unable to assess behavior over time, recall historical events and understand the meaning of why significant people may have become frustrated and angry over time.

Three functional systems have been identified as part of the frontal processes: (1) the system that manages the emotional functioning of the person (attaching emotional relevance to events, allowing the person to experience the feelings of others to engage in meaningful relationships, to use emotions to develop goals and values that comprises their sense of self, used through time to make decisions and to internally drive behavior regardless of external environmental events) (2) the system that specializes in the reception, storing and efficient compartmentalization of information received from the external environment (the working memory system, the system that selectively attends to relevant versus irrelevant information, the system that prioritizes information in a coherent, integrated hierarchical manner using processes of integration) and (3) the output system that is dependent upon intact skills of planning and organization, efficient problem solving that utilizes feedback, mental flexibility (as opposed to perseveration) to employ alternative solutions, with the goal of volitional activity allowing the person to make decisions and act upon them.

Together these systems allow the individual to interact with their environment, to filter relevant from irrelevant information; to formulate and carry out meaningful goal directed behavior, to anticipate the consequences of one's actions, and to continually adapt to changes in their external environment and life's day-to-day challenges. The frontal processes have a central role in attending to and integrating information from the external and internal environment, to formulate hypotheses, to execute plans, make decisions, to monitor and modify their behavior based upon feedback received regarding outcome.

Right frontal processes form the cornerstone of self regulation, the foundation that supports the formulation of goals and the implementation of a guidance system for one's behavior that persists through time (creating an internal drive state as opposed to being driven by the moment). The right frontal lobe has been clearly established for dominance in the areas of social behavior, self-awareness, the maintenance of an individual's sense of self or self-concept, the mediator of the nuances of social conduct, and interaction with others in the environment. Accomplishing these multi-faceted tasks requires the ability to comprehend and to express emotions. When the right frontal area of the brain has been compromised, typical symptoms emerge of irritability and impulsiveness, difficulty understanding or predicting the impact of their behavior; lacking an internal drive state, they are driven by minor irrelevancies, inappropriate habits and routines.

The left frontal processes provide the ability to utilize information received from one's environment, to plan and organize, to make decisions and act upon them, to problem solve and utilize feedback for successful solution generation and to exercise sufficient mental flexibility to adapt to life's continual changes. Verbal learning and verbal working memory are mediated by the left frontal processes and when impaired the child is less likely to use verbal cues or subvocalization to direct, guide, or organize their ongoing behavior.

The frontal processes, as the "seat of civilization," govern the thinking and emotional processes, interpreting and using information received from other brain areas to allow the human experience of making decisions and executing goals over time.

Primary issues that negatively affect the child's learning and functioning in the academic setting, which if not addressed, negate and compromise any educational/learning program:

The difficulty of integrating information, how the parts fit into the whole, coordinating events for goals to become action, the ability to employ

perspective-taking approaches, overall ability to comprehend the entirety of any situation for accurate assessment and appropriate decision-making. Integration affects language function, where able to form a sentence in a structured situation, difficulty applying the vocabulary they do know to a functional level to use language socially or correctly in spontaneous conversation, pulling out the wrong word and conveying a different meaning. This leaves the child unable to verbally communicate their thoughts.

Distractibility and selective attention, paying attention to everything in one's environment, can lead to various problems from irrelevant learning patterns, receiving incorrect information, becoming easily overwhelmed by too much stimuli or information.

Difficulty determining what information or stimuli present in her environment is worth attending to; tendency to attend to everything, switching from one novel thought or stimulus to another; the more stimuli, the more noise, the more people in any given situation, the diminished ability to make selective attention decisions; becoming easily overwhelmed and confused by the overload of information, unable to prioritize her attention, at risk to become enmeshed in the smallest element, with the thought that everything is important and needs to be attended to.

The tendency to shift from one uncompleted topic or sentence to another; loss of focus; loss of thoughts to express self adequately in conversation affecting pragmatic language skills; difficulty retaining newly learned information, becoming impacted by the interference of additional information, newly learned information is highly susceptible to interference; specific implications for learning in the academic setting whereby one subject follows another in a fast paced progression; likelihood of the loss of newly learned information in one subject when attempting to learn information in the next class subject. By the end of the day, the child is at risk to be operating on deficit learning having lost concepts throughout the day.

Perseveration can lead to the tendency to become stuck on one particular issue, which also limits creativity, and increases the likelihood of more rigid thinking patterns, ultimately limiting problem solving and solution generation. Once they give a response, more often they are unable to go back and to re-think it, even if given the opportunity.

Cognitive or thinking rigidity and diminished flexibility can result in the tendency to become highly rigid in their assumptions which can potentially limit adaptability to new or different situations. Difficulty taking another perspective sufficiently to "stand back" to analyze one's mistakes or errors.

The difficulty with sequential analysis can affect the learning of any new procedure, understanding the sequential nature of language, word order, syntax and semantics.

Sequential difficulties noted in this assessment would tend to affect math and the ability to comprehend more complex procedures inherent in concept learning in subjects such as biology, chemistry, the writing of sentences in English and so on. There is the likelihood of becoming easily overwhelmed when there are too many steps present in any new learning process, especially if given all of the steps to learn all at once.

Emotional sensitivity to everyday events and the inability to interpret them correctly.

Word retrieval, word finding issues and the subsequent loss of words can limit the child's ability at times to adequately express themselves and can also lead

to lost or misperceived communications, as well as poor pragmatic language skills necessary to facilitate social relationships at their current developmental age.

Efficient memory processing, development of compartments to store newly learned information for later recall and retrieval, leads to lack of retained learning or knowledge

Difficulty with use of the abstract, understanding of more complex social situations, anticipating the big picture problem, comprehension of the joke, use of humor, all of which compromises pragmatic language and social skills.

Asphyxia at birth has been found to result in selective damage to the inferior colliculus (brainstem auditory pathway) creating a sensorineural hearing and auditory processing problem. A pattern of lesion damage has been identified involving the superior olive (acoustic processing and relay), as well as the trigeminal nerve sensory nuclei (contributing to the diagnosed problems with lower and upper body sensory systems and lack of sensory integration), the vestibular nuclei (involved in equilibrium and reflexive orientation which would affect gait), the ventral thalamic nuclei (affecting sensory processing and relay from the brain stem and the cerebellum to the cortex creating sensory abnormalities and often making these children far more sensory sensitive and vulnerable to environmental influence).

In a pervasive manner the brain is compromised, brainstem areas, cerebellum, subcortical, and cortical sites. Widespread damage to the brain generally is the result of some type of early birth insult.

Electroencephalogram (EEG) studies found EEG abnormalities in 27% to 65% of the autistic population with 25% to 35% representing major motor seizures. The longer the EEG study the more likely that epileptiform activity was found. Magnetoencephalography (MEG) analysis found epileptiform 41 out of 50 children diagnosed with autism (82%). Neurotransmitter dysfunction has been identified involving the catecholamines, involved in all of the psychiatric disorders. Abnormal immune systems have been identified as possible causal and ongoing factors contributing to autism; the identification of "leaky gut," mercury and lead exposure. Whether external factors or other familial inherited factors such as sleep apnea contribute to the genetic influence remains in question.

There is agreement in the field as to the uneven cognitive and language acquisition problem. Symptoms of extremely poor attention span, impulsivity, and hyperactivity are often misdiagnosed as ADHD. Treatment, however, becomes a quest ranging far and wide given the discrepancy present regarding the causal factors. Are the symptoms, the result of sensory integration issues, at basic levels of functioning? Is the problem that of hearing, sound feedback mechanisms and problematic interpretation of sound which is brain driven or sensorineural? Is the problem pervasive damage to the brain preventing the use of necessary systems to acquire language and is clearly affected more than other skills (the child is able to walk, although gait may be disturbed but speech is often more unintelligible than it is intelligible)? How is this different from any child affected early in life by some type of deteriorating process in the brain or any brain disorder? From our perspective the answer to the above questions is yes and yes. In other words, the autism spectrum is a big name or umbrella given to describe early damage to the brain and will always affect the child's ability to acquire language given that early brain impact, especially birth injury, affects the periventricular white matter, which are the tracks connecting all of the above brain structures and the tracks subserving language skills. These children are characteristically compromised in terms

of immune system, nutritional deficiencies, being more prone to abnormalities of asthma and allergies, and being particularly vulnerable to sleep disturbances. One of the most important things to rule out in the autism spectrum, we have found, is seizures, which represents a deteriorating process in the brain; the reason being is that if this is missed, more irreplaceable brain cells are lost. Brain cells taking over for dead cells can develop abnormal connectivity and eventually the whole brain can become compromised by ongoing seizures in a process called kindling. The problem is that too often the field of neurology does not agree on what constitutes a seizure and what constitutes a significant enough seizure phenomenon on the EEG to read it as abnormal—too often limiting treatment until so many areas of the brain have become compromised that the phenomenon becomes undeniable; by that time the damage has been done. This is explained in depth in the chapter by Dr. Tolia on seizure detection and EEG analysis.

Unfortunately, many years of learning are wasted or lost due to improper diagnosis. In the school setting, if certified under the umbrella of autism, the child's behavior becomes the primary focus and cognitive development remains secondary. Too often, the child diagnosed with brain injury early in life (shunt, brain cyst, and various diagnoses related to loss of white matter tissue) is certified under the autism spectrum as opposed to a brain injury or seizure disorder. By focusing on the behavior of the child (which often becomes worse as they pick up the habits of their peers in contained classroom settings) these children suffer substantially in not receiving the necessary early intervention to address their language and cognitive deficits. School personnel are not specifically trained in the frontal processes and unwittingly limit their success by teaching in a more linear manner. They are placed in the position of trying to teach these children without the knowledge of frontal processes seen as central to their learning problems.

There are several learning themes that emerge when there are cognitive deficits specifically related to impaired frontal processes:

- Problems emerge when information being presented is overly complex and involves too many variables. Information being taught needs to be broken down into component parts and teaching concepts explained individually prior to integrating the information either into a whole framework and/or sequential order.
- Use of additional repetition is absolutely essential if learning new information. Learning is greatly enhanced with salience, associative learning, something in the child's repertoire to relate things to, use of manipulatives, themes in their prior learning, provision of the overall concept or prospective prior to the presentation of any new material to create memory compartments for more efficient learning given the inability to rely upon rote learning.
- Repetition does not work if related to a concept the child does not understand. If the child remains confused, the information or concept being taught needs to be either broken down further into more component parts or re-worked in terms of explanation using different manipulatives to communicate the concept.
- If a child is confused with instructions and directions, repeating them will not be helpful and will only tend to ensure more frustration on the part of the child. The suggestion would be to shorten the direction, modify the words, and re-work explanation of the direction or instruction using manipulatives or actually doing one of the tasks using a step-by-step process.

- Information that can be classified into only a few compartments will be easier for the child to retain over time. In other words learning any new information benefits from the process of:
 - Creating the memory compartment first with an overview about the information to be learned.
 - Creating salience
 - Repetition
 - Classification themes kept to a minimum
 - Always over learn and over train before moving to the next item otherwise with the learning of the new item prior learning is at risk to be lost.
- These children are highly at risk for perseveration, once stuck they tend to remain stuck, necessitating the shift to a different task and returning to the original task another hour or another day.
- The risk of confusion is a never ending concern when teaching these children while also attempting to modify their inappropriate behavior related to impulsivity and/or perseverative responses. The tendency to become easily confused given the issues of continued distractibility and impaired attention processes subject to selective attention deficits—and the selection of everything in their environment to attend to—remains ever present. Therefore there is always the risk of the loss of information and/or loss of the response the child was attempting to provide if there is any interruption to address the impulsivity and/or perseverative responses.
- There is a need to continually evaluate and gain feedback to ensure that the child has actually grasped the concept and can adequately apply it to different settings and scenarios.
- During any type of evaluation however, variables of motivation, attention, understanding of the directions, impact of possible events whereby there is a partial loss of consciousness, impulsive or perseverative responding, and most important, if the task is measuring what it purports to measure, always needs to be separated out and addressed.
- Speeded testing tends to be highly problematic (especially as the complexity of the task increases) for several reasons: necessary use of simultaneous processes, dependency upon motoric speed (which may be already compromised), and excess impact to brain functioning.
- These children generally have difficulty employing any type of problem solving and/or use of solution generating creativity to a situation and as such they remain highly dependent upon external input, clues or direction from others given their inherent loss of ability to “think out of the box” as a result of diminished frontal functioning. Consequently, promotion of more creative thinking needs to be an inherent component in the learning programs for these children.
- Issues of selective attention result in vulnerability and sensitivity to any environmental noise or stimuli that needs to be addressed on a continual basis and which is not necessarily remediated by medical management.
- Given the feedback mechanism provided by the frontal lobe, when there are deficits, these children may be unaware of the feedback provided by their body to know when they are hungry, when they have to go to the bathroom, when they are tired and need to sleep and so on. Consequently, they go too long without eating, they wait too long to go to the bathroom rushing headlong into the nearest facility before an accident occurs, or falling asleep immediately

wherever they are. In eating, they may remain unaware of the difference between the size of their mouth and the amount of food they are attempting to insert at one time or when to stop eating once they have started. The same is true for drinking substances such as water, milk, and soda. Their personal hygiene suffers, whether this is showering, wiping food off their clothes, wiping their mouth, washing their hands and so on.

- The problem with speech and language development is one of the more critical issues. When there is impact to the frontal processes, especially if occurring prior to language acquisition and speech development, the problem tends to be pervasive from the inability to correctly pronounce the individual speech sounds (dyspraxia) to the difficulty merging the sounds into a word (integration) resulting in aphasia symptoms that range from dyslexia (reading), dyscalculia (math), dysgraphia (writing), dysarthria (articulation), auditory verbal dysgnosia (confusion with instructions), to spelling dyspraxia (spelling errors). Despite the intervention of speech and language services, the child's difficulty learning and acquiring language remains a very difficult endeavor due to the loss or inadequate functioning of the pathways in the brain that subserve the learning and use of language.
- Speech intelligibility can remain poor for these children whereby even those close to them cannot always understand what they are trying to say. Speech intelligibility is often the result of a number of issues complicating the accurate production of speech (involving breath control, oromotor issues, and skilled movement using the tongue and lips to correctly form the individual sounds) and the child's ability to use individual sounds to form words and then correctly use words in a sentence. Systems of sound production, word structure, syntax and morphology, and semantics are impaired to varying degrees resulting in significant difficulty with both receptive and expressive communication, the ability of the child to take in information correctly and to output or express themselves correctly.

Social issues need to be addressed, due to the continual difficulties that occur from symptoms of impulsivity, lack of inhibition, failure to appreciate the subtle social cues, and difficulty comprehending the more complex abstract concepts inherent in any social situation:

- There is a lack of awareness of the complex myriad of variables contained in social interactions that occur in the school, or at home, or at any of other settings that comprise the child's typical day to day life. While these children may be able to adequately survive a first meeting, as they become comfortable any restraint that may have been present gives way and the true persona emerges.

An example of this occurred this summer at our camp whereby this 13-year-old, who suffers from a rather severe seizure disorder, spent the first two weeks on his best behavior; however by the time the third week rolled around he was grabbing things out of the other children's hands, talking non-stop, and interrupting everyone, as well as hitting or pushing children down to the ground. He did these things continually despite the various admonitions and discipline interventions on the part of Dr. Fisher and her staff. At one point, even with Dr. Fisher holding his hand, he still managed to lash out and hit another child using his long arms and fingers. The camp environment provided a wonderful study in the various forms

of frontal lobe syndrome and the various ways that symptoms manifest themselves. One girl began to scream uncontrollably that the boy noted above invaded her space, working herself up into a tantrum to the point that she was just screaming incoherently. Another boy spent much of his time making T-Rex noises while another boy would fall down and collapse on the group despite the lack of anyone touching him to make this occur. At one point he stood in the middle of the lawn crying that no one would play or race with him, unaware that he had asked no one to race or play with him prior to this time. Another time, while the majority of the children were participating in an activity run by Dr. Fisher and the staff, two children were at opposite sides of a tent, one child was banging her head with a water bottle while the other children was walking around attempting to fall down and talking to himself. Another child would tell everyone they were going to grow up and live in a run down check. Unaware of the message sent by non-verbal cues, unaware that they would have anything to do with the way that others responded to them, summarizing a problematic interaction with the words, "everyone hates me anyway," tends to preclude positive social encounters for these children. Nonetheless, we managed to end the summer on a positive note and proclaimed them all competent with some aspect of social learning that they had demonstrated throughout the summer. These children clearly need structure, day to day routine and a concrete presentation of directions and instructions.

Consequently, it is not uncommon to find the children who have been receiving school services including speech and language intervention, from preschool years onward, still cannot read or write in the sixth and seventh grade. School professionals become helpless and ultimately hopeless when attempting to teach children with frontal deficits who appear "unteachable." Despite tremendous effort the child remains at the same learning level while their peer's progress. To illustrate our point, we cite this example of a boy who suffered a substantial brain injury at the age of 18 months. Astute school professionals, while able to diagnose the traumatic brain injury, remained unaware of how to treat it. Despite procuring the funds and managing to establish the first brain injury program for this particular child, after two years in the program he was "flunking out" due to an inability to learn and benefit from this program. What was missing was the teaching method being aimed at deficient frontal lobe processes. The problem is not only in the method of teaching, but an accurate diagnosis. By seeing the autism spectrum as primarily a problem of behavior and impaired social interaction, these children do not receive the treatment that we have found so successful. Through a thorough evaluation process including 24-hour EEG analysis, these children, all who were initially diagnosed as "autistic," have benefited from our treatment of medication and cognitive rehabilitation. Speech is one of the primary symptoms that improved substantially with the introduction of AED medication in the majority of these children. Cognitive rehabilitation programs, discussed in a later chapter, have been successful in helping the child to fit into their social milieu and to learn the correct and appropriate use of language.

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Part IV: The Overlap of ADD/ADHD and Sleep Disorders—Introduction

Barbara C. Fisher

*Brain Evaluation/United Psychological Services,
Washington Township, Michigan, U.S.A.*

The goal of this chapter is to provide information about sleep and specifically those sleep disorders that mimic attention deficit disorder/attention deficit hyperactivity disorder (ADD/ADHD) symptoms. Recently, we have become more aware of the impact of undiagnosed sleep disorders upon ADD/ADHD and the effects of daytime sleepiness. For children, this means increased hyperactivity. The question becomes whether the hyperactive response is the child's compensatory response to stay awake or poor sleep releases an innate motoric output. There is clearly an overlap between a sleep related breathing disorder, restless legs syndrome (RLS), and periodic limb movement disorder (PLMD) and ADD/ADHD. Authors of these chapters, Drs. Walters, Hening, Picchiatti, and Dzienkowski describe the symptom overlap, reflecting on the debate of a common neurotransmitter imbalance versus sleep deprivation. The high prevalence of RLS and PLMD suggests the need for more public awareness and attention paid to the child's description of growing pains and their continual need for movement while in class. The risk effects of a sleep related breathing disorder are significant, affecting emotional, cognitive and physiological systems. Drs. Huang and Guillemineault point out the improvement in attention symptoms when an underlying breathing disorder is properly treated. They remind us of the severity of an undiagnosed breathing problem that is not treated while doctors mistakenly focus upon attention issues and/or ear, nose and throat surgeons and orthodontists uneducated in sleep medicine do not recognize the problem when it presents itself in their offices during daytime hours. Rauch reminds of normal sleep parameters and what the ideal is supposed to look like for infants, children and adolescents as well as providing sleep parameter and helpful sleep tips. Finally, Drs. Pelayo and Lopes systematically discuss the common sleep disorders affecting children, documenting both the symptoms and peer reviewed treatment strategies. Sleep disorders seen in children are presented; from insufficient sleep to insomnia to sleep apnea to RLS and PLMD to parasomnias and narcolepsy. Different disorders found in children result in different daytime symptoms. A common and primary symptom is hyperactivity or overactivity.

The theme presented by these distinguished sleep neurologists is the overdiagnosis of attention problems while treating professionals simultaneously disregard and/or fail to diagnose life threatening sleep disorders. There is a concern as to the lack of knowledge in the general field of medicine. Although it is well known that sleep apnea symptoms can either make attention symptoms worse, or at times be the sole causal factor for the observed attention symptoms, sleep related breathing disorders remain grossly untreated. Similar overlap has been found for RLS and PLMD, two disorders which can singularly create sleep

deprivation and/or insomnia carrying its own set of far reaching consequences. Sleep is a necessary function and it is critical especially with children that sleep disorders are diagnosed and treated as soon as possible. When it comes to children, the clock is always ticking.

ADD/ADHD Symptoms and Daytime Sleepiness in Children

Barbara C. Fisher

*Brain Evaluation/United Psychological Services, Washington Township,
Michigan, U.S.A.*

Sleep problems are becoming more prevalent in the pediatric population and predictive of difficulties in adolescence and adulthood. Disorders of anxiety, depression, poor school performance, obsessive-compulsive disorder, and school refusal are often the symptoms manifested as a result of an underlying, undiagnosed sleep disorder. Sleep complaints are often expressed by children diagnosed with an attention problem.

Daytime sleepiness in children can result in the following symptoms:

- Increased moodiness
- Emotional lability, tendency to become highly emotional
- Aggressiveness and irritability
- Depression, fatigue, loss of energy, and motivation
- Increased weight gain and inability to lose weight
- Hyperactivity
- Poor impulse control
- Deficits in attention, sustained attention, and increased distractibility
- Deficits in short-term memory
- Disruption in the family
- Overall difficulties in various aspects of life, at home, with friends, and in school

Young children who have daytime sleepiness appear as overactive or hyperactive, especially in a confined area such as the classroom. In order to stay awake they move continuously, bother the students next to them, and do anything to amuse themselves to remain awake.

Research has revealed that children diagnosed with attention deficit hyperactivity disorder (ADHD) fall asleep quicker, even with no primary sleep disorder, and their sleep efficiency was worse. This could be due to anxiety. We know that anxiety goes hand in hand with the real genetic attention-deficit disorder (ADD) and anxiety can disturb sleep by resulting in microarousals and a lighter type of sleep.

When there was a secondary sleep disturbance, the symptoms of ADHD appeared more severe. One study identified 50% of the ADHD population as having obstructive sleep apnea. Other studies have isolated restless legs syndrome (RLS) and periodic limb movements disorder (PLMD) as disturbing sleep. Iron deficiencies, known to increase RLS symptoms, were associated with increased ADD symptoms. If occurring in early years, and the impairment was not altered or remediated with iron replacement, low ferritin or iron levels were found to be associated with ADHD symptoms and a marker of increased severity for ADHD

Possible causal factors resulting in daytime sleepiness in children:

- Insomnia or anxiety and depression
- Narcolepsy (albeit rare)
- PLMD or RLS
- Parasomnias (night terrors, sleepwalking, sleep-wake transition disorders)
- Seizure disorder
- Medication use
- Behavioral disorders such as sleep-onset association disorder or limit-setting disorder or sleep deprivation and poor sleep hygiene
- Specific medical conditions: allergies, asthma, chronic pain, neurological condition
- Adjustment sleep disorder (reaction to a particular traumatic event)

A *sleep-disordered breathing problem* ranges from somewhat to very problematic, in terms of affecting the child's emotional and cognitive functioning. This is truly the overlap with ADHD given the presentation of executive reasoning deficits, the high degree of hyperactivity, impulsivity, and overall lack of control over their behavior, especially in a confined setting. Whereas daytime sleepiness may create more irritability, very low frustration tolerance and the tendency to react emotionally to anything and everything in their environment, as well as attention and memory problems; when clinically seen on testing, it does not create the problem seen when there is a loss of oxygen due to apneic desaturations. Neuropsychological testing typically reveals problems with memory, learning, and retaining newly learned information, as well as thinking problems related to executive reasoning deficits.

Insomnia is often seen accompanying a genetic ADD disorder—given the tendency to be highly anxious, to worry and to anticipate problems. Children with this disorder do not get to sleep at night due to being unable to turn this thinking off. They literally think too much. Everything is analyzed from how they acted during the day to how everyone reacted to them, and to the specific things they said or the specific things said to them. They then proceed to think about how they would have done things differently, what they should have said, and following this they typically beat themselves up with why they did not do things differently. Obviously, all of this thinking and processing takes time and does not allow the child to fall asleep. The suggestion of music, a relaxing routine of reading, a bath or ice cream before bedtime sometimes fixes the problem. The continued worrying at night, which easily moves into insomnia, only leaves this child at risk for more anxiety during the day. A cycle of anxiety factors, creating more anxiety, becomes established in this manner. This is where our cognitive training programs bring relief.

Narcolepsy in children may present with increased nighttime sleep or with daytime sleepiness. A decline in school performance may be the first daytime symptom seen. Sleepiness may be misdiagnosed as a learning disability. The main symptoms are excessive sleepiness accompanied by cataplexy (loss of muscle control), sleep paralysis, and hypnagogic hallucinations. Daytime sleepiness is the primary symptom, which can appear as the tendency to fall asleep easily, sleep attacks during the day [whereby the person puts their head down and immediately moves into rapid eye movement (REM) sleep and begins dreaming], frequent daytime naps that come on suddenly and cannot be resisted. Anytime the person sits down, they are at risk for a nap or sleep attack. More unplanned naps occur in the afternoon or later evening hours. Naps are 10 to 20 minutes and occur three to four

times a day. Cataplexy is a loss of muscle tone that is brief in reaction to emotion, laughter, anger, surprise, whereby consciousness is maintained as knees buckle, there is weakness in the legs, jaw, head, and neck. Episodes last less than two minutes. The person can have awakenings during the night, sleep fragmentation, and a number of microarousals, disturbing the restorative sleep for the body, although they actually have a greater amount of REM sleep. Nightmares are more common, and often narcolepsy is accompanied by the diagnosis of sleep apnea.

Parasomnias, seizure disorders, certain medication use (which includes stimulants for some children), and various neurological disorders easily create nonrestorative sleep for the brain and the body, leading to excessive daytime sleepiness and difficulty getting up in the morning. Unless the sleep issue is somehow addressed, my experience is that these children do not recover as well from the neurological problem—an example is the negative impact of sleep apnea on seizures and learning problems increase substantially. Therefore, every professional needs to address sleep in children as a primary issue. It is when interventions are no longer working with various disorders such as allergies and asthma, that sleep needs to be examined thoroughly by a qualified pediatric sleep specialist given the vast difference between adults and children (children are much more vulnerable; one apnea per hour is significant).

One of the primary difficulties with the behavioral disorders such as sleep onset association disorder and limit setting disorder is the daytime sleepiness that is manifested in an overall increased emotionality and reactivity which only adds to the difficulty in working through the bedtime hour the next night. In this manner, the daytime sleepiness increases the likelihood of the sleep disorder occurring the following night due to the child's continued inability to soothe themselves and their heightened emotional reaction to the idea of going to sleep.

When children have a sleep debt and/or they are sleep deprived, they simply do not function as well and they are less amenable to adult intervention, to acquiescing in any situation and definitely more difficult to cope with emotionally. Until the daytime sleepiness is resolved, the child remains at risk to be caught in a downward spiral of increased emotionality and too little sleep which negates their ability to learn and progress developmentally during a heightened time of acquiring language and social skills.

ADD/ADHD Symptoms and Daytime Sleepiness in Teens, Young Adults, and Adults

Barbara C. Fisher

*Brain Evaluation/United Psychological Services,
Washington Township, Michigan, U.S.A.*

Teenagers tend to be struggling with sleep deprivation and sleep debt built up over time as they shift into adult sleep—still ensconced in a world that is unable to accommodate their shift in sleep habits and needs. Changing sleep in teens results in their not becoming tired until 11:00 in the evening despite the fact that they have to get up approximately five to six hours later. Therefore, from a general perspective—by virtue of not being tired due to hard wired developmental changes in their sleep—all teenagers are boxed in by not being tired until later evening hours yet having to get up even earlier than they did in junior high years. Their sleep is limited by a lack of tiredness and society demands of school start times, automatically resulting in unfulfilled sleep needs and building sleep deprivation.

Aside from the above issues which are developmentally “normal,” sleep disorders, when present, will automatically carry the risk of daytime sleepiness. When there is a sleep disorder that is fragmenting sleep—limiting restorative sleep—the teen, or adult will typically not feel awake until later in the morning. They tend to have difficulty getting up in the morning. Somehow they manage to roll themselves out of bed (or someone else rolls them out of bed), and they finally wake up in the shower; gulping down breakfast on a good day, then shuffle off to school in a semi-wake state. While possibly becoming more awake during early morning hours, there is another natural dip mid-morning and an increased likelihood of becoming sleepy. Finally by the afternoon—just before the last few classes and the end of the school day—teenagers actually “wake up” and are coherent and ready to learn. However, by this time they may be eating lunch or completing the electives scheduled later in the day. While usually people attend better during morning hours, those with sleep deprivation may be more impaired and particularly vulnerable to the low periods during the day. One of the reasons why teens love the afternoon nap is that by this time their natural circadian rhythm has joined forces with the sleep drive built up by sleep deprivation, thus creating the increased drive for sleep. As sleep becomes a more pressing need, the teen will then lie down for a “quick nap.” The problem is that rather than lasting 20 to 30 minutes in duration, this nap may stretch to hours, risking problematic night time sleep, generally a problem of sleep onset. Having napped longer during the day, the sleep drive is now fulfilled, and the teen is even less tired when bedtime occurs. So once again they move into sleep deprivation, due to the time they are finally getting to sleep and the time that they have to wake up for school.

A sleep debt that occurs with increased nights of poor sleep. The teen attempts to make up this debt by “sleeping in” on the weekend. Sleeping a much longer time

than usual allows the recouping of some losses, however upset parents who do not want to see their child sleeping their day away tend to deter this process.

Sleep is a necessary dynamic process with far reaching consequences when there is deprivation. Difficulty processing information, increased anger, and becoming more emotionally reactive are typically seen symptoms accompanying a lack of sleep. Sleep deprivation can result in people becoming more cranky, whereby everything disturbs them. Women tend toward increased depression while men become less tolerant and mean.

Daytime sleepiness can be due to several causal factors when seen in teens, young adults, and adults. The most common disorders to rule out would be the following:

- Delayed sleep phase syndrome (DSPS) (advanced sleep phase syndrome)
- Obstructive sleep apnea
- Upper Airway Resistance Syndrome (UARS)
- Narcolepsy
- Insufficient sleep
- Insomnia
- Restless legs syndrome (RLS) or periodic leg movement disorder (PLMD)
- Additional disorders or conditions disturbing sleep, such as sleepwalking, sleep talking
- Menopause

DSPS is often seen at this age, given the transition into adult sleep. The problem is that teens are required to get up at 5:00 to 6:00 in the morning to be at school by 7:00, when they are typically not sleepy until 11:00 or 12:00 at night. If they have DSPS they are not tired until about 2:00 or 3:00 in the morning. This means that their sleep is substantially reduced resulting in a mere few hours lost. After a few successive days of this pattern, daytime sleepiness is obviously going to substantially increase. This can become complicated by symptoms of insomnia if the person becomes worried about not being able to sleep and they find themselves unable to sleep due to trying to go to bed before they are actually tired. In these cases by changing bedtime hours, the insomnia is resolved. However, life does not typically work around the late hours of the evening, so maintaining the correct sleep time to match this circadian rhythm becomes next to impossible. Adults with DSPS often obtain jobs to match their sleep schedule and become shift workers. If this is not possible, they remain at risk for daytime sleepiness and insufficient sleep until they change their sleep rhythm to match the life they are leading. Advanced sleep phase syndrome, often seen in the aged population, is the tendency to become sleepy earlier in the day and to awaken in the early morning.

Obstructive sleep apnea can easily create a sufficient number of arousals—microarousals during sleep that the individual would not be consciously aware of—eroding the sleep, resulting in lighter stages of sleep and failure to get restorative sleep for the brain, or deeper sleep for the body. Daytime sleepiness is the result of being a “light sleeper” and the inability to get to these deeper levels of restorative sleep. The same is true of UARS. The presence of an airway problem can limit the ability to get to the deeper stages of restorative sleep. There may be frequent awakenings at night, in addition to these microarousals to counteract the difficulty breathing. We all laugh at the person who snores. However, snoring, by definition, is the precursor to sleep apnea. An individual snores when their airway becomes blocked,

and snoring is actually the breathing that takes place in a narrow airway. When you have sleep apnea, the throat is completely blocked, resulting in air not flowing to the lungs and the absence of breathing. In this manner, the presence of sleep apnea, or apneas, and a lack of breathing, can create a life-threatening condition. There are several causal factors in sleep apnea or UARS, which include the following:

- Age (tonicity decreases)
- Smaller-than-normal jaw
- Enlarged tonsils
- Lateral pharyngeal walls close in
- Large tongue
- Tongue moves posterior, which displaces the soft palate
- Tissues that partially block the entrance to the airway

The Primary Symptom of Narcolepsy is Excessive Daytime Sleepiness:

Narcolepsy is more often seen between the ages of 11 and 20 years—usually from adolescence to young adulthood. It is seen in children less often. Other symptoms are as follows:

- **Cataplexy:** More common for facial muscles than for leg weakness—complete loss of motor tone, usually less than two minutes, range of weakness (full attack less common), loss of motor tone precipitated by strong emotions (anger or laughter), may look like a drop attack, appears approximately 6 years after the onset of excessive daytime sleepiness
- **Sleep paralysis:** The inability to move just as you are about to wake up; sometimes it feels as if you cannot breathe
- **Hypnagogic hallucinations:** Inanimate objects take on life; the armchair is talking in evil ways; there are faces on the bed; green men in the room; simple forms such as colored circles, or the image of an animal or person, may appear as nightmares for children.

Daytime sleepiness is the primary symptom of this disorder. Taking several naps lasting 10 to 20 minutes in a day is quite common with narcolepsy. People fall asleep while driving and without the ability to control the onset of sleepiness are at risk for naps to occur anytime they sit down.

Insufficient Sleep Syndrome:

There are two factors that influence how sleepy or how alert a person is during a 24-hour period of time:

1. **Sleep wake balance:** how long it has been since you last slept and the idea that the longer you stay awake, the sleepier you become. This creates a sleep debt that is hard to get rid of. In other words, the less sleep that we get, the sleepier we become—and this does not diminish over time, it gets worse.
2. **Circadian rhythm:** this is your body's biological clock. The natural timing system, which tells you when to sleep and when to be awake, resulting in your feeling less sleepy or more awake depending upon the time of day. This rhythm is responsible for the feeling of a mild need to sleep during the afternoon and a strong need to sleep in the evening. In other words, the urge or desire to sleep is based upon a clock that is "preset" to occur at specific times. When these times are changed by staying up too late, or by a sleeping disorder, the result is daytime sleepiness.

Insomnia truly travels with depression. Eighty percent of those individuals diagnosed with major depression report the presence of insomnia. There is a predominance of individuals diagnosed with insomnia who are depressed. However, the presence of anxiety linked to insomnia is actually greater than depression linked to insomnia. The presence of insomnia has been found to be a predictor of a recurring mood disorder or the presence of a new episode of depression. While antidepressants have been found to be helpful with insomnia, unfortunately, insomnia is the most difficult symptom to get rid of and is in fact the most common refractory symptom of depression. Individuals can have predisposing factors making them more susceptible to insomnia. There are specific issues or factors that precipitate insomnia more often and factors, which perpetuate or allow insomnia to continue. Insomnia tends to accompany another type of disorder, as opposed to existing on its own. Recent research indicated that only 15% tends to be the result of primary insomnia, 50% accompanies psychiatric disorders, and 25% accompanies other physical disorders. Different populations identified to be more at risk for insomnia are the following: those with hip impairment (as primary), followed by myocardial infarction, obstructive sleep apnea, angina, prostate problems, congestive heart failure, and diabetes. The most severe insomnia was associated with hip replacement due to the high incidence of insomnia associated with pain.

Consequently, conditions frequently associated with insomnia are that of: chronic pain (fibromyalgia), head and neck injury, endocrine disorders, menopause, dementia, and pulmonary disease. Sleep complaints drastically rise in women after the age of 50 years, and the use of sleep medication increases dramatically after the age of 60 years. The prevalence of insomnia increases with age and is represented as the highest for ages 65 to 79. This points to the association of health status and insomnia; healthier individuals have considerably less insomnia. Neurological illness such as dementia produces changes in sleep and leaves the person more prone to insomnia. Depression accompanying dementia, especially a disease such as Parkinson's disease, leaves the person more at risk for insomnia to develop—the more severe the dementia, the greater the risk for insomnia. Insomnia is related to several factors that result in a cyclical downward spiral, which consists of medical and psychological issues, diet, and sleep hygiene. Insomnia is a marker of disease and is related to medical issues, neurological factors, mood and sleep disorders.

Insomnia is not the result of sleep deprivation; it is the difficulty of getting to sleep and maintaining sleep. A person may get to sleep and either experience poor quality of sleep (e.g., waking up frequently, watching the clock) and/or waking up too early and being unable to return to sleep. Those with insomnia tend to develop irregular sleep cycles as they try to catch up on the sleep they missed. This person may end up spending an enormous amount of time in bed trying to get to sleep and/or attempting to make up the sleep that they have lost. A person could feasibly go to bed at 10:00 at night and not get up until 11:00 in the morning and they may still feel tired. In actuality, they tossed and turned for five hours until they were finally able to get to sleep at about 2:00 or 3:00 in the morning—and then woke up frequently, finally getting good sleep after 8:00 the next morning. You can see how with this type of pattern it is easy for the person to become preoccupied with their sleep difficulty and lack of sleep. Thus they begin to fight themselves to get to sleep and maintain it.

The problem with insomnia is a loss of sleep, and similar to those disorders resulting in loss of sleep and daytime sleepiness, there is increased moodiness as

well as greater risk to become ill or exacerbate an illness already present. Given that anxiety is associated more with insomnia than any other psychiatric disorder, it is not surprising to find a prevalence of those diagnosed with attention deficit disorder (ADD) to have insomnia at some point in their life. Difficulty falling asleep is often seen clinically due to "thinking too much," or dwelling on issues that occurred during the day that they no longer have any control over.

RLS or PLMD can result in disturbed sleep, as well as difficulty getting to sleep, and thus contributes to daytime sleepiness. If periodic limb movements were present as a child, the person is more at risk to develop restless legs in adulthood. Restless legs can also be related to growing pains as a child. It can be misrepresented as hyperactivity due to the desire to move during the day. There tends to be a significant number of people with attention deficit hyperactivity disorder who have periodic leg movement and/or restless legs. There is a strong genetic component and the need to rule out low iron or ferritin levels.

Additional conditions disturbing sleep such as: sleepwalking, nocturnal leg cramps, rapid eye movement (REM) sleep behavior disorder, sleep-related eating disorder, or sleep talking, fall under the category of parasomnias. These are disorders of arousal or partial arousal while in a deeper stage of sleep, commonly taking place in stage 4, the deepest stage of sleep. Sleepwalking becomes dangerous when the person falls. One particular case that I had involved a 50 year old woman who sleepwalked on a continual basis without problems until her dog moved from its usual spot, at which time she tripped over the dog and sustained a head injury. Adolescents with sleepwalking tend to have more anxiety, panic attacks, and suicidal thoughts. Nocturnal leg cramps, common in the elderly, can disturb sleep as well, resulting in daytime sleepiness. REM sleep behavior disorder is a disorder that involves the acting out of your dreams. In other words, instead of having no muscle tone to move—despite dreaming of running and moving a lot—the presence, of REM sleep behavior disorder means that movement has been unlocked, and now if the person dreams of running, they are actually running—resulting in the risk of head injury—or they are actually hitting—resulting in injury to someone else.

Sleep-related eating disorders are associated with night eating and weight gain due to nightly eating. (Binge eating does not occur during the day, and sleep eating is not discriminatory or remembered) . Sleep talking is sounds made during sleep and more common in males than females.

Women entering menopause have decreased sleep efficiency and/or fragmented sleep due to hot flashes, night sweats, and increased arousals and awakenings. There is difficulty initiating sleep, increased anxiety, panic attacks, mood swings, insomnia, and depression. Apnea may have surfaced due to a long-term problem of UARS. All of the above can result in excessive daytime sleepiness. Research shows that one-fourth of women presenting with sleep disturbance indicate significant daytime sleepiness as well as impaired job performance and ability to care for their family. Approximately 86% of working women report fatigue and exhaustion, while 60% indicate difficulty sleeping. A smaller proportion report falling asleep while driving. Excessive daytime sleepiness has been correlated with premenstrual syndrome symptoms, and menstruation has been linked to episodes of daytime sleepiness. The first trimester of pregnancy is also associated with increased daytime sleepiness.

Daytime sleepiness as a result of a sleep disorder and/or the natural developmental dilemma for the teenager attending high school, presents with emotional and cognitive symptoms during the day.

From a general perspective, emotional symptoms will tend to be that of:

- Emotional lability
- Irritability
- Over-reactivity
- Mood swings
- Increased anxiety
- Depression or sad feelings with no obvious causal reason
- Impulsivity
- Hyperactivity

Cognitive symptoms will tend to be that of:

- Short term memory problems
- Forgetting small things such as where the keys are, papers become easily lost and so on
- Increased distractibility
- Increased difficulty with multi-tasking
- Decreased attention and concentration
- Difficulty making decisions
- Word retrieval and lost thoughts

Risk Factors for Sleep-Related Breathing Disorders

Yu-shu Huang

Department of Child Psychiatry, Chang Gung University, Taiwan

Christian Guilleminault

Sleep Medicine Program, Stanford University, Stanford, California, U.S.A.

Attention deficit/hyperactivity disorder (ADHD) is a behavior abnormality commonly seen in children and adolescents. Its main symptoms include inattention, hyperactivity, and impulsivity. Due to the clinical heterogeneity seen in ADHD, many specialists believe there are multiple etiologies! Several previously published studies have shown that children with ADHD often have abnormal nocturnal sleep. The question has been raised many times as to why children with ADHD have abnormal sleep. A questionnaire surveyed from parents of children with ADHD showed these had more snoring, head banging, restlessness, and nighttime awakening than in a child without ADHD. These observations attracted the attention of pediatric sleep specialists who have been studying abnormal breathing patterns during sleep in children for over 30 years. They observed that some of the complaints reported by parents of children who snore loudly are very similar to those reported by parents of children with ADHD.

THE SNORING CHILD

Chronic snoring is not normal. Snoring can be compared to a trumpet that consists of a small tube and a vibrator. Blowing through the mouthpiece, an audible sound will result once the speed of air is sufficient to cause a vibration. When we snore during sleep, it suggests that we have a narrowing in our airway tube that leads to some part of our airway tube to “vibrate,” resulting in our snoring. The parts in our airway that can vibrate are in our throat and in our nose.

When we are born, we naturally breathe through our nose. The process of breathing through our mouth is a learned reflex that develops after birth. Mouth breathing is not a natural way to breathe because it requires more effort from us. When we breathe through our mouth, we have to work harder, and therefore expend more energy. If we are forced to breathe through our mouth during sleep, when we should be resting and relaxing, our sleep becomes disrupted. As we learned in the previous paragraph, snoring results when we are forced to breathe through our mouth which then leads some part of the narrowed airway to vibrate.

One main reason as to why we become mouth breathers is when our nose becomes plugged, as during a cold. Breathing through our mouth means we have to work harder during sleep to breathe. This disrupts our sleep causing us not to sleep well. We often wake up feeling tired and fatigued. We may become “snappy” or be in a “bad mood.” It becomes hard to get up in the morning and the feeling of fatigue lasts throughout the day. If this persists for several days where we do not

sleep well, we become agitated, aggressive, and have difficulty concentrating. At times, we may even have some personality changes.

Another consequence of breathing through our mouth was studied 25 years ago in infant monkeys. In these infant monkeys, small silicone tubes were placed in their nose to partially obstruct their nostrils. This resulted in the infant monkeys having to work harder to breathe both during wake and sleep. Abnormal nose breathing due to increased resistance in the nasal air-passages forced them to open their mouth to breathe. This had an impact on the development of both the upper and lower jaws and the teeth. They found the upper and lower jaws did not grow to their full genetic potential. This in turn had an impact on the growth of soft tissues attached to the bones. In particular, the soft palate and tongue, which make up the limits of the upper airway, ended up in different positions from where they ideally should have been. The incompletely developed small jaw usually cannot accommodate a complete set of teeth and wisdom teeth. Furthermore, the two bones (the right and left plates) that form the upper jaw, and therefore, the base of the nose, become narrowed, which further impairs nasal breathing. When the small tubes occluding the nostrils of these infant monkeys were removed, everything returned to normal.

Although the findings in infant monkeys were also demonstrated in children, it is more complicated in children. During childhood, our face grows very quickly so that by four years of age, 60% of our adult face is built. By 11 to 12 years of age, we have reached 90% of our adult face. With the onset of puberty and its hormonal secretions, our muscles and soft tissues start to grow. Sexual hormones stimulate the muscles and soft tissues to grow. One of the muscles stimulated to grow is our tongue, which is one of the largest muscles in the body for the space allotted to it. If our facial bones and jaws do not grow adequately by the mechanism outlined above, there is no place for the growing soft tissue and muscle to go except in the upper airway, thereby crowding the upper airway.

One cause for occlusion of nasal passages in children is nasal allergies recognized as early as four to six months of age. Nasal allergies will cause our filters (nasal turbinates), located inside our nose to become enlarged. Frequent infections can cause our tonsils and adenoids to become enlarged. This results in a vicious cycle of mouth breathing causing trauma to the tonsils, which in turn leads to further enlargement of the tonsils that further obstructs the airway, so that an infection may not even be present anymore for the condition to worsen.

We also have to factor in familial traits. Specifically, we look like our parents, and this means we inherited some traits that are partly responsible for how our jaws grow and ultimately, how we look. This is one reason why snoring tends to run in families. The combination of genetic factors and environmental factors will have an impact on our nasal breathing, nasal resistance, and mouth breathing. One of the consequences is change in the size of tonsils and adenoids. The ear, nose, and throat (ENT) specialists have a classification for tonsils based on visual inspection of the tonsils. The grading scale ranges from 0 (no tonsils present) to 4 (tonsils are touching each other, also referred to as "kissing" tonsils). However, this classification is inadequate at describing the full clinical impact of tonsil size in respect to the particular airway that it occupies. These intricacies are underappreciated by ENT surgeons and orthodontists. ENT surgeons will often decide not to remove tonsils and adenoids in a child who snores because by their grading, the tonsils are only 2 to 3 in size, not taking into account the child may have a small jaw. Consequently, this impacts negatively on a snoring child's sleep, with its associated manifestations, and mouth breathing.

Many studies have been done looking at the impact of nose and mouth breathing on a child's growth and development. These studies have been done over the past 35 years, mostly in Sweden, but confirmed in many other centers. These studies showed that chronic mouth breathing and snoring are indicators of a child that does not breath well during sleep.

The American Academy of Pediatrics published a clinical recommendation three years ago stating that any child who snored chronically must be fully evaluated. This recommendation was based on series of studies performed above and worldwide. One such study that received significant attention was the one done in the southern United States where researchers performed a survey of parents at various school districts. The survey asked whether their child snored, and asked about their child's school performance and academic ranking. They then looked at the throat and the size of their tonsils and adenoids. The researcher found there was an overwhelming relationship between poor school performance and loud snoring and enlarged tonsils and adenoids. They proceeded to perform adeno-tonsillectomy on the snoring children who also had enlarged tonsils and adenoids, with the parents' permission. Not all parents agreed to the adeno-tonsillectomy. In the following years, the researchers were able to show that children who had the adeno-tonsillectomy were doing better in school compared with the ones who did not have surgery. Although the study was not optimal, it clearly demonstrated that abnormal breathing during sleep was associated with abnormal daytime behavior. This has also been demonstrated in other studies.

A study done in 1982 performed sleep studies in snoring children and found they had abnormal breathing patterns during sleep. This resulted in problems during the day that included not just poor school performance, but also hyperactivity, agitation, inattention, aggressiveness, and problems with memory and learning. Sometimes opposite depressed effect, abnormal shyness, persistence of bedwetting, repetitive sleep terrors, and/or sleepwalking were also seen.

It has been shown that treatment of the abnormal breathing during sleep by adeno-tonsillectomy and shrinkage of the inferior nasal turbinates (the nasal filters) by radiofrequency drastically improved breathing during sleep with resolution of abnormal daytime behaviors. If the inferior nasal turbinates are not treated at the same time of the adeno-tonsillectomy, mouth breathing will persist and behavior problems, although improved, will persist.

In some cases, resolution of behavior abnormalities is not complete despite adeno-tonsillectomy and shrinkage of the nasal inferior turbinates. The reason is abnormal breathing pattern during sleep is due to a combination of soft tissue enlargement and a small jaw. Therefore, treatment of soft tissue abnormalities always improves the condition, but does not completely correct it. As already discussed earlier, the jaws develop first before puberty arrives to stimulate the soft tissues to grow. If a child is prone to having a small jaw due to familial characteristics, and at times environmental factors, there are ways to help widen the jaws so it will be ready to accept the soft tissues once puberty starts. A method to widen the jaws is orthodontics. Starting at five years of age, a technique called "distraction" can help widen the upper and lower jaw. The lower jaw is difficult to widen. What this really means is we need to be aware that adeno-tonsillectomy with shrinkage of the turbinates is not the end of the treatment. At times, jaws may need to be widened and orthodontists need to be aware of these problems and the techniques used to help fix them.

By the age of 13 to 14 years of age, if persistent narrowed airway anatomy still exists, orthognathic surgery can be performed. The majority of the time, this surgery

can fix the remaining residual problems causing sleep-disordered breathing. Sleep clinics have seen children with sleep-disordered breathing and reported the presence of symptoms similar to that mentioned in children with ADHD. However, children with ADHD are usually not sent to sleep clinics. Therefore, specific research protocols were designed to explore if some children diagnosed with ADHD could in fact be presenting symptoms related to abnormal breathing during sleep.

THE ADHD CHILD AND ABNORMAL SLEEP

As mentioned earlier, investigations of children with ADHD had shown presence of abnormal sleep. The question then posed was: "Could abnormal sleep be related be due to some problems with breathing during sleep?"

Several groups in different centers tackled this question and demonstrated that some children had abnormal sleep due to sleep disorders. However, this did not mean that ADHD is related to the sleep disorder. They had to randomize patients into a placebo pill group (sugar pills) versus an active pill (i.e., Ritalin). In the active group, they found treatment of symptoms resulted in elimination of many symptoms associated with ADHD. However, this was found only in some and not all snoring children with ADHD. Because there is no pill for snoring, the most common treatment is adeno-tonsillectomy and shrinkage of the nasal turbinates.

ADHD AND SLEEP-DISORDERED BREATHING

A study was done to help specialists in ADHD. Subjects in this study were all children aged 6 to 12½ years old referred for suspicion of ADHD during a 12-month period. All subjects underwent the same pediatric, neurological, psychiatric, neurocognitive, and behavioral evaluations. They were seen by the same two experienced child psychiatrists. They all underwent a series of tests, including a test used on ADHD children called the test of variables of attention (TOVA). They also all underwent nocturnal sleep studies which revealed an abnormal pattern of breathing during sleep. They also monitored limb movements along with other biological variables.

A certain number of ADHD children were observed to have a breathing problem during sleep, but not all. The results and explanation of results were sent to their pediatricians and their parents. Pediatrician and parents of the children with both sleep-disordered breathing and ADHD were asked to choose one of three treatment options for their children. The three treatment options were adeno-tonsillectomy, methylphenidate (Ritalin), or wait and see. Few parents selected the wait and see attitude, but there were about equal number of parents choosing between methylphenidate and adeno-tonsillectomy. The severity of the sleep-disordered breathing was not significantly different between the groups at entry into the study. At six months after the start of treatment, all the children were re-tested, and the schoolteachers and the parents filled specific scales used to evaluate for improvement in ADHD. The scorers of the different tests did not know which treatment each child had received (they were "blind" to the type of treatment received).

Not surprisingly the children that had been left untreated were unchanged. The children in the other two treatment groups both improved. The children who had adeno-tonsillectomy had a significantly better score on the TOVA test

along with a lower score in quality of life scale than those who had medical treatment with methylphenidate. The results of the study showed that children who have both ADHD and sleep-disordered breathing have greater outcomes if we correct the sleep-disordered breathing with adeno-tonsillectomy than treatment with methylphenidate.

In summary, not every child with ADHD symptoms has a sleep-disordered breathing. However, presence of symptoms that suggest the concomitant presence of sleep-disordered breathing should lead to a systematic evaluation of the child with clinical evaluation and performance of appropriate tests. Once sleep-disordered breathing is recognized, appropriate treatment needs to be instituted. For this to occur, we need to have ENT surgeons and orthodontists acquire appropriate knowledge in sleep medicine and the reasoning behind various treatment options. ENT surgeons often cannot fully appreciate the problem when parents bring their child to be evaluated for snoring or abnormal breathing during sleep because they see the child during the day in their office. These failures are responsible for inappropriate treatment of children with symptoms that evokes ADHD, but may be related to an entirely different health problem.

Restless Legs Syndrome and Periodic Limb Movements Disorder in Children and Adolescents

Daniel Picchetti

University of Illinois and Carle Clinic Association, Urbana, Illinois, U.S.A.

Karla M. Dzienkowski

Restless Legs Syndrome Foundation, Rochester, Minnesota, U.S.A.

Restless legs syndrome (RLS) is a common and treatable neurological disorder affecting 5% to 10% of adults in some countries (1). In the United States alone, more than 10 million adults are believed to have RLS. Studies have shown that the symptoms often begin in childhood or adolescence, with about 35% reporting onset of RLS prior to age 20 (2,3). Multiple reports have now documented the childhood occurrence of RLS, as well as the related problem of periodic limb movement disorder (PLMD) (4–12).

INTRODUCTION

RLS and PLMD symptoms can range from minor to severe. In many cases, RLS and PLMD symptoms can have a significant impact on a child's quality of life. There are substantial benefits to an accurate diagnosis of RLS or PLMD in a child. Simply understanding why the child is uncomfortable and irritable can go a long way in producing a more supportive parental response. There is hope that early, specific treatment may reduce or eliminate RLS symptoms in children. If children are properly diagnosed, further research can produce more answers. And, most importantly, children who experience poor intellectual or emotional function due to these sleep disorders can have their problems more directly addressed.

Restless Legs Syndrome

In adults, RLS is characterized by unpleasant, restless feelings in the legs that can be relieved by walking or movement. The feelings typically occur when the individual tries to relax in the evening or sleep at night. RLS is associated with disturbed sleep and significantly diminished quality of life. The development of new and more effective treatments has brought hope to many who have suffered silently for years.

Children who experience RLS feelings will also obtain relief from the discomfort by moving their legs, through fidgeting, stretching, walking, running, rocking, or changing position in bed. Parents or healthcare providers may believe that the problem is simply "growing pains" (13). However, it is now recognized that RLS is a discrete disorder that needs proper diagnosis and treatment.

Restless Legs Syndrome and Sleep

Sleep disturbance is common in both children and adults with RLS. In children, the sleep disturbance often precedes or overshadows the complaint of typical RLS leg

discomfort (12,14). Often, sleep quantity and quality are affected. The resulting sleep deprivation can cause moodiness, irritability, inattention, fatigue, or hyperactivity.

Periodic Limb Movements in Sleep

Periodic limb movements in sleep (PLMS) are characterized by brief jerks during sleep (0.5–5.0 seconds), which typically occur at 20- to 40-second intervals (15,16). PLMS are more common in the toes, feet, and legs, than in the arms. The affected individual is usually not aware of the movements or of the associated transient arousals that disrupt sleep continuity. Between 80% and 90% of adults with RLS have PLMS. In children the presence of PLMS supports a diagnosis of RLS (see below) (17). On the other hand, PLMS are not specific to RLS, but also can be seen in some other sleep disorders and can be induced or aggravated by certain medications [particularly serotonin reuptake inhibitor type antidepressants, such as fluoxetine (ProzacTM), sertraline (ZoloftTM), and venlafaxine (EffexorTM)].

Periodic Limb Movements Disorder

PLMD is diagnosed when there are: (i) PLMS exceeding norms for age (≥ 5 per hour for children), (ii) clinical sleep disturbance, and (iii) the absence of another primary sleep disorder or reason for the PLMS (including RLS) (16). In some children a diagnosis of PLMD will evolve over time to a diagnosis of “RLS with PLMS” as the RLS feelings develop. Available evidence suggests that PLMS are due to an underactivity of dopamine function in certain central nervous system pathways and are a marker of instability in the sleep system (18).

DIAGNOSIS OF RESTLESS LEGS SYNDROME AND PERIODIC LIMB MOVEMENTS DISORDER IN CHILDREN AND ADOLESCENTS

Because children experience and present symptoms of RLS differently than adults, the diagnosis of RLS in children is more challenging. It is important to work with an interested healthcare provider in the diagnostic and treatment process. Because RLS has just recently been defined in its childhood presentation, it is unusual to find a doctor who has had extensive experience with childhood RLS. As was the case in the past with adult RLS, it may be necessary for the parent and the healthcare provider to learn together, working as a team to help the child. Pediatricians, pediatric neurologists, pediatric psychiatrists, and family practitioners are potential allies.

Restless Legs Syndrome Feelings in Children

For some children, the urge to move and uncomfortable leg sensations are the main concern. In the past, many of these children were simply diagnosed with “growing pains” (11,13). It is important to go beyond this and determine if the child truly has RLS. In describing RLS sensations children may use age-appropriate terms such as: “oowies,” “boo-boos,” “tickle,” “bugs,” “spiders,” “ants,” “want to run,” and “a lot of energy in my legs.” Non-RLS childhood causes of lower limb extremity discomfort include joint pains, sore muscles, and cramps, as well as nerve compression due to awkward positions.

Sleep Disturbance

In other children, the sleep disturbance and the PLMS predominate as symptoms. Leg discomfort may be mild and intermittent or even absent. A recent study found

chronic, clinical sleep disturbance to precede specific RLS feelings by 11 years in children with this presentation (14). It is in these cases where a diagnosis of “probable” or “possible” RLS may apply (see below).

Family History

A thorough family history can be of considerable help since an autosomal dominant pattern of inheritance is common in early-onset RLS (19–21). It is not unusual for a parent to be diagnosed initially with RLS when help is sought for the child.

Physical Examination

In children with RLS, the physical examination is typically normal. It is unusual to find an underlying medical disorder known to be associated with RLS. Iron deficiency anemia, kidney failure, diabetes, or peripheral neuropathy (damage to the nerves in the legs and feet) are usually not present. However, a mild degree of iron deficiency is often found (see the discussion regarding iron below).

Sleep Testing

Most of these children are described as “restless” in their sleep. Typically, an overnight sleep study (polysomnography) is needed to document the repetitive leg jerking (PLMS) and disturbed sleep. Simple observation of the child during sleep has not proven to be reliable for a diagnosis of PLMD. It is important that the sleep study be done with proper technique and scoring to arrive at accurate results (16). Also, the sleep study should be done at a sleep center that has had experience with children.

RESTLESS LEGS SYNDROME DIAGNOSTIC CRITERIA

Medical professionals have developed special criteria for diagnosing RLS in children aged 2 through 12 years. Adolescents 13 years and older are evaluated using standard adult criteria (17).

The following criteria are used to determine whether a child age 2 through 12 has a diagnosis of definite, probable, or possible RLS.

Criteria for the Diagnosis of *Definite* RLS in Children:

Child meets all four of the following adult criteria:

- An urge to move the legs
- The urge to move begins or worsens when sitting or lying down
- The urge to move is partially or totally relieved by movement
- The urge to move is worse in the evening or night than during the day or only occurs in the evening or night

And

The child uses his or her own words to describe leg discomfort. Examples of age-appropriate descriptors: oowies, tickle, tingle, static, bugs, spiders, ants, boo-boos, want to run, and a lot of energy in my legs

Or

Child meets all four of the above adult criteria

And

Two or three of the following supportive criteria:

- Sleep disturbance for age
 - Biological parent or sibling has definite RLS
 - The child has a sleep study documenting a periodic limb movement index of 5 or more per hour of sleep
-

Criteria for the Diagnosis of *Probable* RLS in Children:

The child meets all essential adult criteria for RLS, *except* criterion no. 4 (the urge to move or sensations are worse in the evening or at night than during the day)

And

The child has a biological parent or sibling with definite RLS

Or

The child is observed to have behavior manifestations of lower-extremity discomfort when sitting or lying, with motor movement of the affected limbs. The discomfort has characteristics of adult criteria 2, 3, and 4: worse during rest and inactivity, relieved by movement, and worse during the evening and night

And

The child has a biological parent or sibling with definite RLS

Criteria for the Diagnosis for *Possible* RLS in Children:

The child has PLMD

And

The child has a biologic parent or sibling with definite RLS, but the child does not meet definite or probable childhood RLS definitions

Source: From Ref. 17.

CAUSE OF RESTLESS LEGS SYNDROME

Research into the cause of RLS is ongoing, and answers are limited. However, two major themes have emerged. First, there is a strong genetic component evident in early-onset RLS. Second, there appears to be an underactivity of the brain transmitter *dopamine* in RLS and PLMD (pronounced: doe-pa-mean).

Genetic Component

Multiple family studies have shown a strong tendency for RLS to occur in families when the onset of RLS is before age 30 in an affected individual (19–23). In these studies, RLS has been linked to an autosomal dominant mode of inheritance. This results in a 50:50 chance of an affected individual passing on the genetic material necessary to inherit a condition such as RLS. Researchers have identified chromosomes 9p, 12q, and 14q as possible genetic locations for the expression of RLS as an inherited trait in the early development of RLS (24–26). Further research continues to locate RLS-specific gene sites and to determine the function of these genes.

Dopamine and Restless Legs Syndrome

The brain transmitter dopamine is one of several important substances in the brain, which allow nerve cells to “talk” to each other. Dopamine is a major communication molecule in several neural networks. Those networks control muscle movements, sleep, and “executive functions” of the brain (attention span, advanced planning, and control of impulses). Pharmacological studies and some brain imaging studies provide substantial evidence for an underlying dopamine abnormality in RLS and PLMD. As discussed below, because iron is needed for dopamine synthesis, the finding of iron deficiency as a contributing factor is consistent with this more comprehensive model of RLS pathophysiology (27).

THE ASSOCIATION OF RESTLESS LEGS SYNDROME AND PERIODIC LIMB MOVEMENTS DISORDER WITH LEARNING AND EMOTIONAL PROBLEMS

ADHD

Several studies have found an association between attention deficit/hyperactivity disorder (ADD/ADHD), RLS, and PLMD in children (6–8,10,28). However, this relationship appears complex. In some children the sleep disturbance and/or restless legs feelings can induce or aggravate inattention and/or motor restlessness. Indeed, there is considerable evidence that sleep deprivation in children can impair cognitive functions, including attentiveness and memory (28–30). This is not to say that all children with ADD/ADHD have RLS or PLMD, but rather that a subgroup may exist within the larger group of ADD/ADHD children. Conversely, not all children with RLS have ADD/ADHD, perhaps due to other modulating factors (28). Recent work has shown that adults with RLS are at increased risk for ADD (31). It is possible that an underactivity of dopamine in the brain is the common factor between ADD/ADHD, RLS, and PLMD (32,33).

Regulation of Emotions

Less well studied is a possible association between mood problems, RLS, and PLMD in children. As many parents know, sleep-deprived children are often moody or “cranky,” rather than overtly sleepy. Irritability, easy frustration, negative affect, and difficulty controlling impulses and emotions can be induced or aggravated by lack of sleep in children (34–36). Given the association emerging between RLS, depression symptoms, and anxiety in some adults (37,38), further study in this area is indicated in children.

RESTLESS LEGS SYNDROME, PERIODIC LIMB MOVEMENTS DISORDER, AND THE CONNECTION TO LOW IRON LEVELS

Iron and Ferritin

Studies in adults have found low iron in the body to be associated with increased RLS symptoms (27,33). This can be explained by the fact that iron is important in production of the brain transmitter dopamine. While low iron is not likely the sole reason for RLS, a lack of iron can induce or aggravate RLS in some individuals. The deficiency does not need to be severe enough to cause anemia. Iron stores are most easily measured by a simple, widely available blood test called serum ferritin. A low value, even in the low normal range, indicates a potential problem. Although the association with low iron stores and RLS/PLMD in children is new (12,39,40), it has been known for a long time that severe iron deficiency in children can affect brain development and function, likely via alterations in dopamine metabolism (41). Infants, toddlers, and teens are at particular risk for iron deficiency. Several studies in adults and two studies in children have shown that administration of iron can reduce RLS and PLMS symptoms (39,40). Some children with RLS or PLMD have ADD/ADHD, which has also been associated with low ferritin (42).

TREATMENT OPTIONS

Good Sleep Habits for Children and Adolescents

Studies have shown that children and adolescents can benefit significantly by establishing a routine of good sleep habits. This advice is particularly important for children and adolescents with sleep disorders. Parents can help establish a sleep routine that becomes a habit and follows the child throughout his or her life. In these early years, children and adolescents often test limits on sleep, resulting in sleep deprivation that may significantly increase their RLS symptoms and adversely affect their daytime function. It is important to know what the normal amount of sleep is for the child's age and to help him or her to get that amount on a regular basis. Typical sleep needs for age are: 2-years-old: 12 hours (1 nap included); 5-years-old: 11 hours; 10-years-old: 10 hours; teen: 9 hours; and adult: 7 to 8 hours.

The SANDMAN chart gives several tips for a good night's rest:

Sleep schedule: Go to bed and awaken at the same time daily, even on the weekend. Establish a bedtime routine.

Avoid caffeine containing foods and drinks such as soda, iced tea, and chocolate especially in the late afternoon and evening.

Naps for teens: only in the early afternoon and no longer than 45 minutes. No driving if tired.

Do allow yourself a bedtime snack.

Make exercise a part of your daily routine.

A relaxing, quiet, comfortable bedroom. Use this room only for sleeping. This room is a no study, loud music, or TV zone. Find another room for time-out.

No use of tobacco, alcohol, or street drugs. All are known to cause sleep disruption.

Source: From Ref. 43.

The "Sleep Well. Do Well. Star Sleeper Campaign" uses Garfield the Cat as its "spokescat" to encourage children aged 7 to 11 to get enough sleep. This is a free, fun, and interactive website for children. It is sponsored by the National Institutes of Health (NIH) and the National Sleep Foundation. Garfield's key message is that adequate nighttime sleep is important for children to do their best at whatever they do (44).

Iron Supplementation

Treat if Low Ferritin

If the serum ferritin level is low or in the low normal range, iron supplementation should be administered. A healthcare provider will prescribe the correct dosage of iron that the child will need to take, usually the typical dose and course of iron used for anemia in childhood. All laboratory work needs to be completed and results obtained prior to initiating iron therapy. It is important that ferritin blood tests be done when the child is not ill because the value can be falsely elevated by acute illness such as colds and other infections. Studies in children and adults have shown decreased RLS and PLMS associated with serum ferritin concentrations above 35 to 50 mcg/L (39,40,45,46). In addition, the healthcare provider will need to consider

a cause of the iron deficiency (usually if serum ferritin is less than 10 mcg/L) and schedule follow-up laboratory testing to carefully monitor the iron therapy. Unless there is a concern about iron becoming too high (e.g., hemochromatosis), a daily multivitamin with iron can be used to help prevent the body's iron from becoming depleted during the growth years (*note*: mcg/L equals ng/mL).

Iron Absorption

Taking an iron supplement with vitamin C enhances absorption of the iron. Many beverages, such as orange juice and fruit drinks, contain vitamin C. Vitamin C tablets are also available. Ideally, food, calcium, and tea should not be taken within an hour or two of taking an iron supplement. These decrease iron absorption and will delay full replenishment of the body's iron stores.

Monitoring Is Important

Taking only the prescribed dose of iron as directed by your healthcare provider and the monitoring of laboratory tests will insure the safe administration of iron.

Pharmacologic Therapy

Medication?

The decision to start a child on medication can be difficult, whether it is for asthma, migraine headaches, or for RLS. Most medications used for children were first found to be effective in adults and subsequently used for children with limited or no testing specifically for children. Most of what we know about the treatment of RLS and PLMD in children is based on specific modification of treatments found effective for adults with RLS (1,46,47). The risks of medication must be balanced against the long-term consequences of poor intellectual and emotional function due to this sleep disorder. All medications (including Tylenol) must be stored safely in childproof containers, out of the reach of young children. Non-pharmacological interventions, as described above, should always be part of the treatment plan, and in some children will be sufficient to manage the RLS. In general, medication should be considered when non-pharmacological interventions are insufficient and the sleep disorder is affecting the child's daytime function.

Goals of Medication

The goals sought with the use of medication are decreased RLS sensations, increased sleep quantity, and better sleep quality, resulting in improved daytime function.

Medication Options

In general, two very useful medications for children with RLS or PLMD are clonidine (Catapres) and clonazepam (Klonopin). Clonidine is the most commonly used medication for children's sleep (48–50). It is particularly useful when there are severe sleep-onset problems. Clonazepam is usually prescribed to improve the quality of sleep in children and decrease RLS sensations. In children with ADHD, clonazepam can sometimes aggravate hyperactivity and it should be discontinued if that is the case. Gabapentin (Neurontin) has shown promise for the reduction of sensory and motor symptoms of RLS and improvement of sleep quality (51,52). Temazepam (Restoril) and zolpidem (Ambien) have been found to help adults with RLS accompanied by severe, chronically disturbed sleep and might be considered in older children and teens with similar issues (46,53).

Medications that Increase Dopamine

Dopaminergics (medications that increase the brain transmitter dopamine) are the medications of choice for most adults with daily RLS (46,53–55). In adults, dopaminergics have been shown to suppress RLS feelings and PLMS more effectively and safely than any other class of medication. This class includes pramipexole (Mirapex), ropinirole (Requip), and levodopa (Sinemet, others). These medications have not had extensive use in children, but medications such as methylphenidate (Ritalin) also increase dopamine and have a good long-term safety record in children, if used properly (56). Dopaminergics might be carefully tried in children and teens with severe RLS sensations or significant PLMS (9,57). A recent study found levodopa to enhance some aspects of learning in normal young adults (58).

Dopamine Medications and Augmentation

“More is not necessarily better.” Augmentation, which is the worsening of RLS symptoms as dopaminergic dosage is increased, most commonly occurs with levodopa and is a less frequent side effect with the other dopaminergics (46). Augmentation is typically managed by reducing the dose, or in some cases switching to another dopaminergic.

Does Restless Legs Syndrome and Periodic Limb Movements Disorder Treatment Help Attention Deficit/Hyperactivity Disorder?

The relationship between RLS, PLMD, and ADD/ADHD appears to be complex, as described above. There is now considerable evidence that the treatment of sleep disorders in children can reduce, or in some cases eliminate, ADD/ADHD symptoms (28,57). Research in this area continues. If a child needs ADD/ADHD medication in addition to treatment for the sleep disorder, the usual stimulant-type medications (Concerta, Adderall, methylphenidate, etc.) have not been found to aggravate RLS or PLMD, as long as they are given in a manner in which the stimulant effect is worn off by bedtime (7,59).

Monitoring Is Important

It is important to note that all pharmacologic treatments must be prescribed and monitored by a healthcare provider familiar with the treatment of sleep disorders in children. The choice of medication is dependent on the type of symptoms that are experienced. As with adults who have RLS, the best treatment for an individual patient must be found by careful trials with reasonable medications. There is no “one size fits all” for the treatment of RLS. Medication should be periodically reassessed, especially in cases where iron deficiency has been treated.

Parent Issues

A Family Affair

The effects of RLS can be felt by the whole family and not just the child with RLS. Parenting a child who does not sleep well can be a real challenge. Help from a spouse, grandparent, or friend may be invaluable. Parenting skills in the areas of limit setting, conflict management, and advocacy often need to be raised to a level that is far greater than when one has an “easy child.” Numerous, excellent resource materials are available (60–62). Working with a counselor may be valuable in helping both the child and family develop methods for dealing with this chronic condition.

Parents May Need to Seek Treatment

If a parent has untreated RLS or PLMD, help for the child should include treatment for the parent too. Well-rested parents are typically more effective parents. Given the high prevalence of depression in adults with RLS, optimal treatment of depression symptoms is important (37,63,64).

ADVOCATING FOR THE CHILD WITH RESTLESS LEGS SYNDROME

Once a child is diagnosed with RLS, it is up to parents to emotionally support the child in coping with RLS. RLS affects each individual differently. Mild cases will warrant different treatment than severe cases.

At School

Apart from seeking medical help, parents should consider working with schoolteachers and counselors to address their child's needs. If the child's RLS affects school performance or there is evidence for a learning disability, the child may qualify for Section 504 accommodations or for an Individualized Educational Program (under "other health impaired" or "specific learning disability" categories). A referral for evaluation can be initiated by contacting your child's schoolteacher or principal. If appropriate, school accommodations might include assignment sheets, extra time for assignments, brief breaks to walk or stretch, providing more visual or verbal instruction, developing behavioral interventions, and/or other modifications of the curriculum.

Understanding and Self-Awareness

As in any case when a child is diagnosed with a medical disorder, parents must be sensitive to the child's psychological attitude towards the medical condition. Some children with RLS will not understand why their limbs ache or move and they may wonder why they are tired. Parents should tailor their explanation of RLS to the age of the child and focus on the treatment that may work to alleviate the medical condition.

Support Groups

The RLS Foundation sponsors RLS support groups, which can be an excellent forum for sharing, collaboration, and advocacy.

CONCLUSION

It is estimated that nearly 1.5 million children in the United States have RLS. The research shows that RLS and PLMD do occur in children, and therefore parents and healthcare providers should be aware of their existence and of the typical symptoms.

Despite the high prevalence of RLS, it is a relatively unknown medical condition in the medical community and general public. Amongst adults and children there are many undiagnosed cases. There is a remarkable lack of information about the disorder, given its prevalence in the general population. When children complain about leg pain, their voices are often dismissed as growing pains.

Proper identification of symptoms and the involvement of a well-informed healthcare provider can determine whether a child receives a correct diagnosis of RLS or PLMD. If that is the case, the parents and healthcare provider can exam-

ine the specific options that exist for treatment. They then can work on the solution for the child's medical problem, rather than focus simply on the behavior problem brought on by the medical condition.

The RLS Foundation is involved in sponsoring research on RLS in the search for better treatments and, ultimately, a cure. The RLS Foundation has supported research studies that have developed into NIH sponsored grants. Substantial progress has been made on diagnosis and treatment. Scientific studies continue to focus on different causes and potential cures for RLS. If your child has RLS, you are encouraged to visit the RLS Foundation's website (65) for more information and to become involved in the search for a cure.

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This chapter is based on the restless legs syndrome foundation brochure restless legs syndrome and periodic limb movement disorder in children, © 2005, modified with permission. Besides the primary authors, other contributors include Anita Raj, Georgianna Bell, and Bruce L. Ehrenberg

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Restless Legs Syndrome and Periodic Limb Movements Disorder in Adults

Wayne A. Hening

Department of Neurology, University of Medicine and Dentistry of New Jersey, Robert Wood Johnson Medical School—New Brunswick, New Brunswick, New Jersey, U.S.A.

The diagnosis of restless legs syndrome (RLS) in adults depends on two things—the satisfaction of four key diagnostic criteria that have been developed by the International RLS Study Group (Table 1) and the elimination of possible mimics, conditions that may satisfy some or all of these diagnostic criteria (1–3). The latter includes cramps, generalized anxiety or restlessness, positional discomfort—often resulting from the presence of some leg injury or condition (arthritis, varicose veins, arterial insufficiency), and certain forms of peripheral neuropathy.

The key diagnostic feature is the presence of a need or urge to move located somewhere within the legs (and sometimes elsewhere) and usually caused by or accompanied with unpleasant sensations. Those who do not feel an urge to move—individuals who tap their feet, for instance—do not have RLS. The other diagnostic features (Table 1) depend on factors which increase this primary symptom: rest—both physical and mental—increases RLS while activity—both physical and mental—decreases RLS. In those with a normal sleep–wake cycle, RLS tends to occur more readily and be more severe in the evening and at night—at least the first half of the sleep period (4–6). Some very severe patients, who often have arm symptoms, may experience symptoms around the clock, but they will recognize that earlier in the course of their disorder, the symptoms were primarily nocturnal.

RLS occurs with periodic limb movements (PLM). Almost all RLS patients will have some of these movements at night during sleep and many will have them while awake—if they are required to stay at rest, the movements can often be evoked (7,8). However, periodic limb movements in sleep (PLMS) are also seen in many other conditions and in otherwise normal individuals (9,10). Like RLS, they are more common in the older population. Studies have consistently shown an increase in the frequency of RLS through at least the seventh decade, while the condition occurs more often in women than men (11). Most RLS appears to be familial and idiopathic (not caused by another disorder) (12). However, some conditions predispose to RLS, such as iron deficiency (13), renal failure (14), and pregnancy (15). Cases with such underlying disorders may be more likely to be sporadic and lack a family history (16).

Because of the strong familial tendency of RLS, it is suspected that RLS may have a genetic basis (17). Several chromosome regions have been identified as likely to hold genes for RLS, but, as this chapter is written, no specific genes have been identified. One major theory holds that some patients with RLS have iron deficiencies in the brain and that this may be present from birth in those with familial RLS (18). Consistent with this theory is the finding that some patients, especially those with iron deficiency, respond to either oral or intravenous iron

TABLE 1 Diagnostic Features of Restless Legs Syndrome

■	Desire or need to move the limbs usually associated with uncomfortable or unpleasant sensations
■	Symptoms are worse or exclusively present at rest (i.e., lying, sitting)
■	There is at least partial and temporary relief by activity
■	Symptoms maximal in the evening or at night

repletion. Also, conditions with an elevated frequency of RLS are associated either with iron deficiency or iron stress, including uremia, pregnancy, and rheumatoid arthritis.

As explained elsewhere in this book, RLS, PLMS, and sleep disruption are common in attention deficit/hyperactivity disorder (ADHD). In one recent study, it was shown that adults with RLS are more likely to suffer from attention deficit than controls (19). Another study found that cognitive deficits in RLS patients were similar to normal adults who had been sleep deprived, with an emphasis on frontal lobe functions (20). The mediating factor for the adults may be the sleep loss induced by RLS. In one model used to explain the constellation of sleep and waking deficits seen in RLS, it was found that sleep deficits could explain most of the daytime dysfunction (21). Because they rarely suffer from profound sleepiness, individuals with RLS may be alert, but unable to concentrate, thereby losing a key attentional function.

Treatment of RLS involves a spectrum of drugs, including the dopaminergics, opioids, anticonvulsants, and sedative-hypnotics. The dopaminergics can have a stimulating effect and, as explained elsewhere in the book, have been used to treat both RLS and ADHD in children (22). However, they can also cause somnolence and have even been blamed for sleep attacks in patients with Parkinson's disease (23). While this is clearly uncommon in RLS patients who take lower doses (24) and are less disposed to be sleepy, daytime somnolence may occur for the first time in RLS patients who are put on dopaminergics. All the other classes of drugs used in RLS are known to cause somnolence. If RLS patients are more functional and less fatigued after use of these drugs, it is likely to be due to improved sleep rather than an active effect of the drugs. It is also suggested that typical therapy involve dosing at night when sleepiness may be desirable. In one study, the Hopkins group found that treated RLS patients given a sedative-hypnotic (lorazepam) were more symptomatic when put at rest during the day than they were without the medication—which has been used to treat RLS (R. Allen, personal communication).

RLS is likely to be intimately tied to the dopamine system of the brain, although we do not yet understand how. This same system is said to be out of balance in ADHD. Therefore, the relation of these two disorders, when understood, is likely to tell us a good deal about the way the brain acts to alternate between arousal and repose, to be focused and alert in the daytime and motorically quiescent and relaxed at night and during sleep.

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Megan Rauch

Great Lakes Sleep Diagnostics, L.L.C., (GLSD) Canton, Michigan, U.S.A.

Nothing appears more peaceful than a sleeping infant or child. Sleep is not always as peaceful as it appears, in fact, it is a period of considerable neurologic and physiologic activity. There are times during sleep in which the brain is actually more active than when awake, with periods of considerable brain activity involving higher cortical functions (1,2). Sleep is also a period of energy conservation and reduced metabolic activity (3). Sleep is a very complex physiologic process that is generated by many different regions of the central nervous system working together (2). Sleep is generally defined as a reversible state of decreased responsiveness and environmental interaction regularly alternating in a circadian manner with responsiveness and environmental interaction (1,2). This differs from unconsciousness, which is a state in which the unresponsiveness is not easily reversed (1,2). Even though sleep has been studied extensively, the exact definition and function of sleep remains elusive (2). What we do know is that an adequate amount of quality sleep is essential for physical growth and development, emotional health, social interaction, healthy immune function, creativity, and learning.

Sleep is such a basic physiologic function that higher vertebrates experience periods similar to sleep, that is they become unconscious to their surroundings for periods of time. Some species sleep for long periods at one time while others, such as dogs, sleep in short bursts. Fish and amphibians reduce their awareness but never become completely unconscious to the environment. Although it varies significantly among species, the cycling of non-rapid eye movement (NREM) and rapid eye movement (REM) sleep appears to be the most basic organization of sleep (1).

Sleep is broken down into two groups, NREM sleep and REM sleep. NREM sleep is further divided into four stages. In adults and older children the stages progress in cycles, starting with stage 1 sleep and progressing to REM. A complete sleep cycle takes about 90 to 110 minutes, with the first REM period occurring about 70 to 90 minutes after sleep onset (4).

THE STAGES OF SLEEP

Stage 1 sleep is the first stage entered and is the lightest stage (Table 1). Stage 1 is often considered a transitional stage from wakefulness to other sleep stages (1,5). Stage 1 is characterized by slow rolling eye movements, a reduction of alpha waves from wakefulness and the presence of theta waves in the electroencephalograph (EEG), mixed frequency low voltage waves; frequency is four to seven cycles per second (cps) for theta waves to 8 to 13 cps for alpha waves (5). Higher voltage vertex sharp waves (amplitudes up to 200 μ V) and the presence of synchronous high-voltage theta burst in children are also common in stage 1 sleep (2,5).

TABLE 1 Electroencephalograph Frequency Bands

Alpha rhythms	8–13 cps
Beta rhythms	> 13 cps
Delta rhythms	< 4 cps
Theta rhythms	4–7 cps

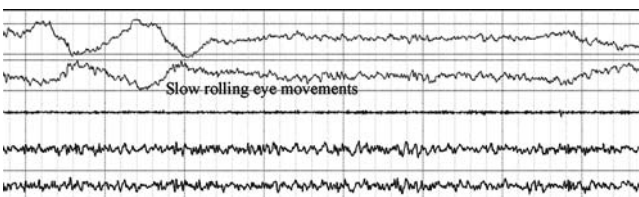
Abbreviation: cps, cycles per second.

Stage 1 can occur when a person is quietly resting, “dropping off” briefly while watching television, reading, or being at an uninteresting lecture. The person may also have what are known as “hypnagogic hallucinations”—dream-like sensations of falling, hearing voices, or seeing flashes of pictures (4,6). Stage 1 may last for 5 to 10 minutes at the beginning of sleep, and accounts for a relatively small percentage of total sleep time (about 5%) in healthy adults (Fig. 1) (1,4,5).

Stage 2 sleep: This stage is considered the baseline stage of sleep. During stage 2, the heart rate slows, breathing becomes even more regular, body temperature decreases, and muscles relax further. The EEG is characterized by relatively low voltage mixed frequency waveforms (1,4,5). Sleep spindles and K-complexes first appear; these are not seen during wakefulness or drowsiness (1,4,5). Generally, 50% or more of the sleep period is spent in stage 2 sleep (Fig. 2) (1,4,5).

Stages 3 and 4 sleep: Often called slow wave sleep (SWS) due to the presence of high amplitude (> 75 μ V), slow frequency delta waves at less than 4 cps (5). Stages 3 and 4 are considered to be “deep sleep” and contrary to popular belief it is the deepest and most restorative, not REM (4). It is very difficult to awaken someone from these stages. There are typically no eye movements or muscle activity during SWS (1,4). Parasomnias are most common during these stages, such as sleep terrors and sleep walking (4). Stages 3 and 4 differ in the amount of delta waves that are present. Sleep is considered Stage 3 when 20% to 50% of a 30-second epoch is comprised of delta waves. Sleep is considered Stage 4 when 50 or more of a 30-second epoch is comprised of delta waves (Figs. 3 and 4) (5).

REM sleep: Characterized by relatively low voltage mixed frequency waveforms; sawtooth waves; theta activity, REMs in different directions; rapid, irregular and shallow breathing and limb muscles become temporarily paralyzed (1,2,4,5). Dreaming occurs during REM sleep (1,4,5). REM is believed to be important for learning and normal brain development, which might explain why infants spend so much more time in REM than other age groups (2). The EEG of REM is characterized by low voltage mixed frequency waveforms (5). After sleep onset the first REM sleep period generally begins 70 to 90 minutes later (4,5). The average person spends approximately 20% of the night in REM sleep, infants about 50% (Fig. 5) (1,2,5).

**FIGURE 1** Stage 1 sleep.

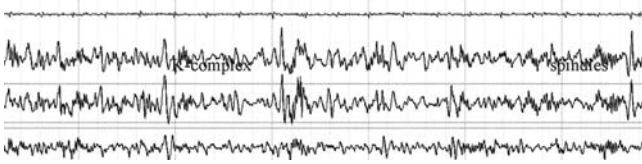


FIGURE 2 Stage 2 sleep with K-complex and sleep spindles.

Significant literature exists that supports a relationship among REM sleep, phasic REM activity, and learning. It has been shown that REM sleep deprivation either before or after learning disrupts primary long-term memory processes (Fig. 6).

Figure 6 shows a typical hypnogram depicting the progression of sleep throughout the night. Note the transitions into different stages and the presence of SWS in the first one-third to one-half of the night. Also, note the microarousals and how they are associated with transitions back to stage 1 sleep and/or wakefulness.

WHY DO WE NEED SLEEP?

Although sleep has been researched extensively and continues to be, scientists are still trying to determine why we need sleep. Studies in animals have demonstrated that sleep is necessary for survival (2,4). A study performed on sleep-deprived rats indicated that those deprived of REM sleep lived only five weeks on average, and those deprived of all sleep lived only three weeks on average (4). Rats typically have a life span of two to three years (4). The sleep-deprived rats developed abnormally low body temperatures and sores on their tails and paws (4). Sleep deprivation is believed to have detrimental effects on the immune system, memory and learning, growth and development, and social interaction. Studies indicate that sleep is important to a number of physiologic processes and appears to help the body restore and rejuvenate in many different ways, including but not necessarily limited to:

- *Growth and development:* Children need much more sleep than adults. Growth hormones (GH) are released during sleep beginning at sleep onset (2,7,8). The release of GH peaks during SWS in the first third of the night (1,2,7).

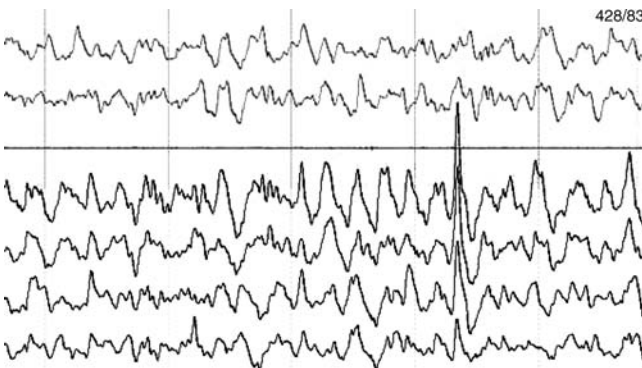


FIGURE 3 Slow wave sleep.

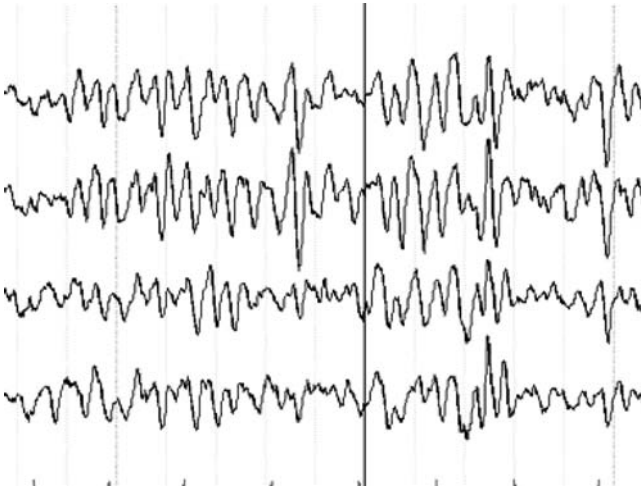


FIGURE 4 Sawtooth waveforms in rapid eye movement.

Therefore, the quality of sleep is vital to proper physical and mental development. Many of the body's cells demonstrate an increased production and reduced breakdown of proteins during sleep (4). Proteins are referred to as the building blocks of cells and are needed for cell growth and repair (4).

- *Immune system:* Similarly, sleep also enables the immune system to function effectively. During deep sleep, the body's cells increase production while proteins break down at a slower rate. Without proper sleep, the immune system becomes weak and the body becomes more vulnerable to infection and disease. The neurons that control sleep work closely with chemicals of the immune system called cytokines (4). Cytokines are produced by the immune system when the body is infected (4). The cytokines are powerful sleep-inducing chemicals (4). Therefore, the body induces sleep to conserve energy and other resources that allow the immune system to function more effectively (4).
- *Nervous system:* Sleep is necessary for our nervous system to function properly (4). Experts believe that sleep allows neurons used while awake a chance to shutdown and repair themselves. It is believed that without sleep neurons become so depleted of energy and polluted with byproducts of normal cellular activity that they begin to malfunction (4). Neuronal malfunction is evident

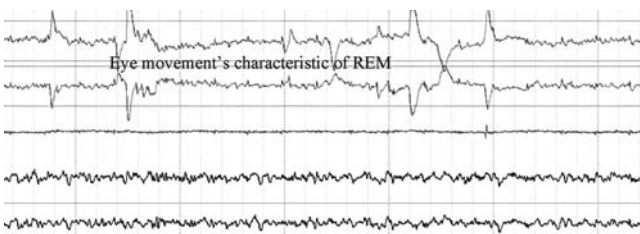


FIGURE 5 Rapid eye movement sleep with eye deflections.

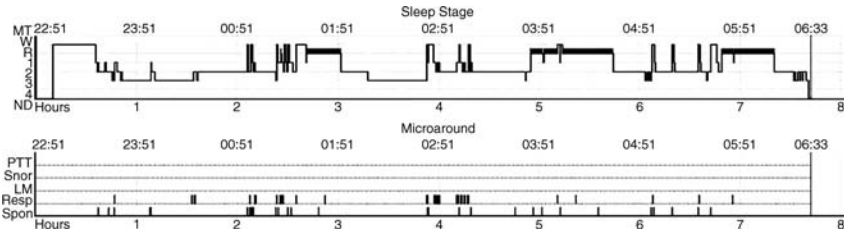


FIGURE 6 A typical hypnogram depicting the progression of sleep throughout the night. Note the transitions into different stages and the presence of slow wave sleep (SWS) in the first one-third to one-half of the night. Also note the microarousals and how they are associated with transitions back to stage 1 sleep and/or wakefulness.

during periods of sleep deprivation. This is evidenced by difficulty concentrating, impaired memory, and reduced physical performance that is common after even mild sleep deprivation.

- *Memory, learning and social processes:* Sleep enables the brain to encode new information and store it properly (4). REM sleep activates the parts of the brain that control learning (2,4). REM is believed to be important for normal brain development and may explain why infants spend 50% of sleep in active or REM sleep. The parts of the brain that control emotions, decision making and social interactions slow down dramatically during sleep, allowing optimal performance when awake. Studies also show that when learning certain types of tasks, those who get a good night's sleep afterward perform better when tested the next day than those who get insufficient sleep. In fact, researchers have found that after a person learns new information, there is activity in the same area of the brain during sleep, and there is improvement in memory performance when the person is tested the next day. So, getting a good night's sleep after learning something new is a crucial step in organizing new information and strengthening recent memories.

REGULATION OF SLEEP

Sleep is regulated by two processes, circadian and homeostatic, which are in turn controlled by the body's "biological clock" (1,4,9). The biological clock is called the suprachiasmatic nucleus (SCN). The SCN is a pair of pinhead-sized brain structures that contain about 20,000 neurons together (4). The SCN contains a type of circadian pacemaker and is the site of circadian rhythmicity. The SCN is located in the hypothalamus, just above the point where the optic nerves cross (9,10). Photoreceptors in the retina create signals that travel along the optic nerves to the SCN in response to light (9). Then signals from the SCN travel to several brain regions that respond to light-induced signals, these respond by stopping the production of the hormone melatonin (9). Melatonin is secreted by the pineal gland; it is often referred to as the hormone of darkness (9,11). The secretion of melatonin occurs during darkness, whereas light is able to stop and entrain melatonin production (9).

The SCN also controls the other functions synchronized with the sleep/wake cycle, such as body temperature, hormone secretion, urine production, and

changes in blood pressure (4,9). Scientists have determined that most people's biological clock actually function on a 25-hour cycle, however, due to sunlight and other bright lights that can reset the SCN, our bodies generally follow the 24-hour cycle of the sun (1,4,9). The two processes that are regulated by the SCN are the *circadian process (rhythms)* and the *homeostatic process* (9,10):

- *Circadian process (rhythms)* (circadian means "around a day" in Latin) (1,4) refers to the regular changes in mental and physical characteristics that occur in the course of a day and function as an internal clock. In humans, the circadian rhythms are fully expressed by six months of life (9). The circadian rhythm dictates periods of activity (wakefulness) and inactivity (sleep) primarily based on the light–dark cycle (1,4,9,10). Other factors influencing the circadian rhythms include such social and environmental cues as ambient temperature, feeding times, bedtime routines, noise, medications, physical activity, and pain (1). In other words, the circadian rhythm incorporates cues from the external environment to regulate sleep and wakefulness. External time cues that affect circadian rhythms are called *Zeitgebers* (meaning "time givers" in German) (4,9). Circadian rhythms also respond to a myriad of other factors such as hormone secretion, core body temperature, gastric acid, intestinal motility, cellular immunity, and sensory processing (1,9).
- *Homeostatic process* involves the sleep debt that accumulates during the day. This process regulates sleep based on the duration of prior wakefulness and the accumulation of the sleep debt (1,12). The longer the period of wakefulness the more the increase in the sleep drive (1,9). The desire for sleep develops during the day and it can be relieved by daytime naps or nighttime sleep (1).

The interaction and synchronization of the circadian and homeostatic processes determine the duration of sleep (12). The circadian and homeostatic processes must be synchronized in order for optimal sleep and wakefulness to occur (6). The ultradian rhythm refers to the alternating cycles of wakefulness, NREM sleep, and REM sleep (1,6). The length of the ultradian cycles (NREM–REM) changes with age. For instance, the ultradian rhythm is about 60 minutes in infants and increases to about 90 minutes during early childhood (12).

PHYSIOLOGICAL CHARACTERISTICS OF SLEEP IN THE NEWBORN (BIRTH TO THREE MONTHS)

The development of the EEG in the fetus, newborn, and child is rapidly changing. The evaluation of the EEG along with other physiologic functions allows clinicians to gain valuable insight into the quality of a child's sleep.

Sleep is the primary activity of the brain during infancy. Circadian rhythms, or the sleep–wake cycle, are regulated by light and dark and these rhythms take time to develop, resulting in the irregular sleep schedules of newborns (9,13). Circadian rhythms of the fetus generally follow those of the mother with the synchronizing substance being melatonin (9). The SCN is active early in the developing fetus and newborn (9). After birth, the rhythms begin to develop at about six weeks, and by three to six months, most infants have a regular sleep–wake cycle (13). The circadian rhythms develop during the first few months of life and are influenced by a number of factors: sleep schedule, melatonin, temperature, and the light–dark cycle (9). The circadian rhythm is first influenced by light at about two days after birth (9). The circadian rhythm of temperature appears at

about one week of age and is based on the morning increase and evening fall in temperatures (9). The circadian rhythm of wake is the next to develop at about 45 days, this appears to be influenced by the melatonin concentration at sunset, or levels equivalent to those of an adult (salivary concentration of 20 pg/mL) (9). The circadian rhythm of sleep is the last to appear at approximately 56 days of life (9). The circadian rhythms of infants are also influenced by the family's sleep schedule (9).

Infant sleep characteristics as observed via EEG differ significantly from that observed in children and adulthood. The typical EEG patterns of a full-term infant are apparent by 37 to 38 weeks of conceptional age (conceptual age is calculated from the first day of the mother's last menses, without consideration for the date of birth) (13,14). The EEG patterns of preterm infants demonstrate different characteristics that will not be discussed in this writing. At the 37- to 38-week threshold, the four main EEG patterns of the infant are visible (14). The four patterns are: a low voltage irregular pattern, a mixed pattern, high voltage slow (HVS) wave pattern, and finally a tracé alternant pattern (14). EEG characteristics do not take on a more adult look until about 52 weeks of conceptual age. The period between 43 and 52 weeks conceptual age reflects the transition from newborn to full-term sleep patterns, and the movement toward adult patterns.

The primary differences of the infant EEG are (13,14):

- Sleep spindles are poorly defined and shifting, central sharp waves may begin to appear.
- Absence of defined K-complexes. K-complexes start to appear around five to seven months of age.
- Absence of waking alpha waves. Waking alpha appears between one and three years of age.
- EEG phenomena exist during wakefulness and sleep that is generally considered abnormal in older children. Phenomena such as non focal sporadic spikes, frontal sharp transients, anterior slow wave activity, and transient asymmetries are not considered abnormal in early infancy.
- Frequency band is slower than in children and adults, between 6 and 7 Hz rather than 8 to 13 Hz.

Recognizing sleep in infants via EEG is often challenging. With the most consistent behavior correlated with sleep in the newborn being persistent eye closure, the absence of alpha EEG frequencies with the eyes closed forces clinicians to rely on behavioral criteria when interpreting data obtained via polysomnogram (13).

There are two alternating types or states of sleep in the newborn:

Quiet sleep (characteristically similar to NREM sleep) (1,13,15). During the deep states of NREM sleep, blood supply to the muscles is increased, energy is restored, tissue growth and repair occur, and important hormones are released for growth and development. Quiet sleep is characterized by the regularity of physiological activity, closed eyes, and lack of body movements (aside from the occasional spontaneous startles or mouth movements). The EEG pattern is a combination of HVS waves, tracé alternants, and mixed frequency patterns (15).

Active sleep (characteristically similar to REM sleep) (Table 2) (1,13,15). During active or REM sleep, brains are active and dreaming occurs. Active sleep is a period of considerable behavioral activity. Periods of immobility are observed but overshadowed by frequent activity, such as facial movements (smiles, grimaces, frowns), small digit limb movement interspersed with gross body movements, slow rolling eyes movements, blinks, vocalizations (brief grunts,

TABLE 2 Patterns of Electroencephalograph Activity in Full-term Infants

Low voltage irregular pattern	Similar in all scalp regions. Little variation. Voltage range 14–35 μ V. Dominated by theta activity (5–8 Hz) with significant slow wave activity (1–5 Hz)
Tracé alternant	Bursts of high voltage slow (HVS) waves (0.5–3 Hz). Occasionally superimposed with rapid low voltage waves and sharp waves of 2–4 Hz between the slow waves. Bursts last 3–8 sec, separated by 4–8 sec of attenuated mixed frequency activity
High voltage slow pattern	Continuous moderately rhythmic, medium to high voltage waveforms with an amplitude of 50–150 μ V and frequency of 0.5–4 Hz
Mixed pattern	High voltage slow (HVS) and low voltage polyrhythmic components. Amplitude less than the HVS pattern

whimpers, and cries), and penile erections in boys (1,13,15). Breathing and heart rate is irregular (1). The EEG pattern is comprised of low voltage irregular patterns, interspersed with mixed, and rarely, HVS patterns (15).

Infants tend to enter into active (REM) sleep until up to six months of chronological age. However, sleep-onset REM generally begins to shift to sleep onset through NREM at approximately three months of age (13). Active and quiet are cyclic, infants generally spend 50% of their time in each of these states, and the sleep cycle is about 50 minutes (13). At about six months of age, REM sleep comprises about 30% of sleep (13). By the time children reach preschool age, the sleep cycle is about every 90 minutes (13). Smooth transitions between active and quiet sleep may be difficult to identify in early infancy. Therefore, a third sleep stage with mixed-stated characteristics, indeterminate sleep, is used to classify periods of sleep that cannot be classified as either quiet or active sleep (13,15). Indeterminate sleep is most prevalent at times of sleep onset, sleep state transitioning, or during arousals (15).

Facts About Newborn Sleep

- Newborns at between one and two months of age spend a total of 17 to 18 hours a day sleeping on average.
- The sleep schedule is irregular and alternates with periods of one to three hours of wakefulness.
- Sleep periods may last from a few minutes to several hours.
- During sleep, they are often active, twitching their arms and legs, smiling, sucking, and generally appearing restless.

Newborns express their need to sleep in different ways. Some fuss, cry, rub their eyes, or indicate this need with individual gestures. It is best to put babies to bed when they are sleepy, but not asleep. They are more likely to fall asleep quickly and eventually learn how to get themselves to sleep. Newborns can be encouraged to sleep less during the day by exposing them to light and noise, and by playing more with them in the daytime. As evening approaches, the environment should be quieter and dimmer with less activity.

PHYSIOLOGICAL CHARACTERISTICS OF SLEEP IN INFANTS (3–12 MONTHS)

EEG characteristics undergo striking maturational changes during this stage of development (13–15). The three-month threshold is a significant juncture in the

maturational process of neurological development. At three months of age, it is still difficult to differentiate NREM sleep stages. However, by six months, NREM sleep can typically be identified and divided into three distinct states: stage 1, stage 2, and SWS (presence of low frequency delta waves) (13):

- A clear pattern of wakeful activity begins to emerge. The trace alternant in the newborn is gradually replaced by a continuous slow wave pattern by three months.
- Between two and six months, sleep spindles assume mature characteristics and appear almost continuously throughout NREM sleep. Complete absence of sleep spindles between three and six months should be considered abnormal. Clear sleep spindles consisting of waxing and waning and medium-amplitude synchronous waves of about 12 to 14 Hz appear at about six to eight weeks of age.
- Rudimentary-vertex sharps and K-complexes are present in newborns, however they do not clearly appear for the first time until around five or six months of development. Vertex sharps are generally seen in the lighter stages of sleep (stages 1 and 2), are of high amplitude (up to 250 μ V) and negative polarity lasting less than 200 msec.
- Slow wave activity during wakefulness becomes more rhythmic and diminishes significantly.
- Generalized delta and theta activity appears and is more prominent in the posterior EEG channels.
- Theta activity increases in prominence in the central and posterior regions and becomes the dominant waking rhythm after five months.
- Sleep-wake transitions are relatively smooth.
- REM sleep undergoes significant changes. Amplitude decreases with a slight increase in the mixture of frequencies. Sawtooth waves appear and the EEG pattern begins to resemble the relatively low-voltage, mixed frequency pattern seen in older children and adults.
- Percentage of REM decreases during this stage. By the end of the first year of life, REM percentage approaches 30% of the total sleep when compared with the 50% seen during early infancy.

On average, 9 to 12 hours of sleep is common with this age group. Napping occurs for between two and five hours during the day. This age group needs up to four naps that are 30 minutes to two hours in duration.

By six months of age, most infants are physiologically capable of sleeping through the night. Nighttime feedings are generally reduced to a minimum and the infants will begin to sleep through the night; 70% to 80% will do so by nine months of age fewer as they reach age 1.

When infants are put to bed drowsy but not asleep, they are more likely to become "self-soothers" which enables them to fall asleep independently at bedtime and put themselves back to sleep during the night. Those who have become accustomed to parental assistance at bedtime often become "signalers" and cry for their parents to help them return to sleep during the night.

Social and developmental issues can also affect sleep. Secure infants who are attached to their caregiver may have less sleep problems, but some may also be reluctant to give up this engagement for sleep. During the second half of the first year, infants may experience separation anxiety. Illness and increased motor development may also disrupt sleep.

Sleep Tips for Infants

- Develop regular daytime schedules.
- Create a consistent and enjoyable bedtime routine and maintain a consistent schedule.
- Establish a comfortable and “sleep friendly” environment for the infant. This is accomplished by maintaining a comfortable temperature, providing comfortable bedding. Soothing sounds are often helpful.
- It is important for the parent to encourage the baby to fall asleep independently and to become a “self-soother.” This is accomplished by placing the baby in the crib while still sleepy, but not yet asleep.

Infants are helpless and therefore are at a high risk of experiencing sleep or sleep environment-related accidents. It is important for the caregiver to practice safe sleep practices when caring for infants:

- Studies indicate that it is safer to place infants on the back when placing them in the crib at night or during naps.
- Place your baby on a firm mattress in a safety-approved crib with slats no greater than 2 to 3/8 inches apart.
- Make sure your babies head and face remain uncovered and clear of blankets. Do not place pillows, stuffed animals, or other items that could interfere with the baby’s ability to breath in the crib.
- Place infants in warm sleepers. Warm sleepers are generally enough to keep a baby warm. If a blanket is used, place the infant with the feet at the bottom of the crib, the blanket no higher than chest level and tucked in around the mattress. Do not use large or heavy blankets or quilts.
- Avoid overheating during sleep and maintain the bedroom temperature at a temperature that is comfortable for adults.
- Maintain a “smoke-free-zone” around the baby and all children. Secondhand smoke has been shown to increase the risk for ear infections, and the incidence of respiratory disorders. Secondhand smoke may contribute to obstructive sleep apnea and even increase the risk for sudden infant death syndrome (SIDS).
- Avoid sleeping in the same bed with an infant. Accidents and deaths have occurred due to bed sharing.
- Remember to remove all mobiles and other hanging crib toys by five months of age. This is generally the age when infants will begin to pull themselves up in the crib. Reaching and/or climbing for the mobile could lead to a serious accident.
- Bumper pads should be removed by 12 months of age when the child begins to climb.

PHYSIOLOGICAL CHARACTERISTICS OF SLEEP IN CHILDREN (TODDLER TO MIDDLE CHILDHOOD)

The changes that occur after one year of age are slow, consistent, and continuous. These changes are more subtle and slow to evolve (13–15).

- Waking rhythms with the eyes closed increase in frequency from 5 to 7 Hz of relatively high voltage activity to the sinusoidal 8 to 12 Hz frequency characteristic of the adult patterns. This is the development of the alpha rhythms. Well-developed alpha rhythms are present in normal children around the age of eight years.

- The amplitude of alpha activity gradually increases during early and middle childhood, before remaining at the relatively low to moderate amplitude of puberty, adolescence, and adulthood.
- The transitional patterns of drowsiness can be identified at one to two years of age. The sleep-wake transition includes more mature alpha admixed with slower, mixed frequency activity.
- The determination of sleep becomes easier to discern as episodes of microsleep become longer and consolidate, alpha activity disappears from the EEG, slow rolling eye movements are easily identifiable, and a muscle tone decrease is witnessed. This allows for a more accurate identification of sleep onset.
- There is a decrease in the percentage of the slow, high voltage activity that is common in infancy and early childhood. Theta activity is prominent between one and four years of age, but begins to diminish after age four. Alpha activity is equally prominent at five to six years; after six years, alpha activity becomes the predominant waking rhythm.
- By middle childhood, all stages of sleep are easily discernable. However, frequencies are somewhat slower in childhood, gradually increasing to those of adulthood.
- The most obvious difference between the EEG characteristics of adults and children is the higher amplitude waves that are common until puberty, after which a more adult pattern develops.
- The length and structure of the sleep cycles continue to evolve. During early infancy sleep cycles last 40 to 50 minutes. The cycle gradually increases to 60 minutes by 18 to 24 months, and 90 minutes at age five. As the sleep cycles develop the EEG activity assumes the more adult characteristics with regular cycles of NREM and REM sleep (1,13).
- Percentage of REM sleep decrease to the normal adult average of 20% to 25% by three to five years of age.
- Sleep onset gradually becomes delayed along with a tendency to awaken at a later time.

Sleep Behavior in Toddlers

By the age of two, most children have spent more time asleep than awake; children will spend 40% of their childhood asleep! Sleep is especially important for children as it directly impacts mental and physical development:

- Toddlers need about 12 to 14 hours of sleep in a 24-hour period.
- When they reach about 18 months of age their naptimes will decrease to once a day lasting about one to three hours. Naps should not occur too close to bedtime as they may delay sleep at night.
- Many toddlers experience sleep problems. These problems range from resisting going to bed, nighttime awakenings, to obstructive sleep apnea.
- Children at this age tend to experience nighttime fears, nightmares are also common. This is the age group in which sleep terrors begin.
- The drive for independence and an increase in motor, cognitive, and social abilities can interfere with sleep. In addition, their ability to get out of bed, separation anxiety, the need for autonomy, and the development of the child's imagination can lead to sleep problems.
- Daytime sleepiness and behavior problems may signal poor sleep or a sleep problem.

Sleep Tips for Toddlers

- Maintain a daily sleep schedule and consistent bedtime routine.
- Create a consistent and stable bedroom environment (lighting, temperature, noise, and surroundings). Should remain the same at bedtime and throughout the night.
- Be consistent and in charge. Set limits that are consistent, communicated and enforced.
- Encourage use of a security object such as a blanket or stuffed animal.

Sleep Behavior in Preschoolers (3–5 Years)

- Preschoolers typically sleep 11 to 13 hours each night.
- Naptimes decrease during this period. Most do not nap after five years of age.
- The desire to stay awake later often leads to many experiencing difficulty falling asleep.
- Nighttime awakenings for a number of reasons (enuresis, sleep terrors) are common.
- Due to further development of imagination, preschoolers commonly experience nighttime fears and nightmares.
- Sleepwalking and sleep terrors peak during preschool years.

Sleep Tips for Preschoolers

- Maintain a regular and consistent sleep schedule.
- Have a structured and relaxing bedtime routine that ends in the room where the child sleeps.
- Children in this age group should sleep in the same sleeping environment every night, in a room that is cool, quiet, and dark—and without a television (TV) or other distractions.
- Although TV is discouraged at bedtime on some occasions an age-appropriate movie may be helpful for calming children prior to bedtime. Reading is more effective. Pick movies that are slow-paced; intense action packed movies are more likely to keep the child up later than helping to get them to sleep.

Sleep Behavior in School-Aged Children (6–12 Years)

- Children aged 5 to 12 years require 10 to 11 hours of sleep.
- The increasing demand on their time from school (e.g., homework), sports, and other extracurricular and social activities begins to interfere with sleep.
- An increasing interest in TV, computers, the media and Internet, as well as caffeine products, all of which can lead to difficulty falling asleep, nightmares, and disruptions to their sleep. In particular, computer use and watching TV close to bedtime has been associated with bedtime resistance, difficulty falling asleep, anxiety around sleep, and sleeping fewer hours.
- Sleep problems and disorders are prevalent at this age.
- Poor or inadequate sleep can lead to mood swings, behavioral problems (such as hyperactivity) and cognitive problems that impact on their ability to learn in school.

Sleep Tips for School-Aged Children

- It is important to teach healthy sleep habits.
- Continue to emphasize the need for a regular and consistent sleep schedule and bedtime routine. Remaining awake later on weekends and sleeping later

lead to phase-delay effects on Sunday nights, leading to difficult awakenings on Monday mornings.

- Children's bedrooms should be conducive to sleep. The room should be dark, cool, and quiet at bedtime.
- Keep TVs and computers out of the bedroom!
- Avoid caffeine and high sugar intake.

Sleep and the Adolescent (13–18 Years)

A survey performed by the National Sleep Foundation in 1999 found that 60% of children under the age of 18 complained of daytime sleepiness, and 15% reported falling asleep in class (16). The report indicated that teenagers complain of daytime tiredness more frequently than younger children (16). Most researchers agree that adolescents require 8 to 10 hours of sleep each night to function normally. Unfortunately, due to a number of factors, the average teenage student sleeps less than seven hours on school nights. A survey conducted by Owens at Hasbro Children's Hospital for the National Sleep Foundation found that only one in five adolescents between the ages of 11 and 17 get the recommended nine hours of sleep each night (17). The same survey indicated that sleep times decrease with age, sixth graders slept an average of 8.4 hours, while high school seniors only sleep 6.9 hours on average (17). Most teenage students would sleep longer on school days if not for the typical 7:30 a.m. or earlier school start-time.

Chronically sleep-deprived teens often become so used to the sensation of sleepiness that they do not realize that they are settling for less than they are capable of in creativity, academic performance, and communication both in and out of the classroom. According to the survey by Owens (18), adolescents who get less sleep also get worse grades than those who get at least nine hours of sleep on average. Eighty percent of the well-rested adolescents reported getting A and B grades in school (17).

A combination of factors such as social activities, athletic events, homework, school extracurricular activities, TV, and computer use all influence a teenager's sleep-wake schedule (16). Late-night computer use is a growing problem. Computer use before bed is disruptive to sleep onset and should be discouraged, the bright computer screen is believed to affect the biological rhythms that control sleep (16). Exciting or challenging computer programs may have an even greater affect on sleep.

Many adolescents are not ready for bedtime until 11 p.m. or later due to biological changes experienced during puberty (9). These changes affect the internal sleep-wake clock or circadian rhythms that govern sleep (19). This occurs due to physiological changes that allow adolescents to sleep even after their body temperature rises in the morning and to remain awake after the body temperature falls in the evening (9). This explains the desire many adolescents have for later bedtimes and their difficulty awakening in the morning. School schedules are not conducive to the sleep needs of children (20).

Since so much of what teens are learning is important for school, sports and other activities, as well as for discovering the strengths and interests that can shape their lives in the short and long term, it is important to make sure teens are getting enough sleep to feel, look, and act their best!

The National Sleep Foundation indicates that chronic sleep deprivation in adolescents can impair the following (16):

- Ability to pay attention
- Verbal creativity and effective communication
- Abstract thinking

- Creative problem solving and innovation
- Mental sharpness (the sleep-deprived person is more vulnerable to misleading remarks and has more difficulty with complex, ambiguous material)
- Decision-making involving the unexpected
- Adaptive learning that involves retrieving knowledge from long-term memory, adding to that knowledge and using it to solve problems
- Overall mood and motivation

The following “Sleep-Smart Tips for Teens” (National Sleep Foundation) are recommended by the National Sleep Foundation to help ensure teens get enough sleep, remain healthy and function at peak performance (16):

1. *Sleep is food for the brain:* Get enough of it, and get it when you need it. Even mild sleepiness can hurt your performance—from taking school examinations to playing sports or video games. Lack of sleep can make you look tired and feel depressed, irritable, and angry.
2. *Keep consistency in mind:* Establish a regular bedtime and wake time schedule, and maintain it during weekends and school (or work) vacations. Do not stray from your schedule frequently, and never do so for two or more consecutive nights. If you must go off schedule, avoid delaying your bedtime by more than one hour, awaken the next day within two hours of your regular schedule, and, if you are sleepy during the day, take an early afternoon nap.
3. Learn how much sleep you need to function at your best. You should awaken refreshed, not tired. Most adolescents need between 8.5 and 9.5 hours of sleep each night. Know when you need to get up in the morning, then calculate when you need to go to sleep to get at least 8.5 hours of sleep a night.
4. Get into bright light as soon as possible in the morning, but avoid it in the evening. The light helps to signal to the brain when it should wake up and when it should prepare to sleep.
5. Understand your circadian rhythm. Then, you can try to maximize your schedule throughout the day according to your internal clock. For example, to compensate for your “slump (sleepy) times,” participate in stimulating activities or classes that are interactive, and avoid lecture classes or potentially unsafe activities, including driving.
6. After lunch (or after noon), stay away from coffee, colas with caffeine, and nicotine, which are all stimulants. Also avoid alcohol, which disrupts sleep.
7. Relax before going to bed. Avoid heavy reading, studying, and computer games within one hour of going to bed. Do not fall asleep with the television on—flickering light and stimulating content can inhibit restful sleep. If you work during the week, try to avoid working night hours. If you work until 9:30 p.m., for example, you will still need to plan time to unwind before going to sleep.
8. Say no to all-nighters. Staying up late can cause chaos to your sleep patterns and your ability to be alert the next day and beyond. Remember, the best thing you can do to prepare for a test is to get plenty of sleep. All niters or late-night study sessions might seem to give you more time to cram for your examination, but they are also likely to drain your brainpower.

Chronically sleep-deprived teens can become so used to the sensation of sleepiness that they “settle” for less than they are capable of in creativity, academic performance, and communication both in and out of the classroom.

Certain tasks, especially those that are rule-based, logical, or very exciting and engaging, can be less sensitive to sleep deprivation and give the misperception that a person's overall learning and performance is at its best. For example, research shows that a sleep-deprived person may be able to memorize facts but then be unable to use that information in a constructive and innovative way. A person may be able to say something logical, but be unable to come up with spontaneous ideas or handle unpredictable situations.

Sleep Disorders in Children

The field of pediatric sleep medicine is rather young. Sleep disorders in children have largely been ignored. Infants and young children are unable or do not typically complain about their sleep patterns or problems, making identifying sleep problems in children very challenging. When it comes to solving sleep problems in children, an age appropriate approach is necessary. The emotional and physical needs are much different than with adults. Quality sleep recordings via polysomnography are a significant tool to assist in determining the presence of such problems as sleep-disordered breathing, movement disorders, as well as a number of other sleep disorders. Clinical correlation with other specialties is also important.

In 2004, the National Sleep Foundation conducted the seventh annual Sleep in America poll. The poll was the first to examine children's sleep habits, and the toll poor sleep habits take on parents/caregivers. This poll explored the sleep habits of children from infancy to age 10 and that of the parents/caregivers. The polls focused on children's sleep habits and problems, bedtime routines, sleep environment, and the sleep habits of the parents/caregivers. Perhaps the most important finding is that overall, "kids need more sleep"! Not only are children receiving an insufficient amount of sleep, but also the poor sleep habits of children result in up to 200 hours of lost sleep per year for parents/caregivers. The poll also indicated that an apparent gap exists between what a parent/caregiver believes to be the amount of sleep a child needs and how much they actually receive.

Interviews with parents/caregivers indicated that up to 69% of children experience at least one or more sleep problem during the week, and up to 30% of all children are waking at least once a night needing attention. The most common problems include difficulty falling asleep, night-awakenings, snoring, stalling and resisting going to bed, having trouble breathing, and loud or heavy breathing while sleeping. The interviews also determined that snoring is very common in children; up to 19% of preschoolers snore and 18% of school age children. Furthermore, findings indicated that up to 14% of children have difficulty falling asleep at bedtime, 9% have trouble breathing or exhibit symptoms of obstructive sleep apnea.

A survey conducted by the American Academy of Otolaryngology indicated that eight out of 10 people are unaware that attention-deficit hyperactivity disorder (ADHD) and obesity can be a result of sleep disorders in children. According to the article "Obesity Hypertension in Children" that appeared in the October 2002 edition of *Hypertension* published by the American Heart Association, the prevalence of obesity in the United States has grown from 5% in the 1960s to 11% in the 1990s (21). Possible outcomes associated with childhood obesity include hypertension, type 2 diabetes mellitus, dyslipidemia, left ventricular hypertrophy, non-alcoholic steatohepatitis, obstructive sleep apnea, orthopedic problems, and psychosocial

problems. Clearly, problems exist not only due to poor sleep habits and hygiene but also due to physiological factors.

The first step to solving children's sleep problems and improving the physical, emotional, behavioral and psychological health of children is through effective education and increasing the awareness of common sleep problems. Not only is it important to target parents/caregivers, but also teachers, physicians, and other professionals involved in the care of children. The general public is generally unaware of the severity and frequency of sleep problems in children and the associated problems. For instance:

- Studies conducted by the University of Michigan, Stanford, and the University of Pittsburgh on 866 children found "substantial associations" between symptoms of sleep-disordered breathing and inattentive and hyperactive behavior.
- A study conducted by Dr. Chervin at the University of Michigan found that habitual snoring occurs in 33% of kids aged 2 to 18 who are diagnosed with ADHD, compared with 9% of the control group.
- A study performed at the University of Tuebingen and the Hanover Medical School, both in Germany, clearly demonstrates that children who snore do worse in school.
- A study performed at the University of Illinois at Urbana-Champaign found that 26% of 69 children diagnosed with ADHD suffer from periodic limb movement disorder.
- Breathing problems during sleep may affect mental development in infants. A National Institute of Health study (NIH 10/07/2004) indicated that children who have problems breathing during sleep tend to score lower on tests of mental development and intelligence than do other children their age.
- Sleep apnea linked to bed-wetting in kids (Journal of Pediatrics 2003): 66 (41%) out of 160 kids aged 4 to 17 who were referred to a sleep laboratory for sleep-disordered breathing were also noted to be bed-wetters.

Pediatric sleep disorders are often missed by primary care physicians. For instance, Dr. Judith Owens, M.D., Associate Professor of pediatrics at Brown University School of Medicine and director of the Pediatric Sleep Disorders Clinic at Hasbro Children's Hospital in Providence stated in the October 2001 issue of Child Magazine that only 25% of 600 pediatricians interviewed felt comfortable diagnosing and treating sleep disorders. It is important for parents/caregivers to talk with a physician about the possibility of a sleep disorder if any of the following signs and symptoms are observed:

Common Signs and Symptoms During Sleep:

- Snoring
- Witnessed apnea
- Chocking noises
- Increased work of breathing
- Paradoxical breathing
- Enuresis (bedwetting)
- Bruxism (teeth grinding)
- Restless sleep
- Diaphoresis (night sweats)
- Hyperextended neck

- Frequent awakenings
- Dry mouth
- A newborn who is extremely and consistently fussy.

Common Signs and Symptoms During Wakefulness:

- Poor school performance
- Aggressive behavior
- Hyperactivity
- Attention-deficit disorder
- Excessive daytime sleepiness
- Morning headaches

The Most Common Sleep Disorders in Children (22,23):

- Insomnia
- Excessive daytime sleepiness
- Narcolepsy
- Respiratory disorders, including obstructive, central sleep apnea, and hypo-pnea syndrome
- Night terrors
- Somnambulism
- Restless legs syndrome
- Periodic limb movement
- Circadian rhythm disorders
- Newborn conditions of disrupted sleep
- Siblings of infants who have died of SIDS
- Infants who have experienced an apparent life threatening event

According to Wei et al. (24), there are a number of other factors that may contribute to an increased risk for obstructive sleep apnea:

Neurologic Abnormalities

- Seizure disorder
- Head injury
- Cerebral palsy
- Hydrocephalus
- Arnold-Chiari malformation
- Head injury
- Prematurity
- Central apnea
- Meningocele
- Myotonic dystrophy

Craniofacial Abnormalities

- Micrognathia
- Macroglossia
- Retrognathia
- Maxillary hypoplasia

Diseases

- Hypothyroidism
- Goiter

- Morbid obesity
- Crouzon's disease
- Gastroesophageal reflux

Anatomic Obstructions

- Excessive soft tissue of the neck
- Short neck
- Lingual tonsil hypertrophy
- Redundant oropharyngeal mucosa/long uvula
- Enlarged adenoids
- Enlarged tonsillar
- Pharyngeal flap surgery
- Nasal stenosis
- Choanal atresia
- Septal deviation
- Laryngeal papillomas/tumors
- Subglottic stenosis
- Subglottic hemangioma
- Nasal polyps
- Laryngeal web/stenosis/mass

Syndromes

- Achondroplasia
- Apert's
- Down
- Pierre Robin
- Prader-Willi
- Klippel-Feil
- Beckwith-Wiedemann
- Treacher Collins
- Stickler's
- Fetal alcohol
- Marfan's
- Hemifacial microsomia

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Rafael Pelayo*Sleep Disorders Clinic, Stanford University, Stanford, California, U.S.A.***Maria Cecilia Lopes***Sleep Disorders Clinic, Stanford University, Stanford, California, U.S.A., and
Department of Psychobiology, Federal University of Sao Paulo, Sao Paulo, Brazil***INTRODUCTION**

Attention deficit disorder is ultimately a clinical diagnosis of exclusion. Failing to exclude sleep disorders as either a cause or exacerbating factor for the child's daytime symptoms is, in our experience, a common pitfall. Children who do not sleep well may have difficulty learning and concentrating in school. Practitioners need to include sleep disorders in the differential diagnosis when evaluating these children and if necessary make the appropriate referral. Because the majority of children with sleep disorders improve, it is important that they be addressed before a formal diagnosis of attention deficit disorder is made. This chapter will review the common sleep disorders of childhood.

The sleep complaints are usual in our modern society in all age spans. After the industrial revolution and technological development, the relationship between work and home activities had important behavioral changes associated with difficulty in falling asleep early. Because of the increasing industrialization of our society, shift work is necessary in many occupations. The evolution of society also resulted in many significant changes in nighttime activity, independently of work. The nighttime is a prominent part of our social life nowadays. The bedtimes started to be later in the night for several individuals, and it may explain the common complaint of insufficient sleep and may result in severe circadian rhythm disturbances.

According to the International Classification of Sleep Disorders, the intrinsic sleep disorders are primarily sleep disorders that either originate or develop within the body or that arise from causes within the body. This group of disorders has been also called dyssomnias. Some sleep disorders can be associated with behaviors that are not expected during sleep. This group of sleep disturbance has been called parasomnias, particularly common in childhood. There is a common association between sleep disorders and mental, neurological, psychiatric, or other medical disorders. It was clear just for adults but in the last years, several authors have reported that neurobehavioral changes in children correlated with sleep disorders (1–4). Moreover, it has been clear correlated with the subtype of school grade time. Children with sleep disorders have poor school development than others without the diagnosis of sleep disorders (5). It is now clear that the morning time for school is completely inadequate for adolescents (6,7). The adolescent development is accompanied by profound changes in the timing and amounts of sleep and wakefulness. The findings strongly indicate that self-reported shortened total sleep time, sleep/wake schedules, late bed and rise times, and poor sleep quality are negatively associated with academic performance for

adolescents from middle school through the college years. It is well known that teenagers have changes in time of sleep onset and it has been showed by the percentage of sleep delay phase syndrome in adolescents (8).

NORMAL SLEEP

The basic principles of normal sleep are the same for children and adults. The most common question asked about a child's normal sleep is, "how much time does my child need to sleep?" To determine if a problem is due to an inadequate quality of sleep, more detailed measurements of sleep and the underlying physiology may be needed. The brain seems to have three basic states or modes: awake, dreaming, or sleeping without dreaming. Determining these states and stages requires three electrophysiological measurements with electroencephalogram (EEG) and muscle tone that is typically measured with a chin electromyogram. The final measurement is eye movement, which is measured with an electrooculogram. The patterning of these measures (EEG, muscle tone, and eye movements) divides sleep into the broad categories of rapid eye movement (REM) sleep, which is associated with vivid dreams and non-REM sleep.

REM sleep is a moment during which brain waves are similar to the awake state but the body seemed paralyzed. REM sleep is characterized by muscle atonia that results in peripheral muscle reflexes being either absent or greatly diminished. Dreaming activity is associated closely with REM sleep. Non-REM can be described as one way from sleep onset to deepsleep, with limited time. Sleep is subdivided further into stages 1, 2, 3, and 4. Stage 1 is the lightest sleep and is typically a transition from awake to drowsy to sleep. In stage 1 people may not realize they are asleep and think they were awake. Stage 2 is an intermediate state that can be over half of the total sleep time. Stages 3 and 4 (also called delta or slow-wave sleep) represent the deepest sleep as measured by the amount of stimulation needed to wake up (9).

The modulation between alertness and sleepiness is an important part of sleep physiology. This process of modulation can be called as a circadian model that can follow light changes between day- and nighttime. Part of our circadian physiology is our tendency to have decreased alertness in the afternoon and to have a surge of alertness ("second wind") in the evenings. This process is modulated by the suprachiasmatic nucleus and is referred to as clock-dependent alerting (10,11). If a person is having trouble falling asleep, then an earlier bedtime may make the problem worse by creating greater frustration. Having dramatic shifts in wake-up times on school days compared to non-school days can alter the circadian patterns and lead to sleep problems.

HOW CAN WE HANDLE INSOMNIA IN CHILDREN?

As well known, a circadian pacemaker regulates sleep. Insomnia can be caused by disturbances of the coupling of sleep to this pacemaker (11). Although the role of insomnia as a risk factor for psychiatric disorders is well established, the association between chronic insomnia and significant medical morbidity such as hypertension, coronary artery disease, and stroke is unclear. In children, the effect of sleep restriction in children is also still not clear (12). Commonly, it is the parents' subjective impairment that leads the family to seek medical attention. The young child may have a tendency to awake but they fall back often asleep.

However, the parents sleep schedule is disrupted when the children have sleep problems. The sleepless child can be a challenging situation for both the family and the primary health-care provider. The primary health-care provider may have limited training in pediatric sleep disorders. The manifestation and management of the insomnia will depend on the child's age. In general, behavior techniques should be the mainstay of treatment. Medications may have a role as an adjunct in the insomnia management.

Sleep laboratory testing has a limited value in distinguishing insomniacs from normal sleepers (13). However, chronic insomnia in children can be associated with other sleep disorders (12,14). Other methods such as actigraphy or sleep diaries can be useful, particularly in children. Despite the fact that actigraphy cannot identify wakefulness periods in bedtime without movements, it can be a good tool when there is a suspicion that the parents have under- or overestimated the severity of the insomnia process (15,16).

The therapeutic goal in insomnia should be to improve the quality or quantity of nighttime sleep. Some therapeutic methods such as melatonin or bright light have been recommended in chronic insomnia in children. Behavioral techniques have been helpful and have been applied to a variety of clinical situations (17,18). The first issue to be addressed in a behavioral sleep problem in an infant or small child is where the parents want the child to sleep. The child will typically prefer to sleep with the parents; the question is what the parents' preference is. There are many variations possible to where a child will sleep such as in a crib in a separate room, a crib in the parents' room, in the same bed with the parents, or in the same bed or bedroom as a different relative. The parents may need additional direction to be able to implement firm limits for the child. The sleep situation may change on the basis of multiple factors such as new siblings or change in the size of the home. Cultural issues will also play a part in this situation.

Most pharmacological guidelines were developed for sleep disorders in adults and can be empirically extrapolated to children. Pharmacologic studies have reported improvement of sleep indices only on a short-term basis. These insomnia patterns are of a behavioral nature and usually do need to be treated with medication (19). Antihistamines and clonidine may be tried in some of these children but there is little evidence to suggest that these preparations provide anything but short-term sedation (20). In particularly difficult situations, medication can be used as part of a comprehensive treatment program with behavior modification at its core.

The sleep patterns of adolescents seem different from other children and adults. This may be due to a combination of physiological changes and external societal influences. The most common form of insomnia in adolescents may be delayed sleep phase syndrome (DSPS). DSPS is a circadian disorder characterized manifested by a sleep-onset insomnia. This circadian rhythm sleep disorder is characterized by chronic sleep-onset difficulty and an inability to arise at an appropriate time in the morning. DSPS can be sometimes associated with depression and should be considered when evaluating adolescents with depression (21-23). A study in Japan attempted to define the psychological features of patients with DSPS (23). DSPS is not difficult to diagnose once the clinical suspicion is raised, but obtaining a satisfactory response to treatment is more difficult. Attempts to correct the sleep schedule will be fruitless unless the adolescent is motivated to alter the lifestyle factors that influenced the late bedtime, particularly on weekends (24). The original treatment for DSP was called chronotherapy by Weitzman et al. (25).

Chronotherapy resets the patient's sleep cycle by a series of consecutive delayed adjustments of the bedtime, which are made over several days. To maintain the readjusted sleep pattern, the patient is encouraged to keep strictly to the new sleep-onset and wake times. This treatment can be impractical because the progressive forward bedtime shifts will have the child, at one point, temporally sleeping in the daytime. The child must be constantly supervised to avoid falling asleep at the wrong time. This treatment, although physiologically sound, has been impractical.

HOW CAN WE HANDLE SLEEP APNEA SYNDROME IN CHILDREN?

Obstructive sleep apnea (OSA) is a common cause of morbidity during childhood, occurring in 5% of preschool children (26). Symptoms for OSA in adults include either excessive sleepiness or insomnia with frequent episodes of obstructed breathing during sleep and associated features of loud snoring, morning headaches, and dry mouth upon awakening. However, children have described less sleepiness, mostly hyperactivity, poor school performance, morning irritability, and other differences when compared with adult OSA, also as polysomnographic differences are well known (27).

The most obvious nocturnal symptom is snoring. Snoring indicates turbulent airflow and is not normal (2,28,29). Not all snoring is due to OSA. It may be due to other forms of obstruction such as nasal allergies or a cold (30,31). Chervin et al. assessed the frequency of childhood sleep problems at two general pediatric clinics. Parents of 1038 unselected children (554 boys) aged 2.0 to 13.9 years completed a validated pediatric sleep questionnaire. Habitual snoring was reported in 176 (17%) of the children (32). Many of these children are mouth breathers. Regular mouth breathing should always lead to a suspicion of sleep-disordered breathing (SDB) (33). Children with disordered breathing may avoid going to bed at night due to hypnagogic hallucinations. Upon awakening, these children may report morning headaches, dry mouth, confusion, or irritability. As mentioned, daytime sleepiness may not be obvious, depending on the age. It may translate only as a complaint of daytime tiredness. It may also present itself as a tendency to take naps easily anywhere.

The most common cause of childhood OSA is enlargement of tonsils and adenoids in association with increased upper airway collapsibility (34). However, anatomic abnormalities have been described in children with apnea, but no definite relationship was found between nasorespiratory function and orofacial morphogenesis. Moreover, a lot of cases in pediatric population have been ignored because the symptoms are insidious.

SDB may occur more often in special populations. Any condition or syndrome associated with cranial facial anomalies may be associated with SDB. Pierre Robin, Apert's, and Crouzon's syndromes are among these syndromes. Approximately half of all children with Down syndrome have SDB. However, symptoms of daytime sleepiness and sleep disruptions at night may be due to non-neurological factors such as maxillofacial abnormalities, large tonsils or adenoids, hypogonathia, large tongues, or other abnormalities. Such factors often lead to sleep fragmentation and daytime sleepiness. Sleep disorders often occur in patients with neuromuscular disorder because of associated weakness in respiratory muscles, which is further exacerbated by hypotonia during sleep.

While SDB in children has many important similarities to the adult version of this disease, there are also marked differences in presentation, diagnosis, and

management. The abnormal daytime sleepiness may be recognized more often by schoolteachers than by parents of young children. An increase in total sleep time or an extralong nap may be considered as normal by parents. Nonspecific behavioral difficulties are mentioned to the pediatrician, such as abnormal shyness, hyperactivity, developmental delays, or rebellious or aggressive behavior (35). Chervin et al. found that conduct problems and hyperactivity are frequent among children referred for SDB during sleep. They surveyed parents of children aged 2 to 14 years at two general clinics between 1998 and 2000. Parents of 872 children completed the surveys. Bullying and other specific aggressive behaviors were generally two to three times more frequent among children at high risk for SDB (36). Other daytime symptoms may include speech defects, poor appetite, or swallowing difficulties (37,38). Nocturnal enuresis or bedwetting accidents should raise suspicion of possible SDB.

The diagnostic criteria used for adults with OSAS cannot be used reliably in children (33,39–41). The diagnosis of SDB is based on the history, physical findings, and supportive data. Laboratory testing should be, ideally, tailored to the clinical question. For example, if there are concerns about excessive daytime sleepiness a multiple sleep latency test (MSLT) may be indicated (42). The MSLT is ideally performed in subjects who are at least eight years old.

The polysomnogram in a child uses the same technology and the same type of information is recorded as in adults. Airflow, respiratory effort, and pulse oximetry make up the breathing measurements usually monitored. The respiratory effort is measured most accurately in a clinical sleep study using esophageal pressure measurements with a water-filled catheter. Esophageal pressure measurements are not yet part of the routine polysomnogram in most sleep laboratories. An alternative measurement can be obtained using end-tidal CO₂ monitoring, which can detect important transient episodes of hypercarbia. A more recent a technique to measure airflow using a nasal cannula has been introduced. This technique has been replacing nasal thermistors and is less invasive than esophageal manometry (43–45).

In children, adenotonsillectomy is the most common initial treatment for SDB; however, it does not always cure the sleep disorder. The true cure rate of this surgery for SDB is unknown. Some may argue that clear-cut cases of SDB may skip the sleep study. If surgery is not a viable option for the child then continuous positive airway pressure (CPAP) therapy should be considered (46–48). CPAP uses a small air compressor attached to mask via hose. The mask usually only covers the nose, but masks that cover the nose and mouth are also available. By forcing positive pressure in the airway, the negative pressure of inspiration can be countered to avoid airway narrowing or collapse. CPAP is effective but can be cumbersome to use. Over time, the CPAP devices have become smaller and quieter.

HOW CAN WE HANDLE RESTLESS LEGS SYNDROME/PERIODIC LIMB MOVEMENTS OF SLEEP IN CHILDREN?

Restless legs syndrome (RLS) is an autosomal dominant chronic neurologic disorder (49–51). It is characterized by leg discomfort that makes the patients want to move their legs. The leg discomfort may be hard to describe and in children may be characterized as “growing pains.” The discomfort is relieved with movement and is more common in the evening. The sensation may also be present when the patient is sitting still, such as seated on an airplane or in a movie theater (51).

In RLS patients, sleep maybe disrupted by hundreds of involuntary kicking movements of the legs during sleep, called periodic limb movements of sleep (PLMS). The movement in the leg is the extension of the big toe, while at the same time the ankle, knee, and, sometimes, the hip are partly flexed. These repetitive episodes of muscle contraction lasts from 0.5 to 5 seconds, with an interval of about 20 to 40 seconds. PLMS may occur alone, without RLS (49,50). The diagnosis of PLMS requires an overnight sleep study that demonstrates a PLMS index of more than five episodes per hour. RLS/PLMS can result in significant daytime difficulty as a result of sleep disruption.

Both RLS and PLMS are associated with poor-quality sleep. This effect on sleep may lead to daytime behavior that mimics attention-deficit/hyperactivity disorder (ADHD) (52–56). Picchietti and Walters reported a retrospective review of 129 children and adolescents who were found to have PLMS of more than 5/hr of sleep. Sixty-five had PLMS of 5 to 10 per hour of sleep, 48 had PLMS of 10 to 25/hr of sleep, and 16 had PLMS of more than 25/hr of sleep. Of the original 129, 117 had a prior diagnosis of ADHD. Stimulant medication did not seem to play a role in the production of PLMS. In only 25 of the 129 cases did parents note the presence of PLMS before being specifically asked to look. Some of these children had their PLMS initially misdiagnosed as seizures. Daytime symptoms improved with dopaminergic medications (55).

Iron seems to play a role in the pathophysiology of RLS. Allen et al. reported magnetic resonance imaging data that indicated brain iron insufficiency may occur in patients with RLS in some brain regions (57). Further work by the same group found decreased transferrin receptor expression by neuromelanin cells in the substantia nigra, supporting the theory that brain iron insufficiency may occur in patients with RLS in some brain regions (58).

Nondrug treatments may help counteract, temporarily, the sensations of RLS. Patients may find that walking, stretching, taking a hot or cold bath, massaging the affected limb, applying hot or cold packs, using vibration, performing acupressure, and practicing relaxation techniques (such as biofeedback, meditation, or yoga) may help reduce or relieve the symptoms. In addition, some find that keeping their mind actively engaged through activities such as reading an interesting novel, or playing video games helps during times that they must be stay seated. This may be particularly helpful while traveling. Selective dopamine agonists are potent treatments for periodic limb movements disorder and RLS. They tend to have fewer side effects than carbidopa/levodopa. Pramipexole, ropinirole, and pergolide are the most commonly used medication in this category (59,60). Selective dopaminergic agonists have side effects similar to that of carbidopa/levodopa but at a lower frequency. These agents are more potent and allow for lower dosages than with carbidopa/levodopa. Of these agents, pramipexole has been particularly effective in our experience. Montplaisir et al. have found pramipexole to be effective in a double blind placebo-controlled study in adults (61). The starting dose in adults in this study was 0.375 mg. In children, the lowest dose available is an empirical starting dose. Pramipexole is available in a 0.125 mg size tablet. This tablet is scored and can be halved if an even lower starting dosage is desired. It is important to make medication changes slowly because the symptoms of PLMS and RLS seem to fluctuate independently of the medication. In addition, if the dosage is too high, significant side effects may occur. We advise parents to only adjust the medication once a week at most when they first start the medication. Once an effective dose is found, it does not typically have to be adjusted except to allow for the

child's growth. In adults, the dosage of pramipexole for RLS usually does not exceed 1.5 mg and is often effective at a much lower dose.

HOW CAN WE HANDLE PARASOMNIA AND NARCOLEPSY IN CHILDREN?

According to the International Classification of Sleep Disorders, parasomnias are clinical disorders that are not abnormalities of the processes responsible for sleep and wake states per se but, rather, are undesirable physical phenomena that occur predominantly during sleep (49). This nosology describes over 20 different parasomnias, the majority of which can occur in children. The most common parasomnias occur in children and include the clinical spectrum of confusional arousals, sleep terrors, and sleepwalking. These conditions are thought to arise from impaired arousal from sleep, typically slow wave sleep. Because slow wave sleep (stages 3 and 4) dominate in the first third of the night, the arousal parasomnias also occur at that time. Anything that increases the amount of slow wave sleep, such as recovery from sleep deprivation, may increase the likelihood of these parasomnias occurring in susceptible individuals. If necessary, clonazepam may help decrease these arousal parasomnias but should be avoided in the presence of SDB (19).

The confusional arousals can sometimes be a partial manifestation of parasomnias. Sleep terrors are characterized by a sudden arousal from slow wave sleep with a characteristic "blood-curdling" scream accompanied by intense fear. Pronounced autonomic nervous system discharge may occur, with tachycardia and sweating. The child may be described as wide-eyed with an intense look of fear, staring past the parents. The prevalence of sleep terrors in children is 3% and decreases with age to about 2% in adults (62).

Arousal is difficult, and if successful, the patient may be confused and disoriented. The child may try to describe fragments of images with poor coherence. These images will not have the rich detail of a nightmare. Waking the child 15 minutes after they have fallen asleep has been a popular treatment. By waking up the child during the time they would be expected to enter slow wave sleep seems to somehow decrease the tendency for these parasomnias to occur. When the child returns to sleep, the homeostatic mechanism driving slow wave sleep may raise the arousal threshold and decrease the likelihood of the sleep terror from occurring. The parents should be warned that the child with sleep terrors might also sleep walk. Sleepwalking is also called somnambulism (49). The term "sleepwalking" may be a misnomer; perhaps sleep fleeing would better characterize the dramatic behavior witnessed. The range of behaviors witnessed may range from simply sitting up in bed to running out of the home and driving an automobile. During the sleep-walking episode, the pain thresholds are elevated (63). The child will have difficulty waking up and may be confused and disoriented. The motor activity may terminate spontaneously or the child may simply return to bed without reaching alertness. Sleep talking may occur during this event.

The treatments mentioned above for the other arousal parasomnias may be helpful. Safety precautions should always be taken. Specifically, the child should sleep on a ground floor if possible to avoid injury while negotiating stairs. If the child has a bunk bed, the lower bunk should be used. Drapery should be kept over the bedroom windows to protect the hands of the child in case the child tries to punch a window. A door alarm is helpful to warn the parents if the child walks

out of the home. Finally, in adults, there should not be any weapons available at night. Conditions that may precipitate sleepwalking should be minimized, such as sleep deprivation. OSA may be an occult aggravator for sleepwalking (1).

The onset of narcolepsy has been described in patients as young as two years of age, but the first symptoms often develop near puberty, with peak age between 15 and 25 years (64). However, the prepubertal occurrence of narcolepsy is seen with a low frequency (64). It is important to consider narcolepsy, especially in young patients, because it can take up to 20 years between the initial onset of the first symptom, commonly sleepiness, and development of the full clinical syndrome. During this lapse of time, the patient may be mislabeled with wide variety of diagnoses. The patient may be considered lazy or depressed.

School impairment is not unusual in children with narcoleptic syndrome (64). Narcolepsy has deleterious effects on performance, promotion, learning capacity, and interpersonal relations. Child and adolescent narcoleptics report embarrassment, academic decline, and loss of self-esteem (65).

There are a lot differences between children and adults in clinical manifestations (Table 1). It is difficult to recognize daytime sleepiness in very young children, but cataplexy was a very obvious symptom in these very young patients. Laughter was always reported as a cause of cataplexy and daytime sleepiness

TABLE 1 Comparison of Narcolepsy in Children and Adults

Symptom	Children	Adults
Cataplexy	Most of narcoleptic children, because cataplexy is easy to recognize in them; often occurs while playing with other children, frequently the first symptom to be recognized; differential diagnosis with other causes of drop attacks in children	Around 70% of narcoleptic patients; usually, occurs in association with laughter; it is the first symptom in 5–8%; can be described similar to drop attacks; may appear on an average 6 yr after the onset of EDS
EDS	Sometimes may be difficult to recognize; more usual symptom is falling asleep in class; sleepiness can be hidden behind other abnormal behavior such as hyperactivity	Easy to recognize, if we use objective scale for sleepiness Difficult to concentrate in slow activities; problems in work, which lead to sleep episodes in monotonous situations
Hypnagogic hallucination	Symptoms such as nightmares and hypnagogic hallucinations were considered as part of normal childhood; these facts may be difficult to diagnose	Present in 30% of adults; visual hallucinations usually consist of simple forms (colored circles, parts of objects that are constant or changing in size); the image of an animal or a person may present itself abruptly; auditory hallucinations are also common
Sleep paralysis	Frequently accompanied by hallucinations Children dislike to talk about these events	Sometimes can be a terrifying experience; may occur in healthy subjects; symptom decreased with age
Disturbed nocturnal sleep	This symptom cannot affect children and, sometimes, is transitory complain	Worse during adulthood; may have influence in the treatment response

Abbreviation: EDS, excessive daytime sleepiness.

usually starts after the cataplexy symptom (64). Cataplectic attacks may raise the differential diagnosis of all causes of drop attacks and careful assessment is necessary. Undoubtedly, the very young age may render early diagnosis more difficult as daytime sleepiness may not be obvious.

INTERACTION BETWEEN SLEEP DISORDERS AND NEUROBEHAVIORAL FUNCTION IN CHILDREN

Guilleminault et al. in 1976 described children with behavioral problems due to SDB (66). More studies have been published about the relationship between behavior disorders in children and OSA (3,5,26,67–74). Inattentive and hyperactive behaviors are highly prevalent among school-age children and have often been associated with a clinical psychiatric syndrome such as ADHD until their sleep disorder is detected (29,75). Until this moment, we have used the same criteria to adults for sleep scoring and other sleep variables, and probably we have underestimated SDB in children. Concerns about school performance were raised in the original description of OSA in children (66). More recently, the possible association between SDB and attention deficit disorder has been studied (37,52,74,76–83). A study by Gozal and colleagues examined the hypothesis that domains of neurobehavioral function would be selectively affected by SDB. They studied children with reported symptoms of ADHD and also determined the incidence of snoring and other sleep problems in five- to seven-year-old children in a public school system. Children with reported symptoms of ADHD and control children were randomly selected for an overnight polysomnographic assessment and a battery of neurocognitive tests. Frequent and loud snoring was reported for 673 children (11.7%). Similarly, 418 (7.3%) children were reported to have hyperactivity/ADHD. Eighty-three children with parentally reported symptoms of ADHD had sleep studies together with 34 control children. After assessment with the Conners' Parent Rating Scale, 44 children were designated as having "significant" symptoms of ADHD, 27 as "mild," and 39 as "none" (controls). Overnight polysomnography indicated that OSA was present in 5% of those with significant ADHD symptoms, 26% of those with mild symptoms, and 5% of those with no symptoms. The authors concluded that an unusually high prevalence of snoring was identified among a group of children designated as showing mild symptoms of ADHD based on the Conners' ADHD.

There is no doubt that SDB can lead to mild ADHD-like behaviors that can be readily misperceived and potentially delay the diagnosis and appropriate treatment (74). Recent research has indicated that children with SDB or snoring show higher levels of, and increased risk for, behavioral and cognitive abnormalities (5,34,67–69,84).

Studies have been done to search the interaction between sleep disorders and neurobehavioral function in children. The strongest causal data available indicate that treatment for SDB can result in significant improvement in behavior and school performance (3,67,69,73,85,86).

CONCLUSION

Sleep disorders are very common in children. Sleep disorders may have daytime behavioral problems. Most sleep disorders will improve when correctly addressed. The sleep medicine has been improving the acknowledgement about bedtime of

children and their parents. There is a need for greater information on the pharmacological management of sleep disorders in children. Health-care providers need to have a comprehensive understanding of clinical sleep disorders in children. Training programs in the field of sleep can lead to changes in the clinical management of sleep disorders in children.

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SECTION B
*What Does It Mean to Be ADD? The Effect on
Everyday Life*

**Part V: Primary Problems to Watch for
in ADD Children**

Barbara C. Fisher

*Brain Evaluation/United Psychological Services,
Washington Township, Michigan, U.S.A.*

Chapters in this section address the most commonly seen academic difficulties accompanying attention deficit disorder/attention deficit with hyperactivity disorder (ADD/ADHD)—math and language functioning. The findings of a neuropsychologist, a math specialist with over 30 years of school and special education experience, and a speech and language pathologist are explicitly detailed. Merging the worlds of these diverse fields, common traits relating to the “real ADD” as significantly affecting math and language development is discussed in depth. Chapters also report on the success of Fisher Academy, a rehabilitation school for frontal lobe disorders in teaching math and language skills by employing the use of neuropsychological tenets to define the learning needs of children suffering from injury to the brain. Adaptation of regular school curriculum and modifying it to account for selective attention deficits, poor integration and sequential analysis, difficulty with the abstract and perseverative focus upon the concrete has been successful in teaching children basic academic skills never acquired previously. Specific suggestions of how to apply these concepts is provided in these chapters which will hopefully aid the teacher in the classroom as well as the professional working with these children.

Reading and Language Problems Related to ADD

Barbara C. Fisher

Brain Evaluation/United Psychological Services, Washington Township, Michigan, U.S.A.

Nancy Torgerson

Fisher Academy, Washington Township, Michigan, U.S.A.

It is widely agreed that a common finding accompanying the diagnosis of attention deficit disorder (ADD) is a reading comprehension problem. For this reason, children are typically placed in reading tutorial classes, and referred for reading evaluation and treatment to improve their reading skills in the first grade. By the second grade, they are labeled dyslexic. Despite intervention and tutorial help, things do not greatly improve, although the child may make sufficient gains to keep up with his or her grade level (provided that they have the extra cognitive ability or reserves beyond average limits in order to function within average limits).

Bright children with ADD tend to use their high-level ability to compensate for deficit areas, with the result that their overall functioning regresses to the mean. In other words, higher levels of cognitive reserve are used to offset problems and the child appears outwardly to be within average limits. This can be a blessing, allowing the child to fit into the class rather than falling behind; however, he or she can also become quite frustrated (i.e., aware of higher-level skills and/or feel like he or she is expending far too much effort to function within only average limits).

The child is placed in various types of phonetic and reading programs as treatment for a "reading" problem. The effectiveness of the programs is limited by the problematic brain functioning that created the reading difficulties in the first place. Simply put, if visuospatial deficits create the problem of learning decoding, limiting the child's ability to benefit from instruction taught in the school setting as part of the academic curriculum, what is going to change when that child receives tutorial help? Is it the intervention of one instruction that would prove beneficial? Is it increased learning drills or a review of the principles of decoding that creates improvement? Or is the skill of decoding never truly learned? Instead, the child simply improves his or her ability to compensate by becoming more familiar with the words, reading more, and developing a memorized sight word vocabulary. Although gains in functioning are made from reading tutorials, evaluation reveals the same decoding problem. Changes may occur more when the decoding is focused on for the reading treatment as opposed to teaching scanning strategies. We have found greater success in using decoding programs employing visual as well as verbal modalities, which provide a logical means of recalling the word while remaining focused on letter sound combinations to improve decoding.

An additional difficulty is that when a reading problem is diagnosed, too often causal factors for the presence of reading difficulties are not explored. From our perspective, how can one adequately treat a problem that has not been

adequately diagnosed or assessed? Why is it that children receiving one-on-one speech and language services remain at the same level of learning as when they began to receive services? Is this a staff problem, a problem in the teaching method, or a problem belonging to causal factors?

We view reading problems related to ADD as quite different diagnostically, certainly more amendable to treatment, when there are not additional problems related to memory capacity (e.g., the inability to recall what was learned sufficiently to recall the information on the following day) or a learning problem. If present, a learning problem may be the result of executive reasoning deficits, impaired frontal processes and specific symptoms of integration, poor sequential analysis, selective attention deficits, and perseveration. The difficulty becomes that of integrating learned concepts or letter sound combinations.

Too often, the lack of a search for additional causal factors and/or primary causal factors negates the differentiation between a reading problem or dyslexia and the long-term consequences of a genetic attention disorder. The term "dyslexia" means a learning disability or problem reading; the "dys" means that the person can read, albeit not well. Reading problems associated with ADD tend to be the consequence of long-term visuospatial deficits created by the process of compensation for attention symptoms. If visuospatial deficits are responsible for reading difficulties, typically the problem is that of failure to learn decoding and the continual tendency to substitute word sounds. These are the cases that benefit from the cognitive training program that specifically addresses this area of brain functioning. Our experience over the past five or six years is that training geared to the visuospatial processes naturally readies the person to learn decoding, which subsequently comes far easier to them, thus avoiding the previously seen adverse reaction to reading and reading skill development. Children pick up books on their own for the first time and are receptive to learning decoding given the increased likelihood of success following this training program.

However, if the causal factor involves a disorder beyond that of ADD that is more related to brain impairment and difficulty learning, then teaching methods need to be altered to accommodate the specific deficit areas. If the search for causal factors does not occur, then treatment is obviously going to be limited to only momentary success. Unfortunately, when a child is identified with a reading problem, no one thinks, "Hmmm, maybe there is an underlying ADD disorder," although typically that is the situation. Rarely do professionals connect the reading problem to the ADD disorder, although typically the child is diagnosed with both problems and the two disorders are commonly seen accompanying one another as co-related or co-morbid conditions.

Consider the following case: A 23-year-old woman came in for diagnosis of an attention disorder given the genetic propensity present in her family history and her difficulty in school-sustaining attention. Her reading difficulties had been recently diagnosed as severe on a standard reading assessment. Her difficulties taking exams had prompted this reading evaluation, which produced rather devastating results, and the indication of only a fifth grade reading level. Having recently graduated from college, she was certainly working hard and beyond her apparent capacity. The immediate question was how she had managed to advance up to this point in time. The answer rested in her will and determination, along with the continual help of her father, who was a teacher. Her father had worked extensively with his daughter on a daily basis, resulting in her ability to complete her college studies. The ADD evaluation, while identifying the characteristic visuospatial

deficits, was not sufficiently problematic to explain her extensive reading difficulties. In search for an answer, a further history and neuropsychological evaluation identified the concern of the long-term effects of a sleep-related breathing disorder. Referral to a sleep neurologist and subsequent sleep study confirmed the presence of suspected sleep apnea and the probable long-term effects of sleep and oxygen deprivation. Additional assessment identified memory deficits as well as the overlap of deficits related to the frontal processes. Her reading problem was diagnosed as the result of the impact of the long-term compensation of ADD, as well as deficient memory and frontal processes negating her ability to learn decoding and to memorize words, and developing a sight word vocabulary.

From our experience, reading problems associated with ADD are qualitatively different from reading difficulties when there is brain impairment. Listening to a child with ADD read results in the following, typically seen scenario. ADD children:

- Read a passage dropping small words such as: and, so, but, not, of, for, and so on
- Substitute words using similar sounds that are often idiosyncratic and totally unrelated to the word
- Intermittently correct the words spontaneously while reading or later when they get to the end of the sentence, which now makes no sense as a result of the word substitution.

It is always amazing that they can respond correctly to some of the comprehension questions, especially when they just finished reading a story that is totally different from what is on the printed page (and what the comprehension questions are based upon). Generally, the more detailed questions or those questions reliant upon an understanding of the story are the ones they could not answer correctly. The point is that typically in the ADD population, the reading problem is the effort taken to decode the reading passage that is so laborious and extensive that the child is unable to recall what they just read. More often, the problem is the lack of sufficient reading fluency to “read” a passage with ease to the degree that reading produces the simultaneous process of visualizing the picture that the written word has created.

ADD children typically do not like to read. If they say they like to read, it is only certain types of reading materials (such as a sports magazine or fiction books) or they do not read very often. Children who compensate by memorizing their words and do not read much have a problem with reading due to lack of practice. Children who compensate by memorizing and do read a lot enlarge their vocabulary, although they may still pronounce words wrong, having not heard the word and connected it with the spelling (such as corps as corpse). The typically seen pattern when there is a genetic attention disorder is the breakdown of the word into syllables rather than exercising the use of phonetics for more accurate decoding. Even armed with accurate phonological processing skills, ADD children and adults similarly struggle with the same problems. This is why in our experience the use of these reading intervention programs provided only temporary relief. Why? Because the problem is with the brain and use of the brain processes involved with visuospatial and visuo-perceptual functioning.

Recent research is beginning to look at the spatial or parietal area of the brain as related to ADD. What consistently remains a problem unless treated directly is the spatial problem seen across a range of intellectual capacity, from the gifted to

the average or low-average student. The compensation process to address the attention deficits results in the typically seen maximized logical reasoning skills compared to the significantly reduced spatial processes, which negates the easy acquisition and learning of word attack skills. Basically, the presence of a genetic attention disorder does not preclude or prevent a child from learning to read (as opposed to brain impairment specifically involving the frontal processes), reading is harder and demands more energy and time. The investment of time and practice memorizing words will aid the reading process, producing increased reading time, which ultimately improves reading skills. ADD children can learn to read; the problem is that reading is laborious, a more painful experience than a joyful learning one. In our experience, when a child has difficulty learning to read beyond these issues, more than likely a brain problem is creating the situation. Finally, when there is an additional underlying genetic attention disorder that has had the time to form, this discrepancy in functioning, then there will be evidence of spatial distortions well beyond what would be typically seen with an attention disorder. However, if there is injury to the brain that occurred early and predates the development of language/reading, the impact is clearly more devastating, requiring a more specialized intervention. Generally, either a spatial discrepancy does not occur (whether there actually is an underlying genetic attention disorder or not), as the process of compensation never occurs—the brain is too devastated. In these cases, a diagnosis of an acquired attention disorder that references a brain injury and attention problems arising out of diminished frontal functioning is made. This topic will be further referenced in the chapter by education specialist Dr. Ron Savage.

TAKE HOME POINTS

- Genetic ADD results in greater difficulty reading and acquiring adequate phonetic decoding skills, accompanied by the tendency to substitute words, with the overall result of reading being a laborious experience that produces more pain than pleasure.
- When a brain injury accompanies a genetic ADD disorder, the problem of impaired visuospatial processing is increased, and reading difficulties are the result of the combined symptoms of problematic memory, visuospatial deficits, and possibly the addition of impaired frontal processes.
- When there is a brain injury from birth or at a very young age that is significant, the brain injury that often involves pervasive injury to the brain negates the ability to read, creating the true dyslexia as a result of deficits involving memory as well as visuospatial/visuoperceptual analysis and impaired output due to dysfunctioning of the frontal processes.

Barbara C. Fisher

*Brain Evaluation/United Psychological Services, Washington Township,
Michigan, U.S.A.*

Kathy Albrecht

Fisher Academy, Washington Township, Michigan, U.S.A.

Difficulty or issues with math are often a key characteristic of individuals diagnosed with attention deficit disorder (ADD). My years of experience have convinced me that compromised spatial ability is the root of these problems. Math does not seem to arise as an issue in the early elementary years. In the elementary years, math is logical and makes sense. However, between the elementary years and junior high, math changes, becomes more complex, and creates havoc for the person with ADD.

We have condensed these issues in a few notable ways. Math books do not provide the "pearls," the specific principles being taught. Instead, there is application after application without ever elucidating the principle. This becomes very murky for someone with ADD who tends to be logical and only reads part of the sentence. Now, when a text includes the "pearls" in a separate, clearly defined, and concrete sentence, then the math becomes logical once again and easy to understand.

There is, however, a caveat to be considered. It is difficult to read those "pearls" and totally comprehend them. It is important that students with ADD learn to write out important principles in order to retain them better in their memory. When they write things out, there are highly increased odds that they will retain the information and that they will understand it. So, to truly get the principles, we suggest that they are written out on a flash card.

In addition, math is built upon concepts that layer on top of one another to form a whole theoretical structure. So if part of a concept is missing, it makes the new principle they are trying to learn more difficult to assimilate and understand. Therefore, the best thing for them is to write all of these "pearls" on note cards to see them as a whole concept.

Another important area to consider is math fluency. We have recently become aware of more and more children who are not fluent in their basic math facts. Fluency means that they can easily answer an addition, subtraction, multiplication, or division problem in a matter of seconds, drawing on this information as over-learned material that comes naturally. When adding two- or three-digit numbers, it becomes very hard to add if they are struggling with adding one-digit numbers and then also are required to remember their operations. The same is true as the math problem increases in complexity and becomes an equation. In the old days, children used to write math facts over and over until they were committed to over-learned memory and had become fluent. Upon repeating the same process used with addition, as children move from subtraction to multiplication, and then division, "the light usually goes on," triggering the knowledge of the patterns that are present.

In today's classroom, students get a sheet of problems and then they are timed on how fast they can complete the page. They do not write the problem as we did; instead, they just provide the answer. Children are not memorizing their math facts this way. We believe that this process would become more effective if some type of additional process, such as writing out a problem, was included as part of the learning experience.

Typically in math, students with ADD will tend to:

- Reverse or interpose numbers and math symbols
- Have more difficulty with geometry, trigonometry, and calculus due to the increased complexity and math relationships that need to be learned
- Have difficulty interpreting graphs, tables, and charts
- Struggle more in grasping math concepts and equations
- Have trouble placing numbers in their appropriate position when completing math computations
- Experience problems understanding the concept and use of coins
- Have difficulty understanding the principles underlying the positioning of numbers, e.g., units of tens, hundreds, thousands, and so on
- Have difficulty decoding the math story problem. These children have the greatest difficulty figuring out what type of math operation the story problem is referencing, and ascertaining what to do first, specifically whether to add, subtract, divide, and so on

The following are the basic domains of math that each child needs to learn:

- Number/concept sense
- Basic operations
- Mathematical meaning
- Problem-solving skills
- Math-reasoning skills

Often, the use of manipulatives and hands-on activities are helpful to continually reinforce the math concepts that comprise the above domains, while addressing the standards of math: problem-solving, math as communication, math as reasoning, and math connections. Using models and manipulatives, the concept is demonstrated and explained in a variety of ways until understanding is demonstrated prior to teaching the specific operations, math facts, and algorithms.

The following suggestions are helpful in learning some of the basic math concepts noted below:

- One to one counting:
 - Counting objects by stringing beads in patterns
- Understanding of money:
 - Keeping track of daily change on paper, showing exchanges that require the least amount of coins or paper money
- Understanding of time
- Sequencing numbers:
 - Card games that require sequencing numbers, such as RACK-O

- Place value:
 - Building larger or smaller numbers if given random numerals on cards or by rolling dice
- Learning and using patterns of number sequencing:
 - Use of a hundred chart in words or numerals to count by 2s, 3s, 5s etc.
- Math memory:
 - Memory-type games that require basic addition and subtraction
 - Adding up the numerals on license plates while traveling in the car
- Spatial relationships and exploration:
 - Grouping in 10s
 - Bowling (SPARE-TIME by Think Fun)
 - Tangrams and pentominoes for spatial explorations
 - Dominoes (covers a wide range from spatial to addition/subtraction basic facts, sequential, and so on)
- Basic fraction identification:
 - FUN WITH PIZZA FRACTIONS by Learning Resources
- Organization of data:
 - Graphing time doing activities such as watching television

The idea is to make up different rules and continually change the rules in a step-by-step procedure based upon demonstration of understanding. If there is a demonstration of understanding, then the rule is only slightly modified to accommodate an additional concept, such as using factors of 2 or order of 3 sequentially. The process is repeated, with demonstration of understanding followed by a small change in the rule in a step-by-step process. The rules of any game can be altered in this manner. For example, using dominoes with an additional rule of providing the sum or difference of the numbers represented prior to placing the domino on the grid. In RACK-O, starting with fewer cards, 3 or 5, as opposed to 10 to develop the concepts involved in this game. In this manner, no task is too easy or too hard as variables are added or deleted depending upon the child's performance.

Learning math in a mathematical environment requires addressing it as a science of patterns and order, the verbs of doing mathematics, developing the meaning of math operations (prior to attempting to master the math facts), making connections and problem solving, conceptual and procedural knowledge, developing links using models and language to develop math concepts and connections, as well as developing metacognitive habits of monitoring and regulating thought processes to solve problems without guidance. Continued assessment is critical to ascertain the child's ability to learn, integrate, and apply the math concept with fluency prior to moving on to the next concept.

IEP accommodations and modifications that would be beneficial for children struggling with math:

1. Continuous use of manipulatives and hands-on activities to introduce learning of all math concepts.
2. Create a personal reference file for the child to refer to when studying for tests due to the need for visual organization and the importance of math placement.

The child may require prompts and starters for each math area covered in class identical to what was used in class instruction.

3. Require the child to re-work those math problems that they responded to incorrectly for homework as well as tests, and all in-class work to ensure demonstrated understanding of the concept being taught prior to moving on to a new math concept.
4. Use of a calculator for computation, but only when appropriate and for checking work.
5. Require the child to maintain a daily assignment book or planner.

Central Auditory Processing Disorder Versus ADD and Information-Processing Deficits

Barbara C. Fisher

Brain Evaluation/United Psychological Services, Washington Township, Michigan, U.S.A.

Nancy Torgerson

Fisher Academy, Washington Township, Michigan, U.S.A.

Information-processing deficits are a common symptom of the genetic developmental attention deficit disorder (ADD). In real life, this deficit area presents itself as the tendency to miss and/or confuse information. Frequently, too frequently in fact for family, friends, and teachers, individuals with ADD will say that they were never told about an important date or they do not recall a particular conversation, adamantly denying its occurrence. This typifies one of the major deficit areas and the one that is argued about most often, negatively affecting family communication. Information-processing deficits are measured using two tests, the Paced Attention Serial Addition Test (PASAT) and the Wisconsin Card Sorting Test. The first measure provides a more direct measure of information processing while the second measure is a more indirect assessment of this deficit area. The PASAT demonstrates the ability or difficulty of processing information, requiring the individual to perform a simple calculation of adding numbers, continuing to take in information, processing it by performing a simple calculation, and letting it go to add the next two numbers in a continual, paced task comprising four trials that increase in speed. The second measure assesses the long-term compensatory skill of using logical reasoning to problem solve a new and novel learning task instead of attempting to process information from the examiner. This measure demonstrates the typically seen tendency of individuals with ADD to rely on their own resources to logically figure out the information they need to problem solve this novel learning task.

In real life, ADD individuals tend to avoid asking for help, only turning to ask a question when they are at the 11th hour and are totally frustrated. Otherwise, they tend to work at something over and over until they manage to figure it out for themselves. Sometimes, they will struggle for hours before asking for help. Having learned through the years of the tendency to miss pieces of information, the individual adopts the safer pattern of figuring things out for themselves. Subject to errors processing information from another person or information source (such as a book), this pattern becomes ingrained.

In the brain, the information-processing center is identified in the inferior parietal lobule, an area of the brain composed of association fibers, enabling it to receive information from the various brain areas and process it effectively. The brain does not discriminate among modalities. Consequently, even though we are used to thinking in terms of verbal processing, this area of the brain is responsible for processing information from other modalities, such as touch and sight.

Information-processing deficits are not confined to auditory information. Visual information can be similarly missed. A person with ADD may not process visual information communicating the subtle social cues, resulting in social mistakes that negate peer interactions and adequate social development. The following are typically seen social mistakes:

- A comment made at the wrong time because one did not assess all of the visual cues in the environment
- Lack of awareness of all of the social events occurring in a particular situation
- Not understanding the impact of what was just said
- Misunderstanding or not understanding the punch line of a joke
- Missing the social nuances in conversation that are suddenly understood a few hours later

Unfortunately, central auditory processing disorder (CAPD) has been applied to the ADD population as a problem without the realization that the issue is a central processing problem, and is not limited to the auditory or verbal modality. Consequently, rather than diagnosing ADD, the diagnostic label becomes CAPD and the child is inundated with therapies designed to combat CAPD. Although this may be helpful in the short run, in the long term, missing the diagnosis of ADD when it is applicable becomes problematic for numerous reasons. As a result, several years later, following the diagnostic label of CAPD and treatment, we see children still struggling with ADD symptoms like distractibility, poor concentration in the classroom, slow cognitive speed, and reading comprehension problems that have not been addressed.

DEFINING CAPD

CAPD is defined as a deficit in processing verbal information received aurally when hearing loss has already been ruled out. The problem of processing verbal information exists despite a normal ability to process verbal information. Children with CAPD are typically described as poor listeners; they seem to have a short attention span for auditory information. Processing auditory information becomes even more difficult for this child in a noisy setting. In addition, recurring ear infections are common in this population. Diagnosis and evaluation are accomplished using dichotic listening tests.

THE OVERLAP

The overlap between these two disorders suggests a range of co-morbidity from 45% to 75%. A question remains as to whether CAPD produces ADD/attention deficit hyperactivity disorder (ADHD) symptoms or vice versa. In our experience, a diagnosis of CAPD is difficult to pinpoint, given the problem of differentiating a specific syndrome that involves auditory processing only. It is well-known that the processing of all sensory information takes place within an association cortex area of the brain located in the parietal area. As indicated, the information-processing deficits historically seen within the ADD/ADHD population are seen as the result of a processing problem for all types of sensory information and are not specific to auditory.

Closing Thoughts

ADD individuals tend to be more visual than verbal learners for two reasons: one, their continual struggle with language, and two, it is always easier to learn using two modalities rather than just one. When looking at visual material to recall, more often than not, the person with ADD is auditorially talking to themselves, describing what they are seeing visually. We see the problem of missing information as the direct result of information-processing deficits as opposed to CAPD, given the changes that occur with medication on pre- and post-testing evaluation. The cognitive training that we are using to address basic attention symptoms produced an improved response similar to that of medication on the direct measure of information processing. Documented test findings prove that the cognitive therapy program primarily targeting the parietal processes that would not be related to the auditory pathways (identified as problematic for the CAPD population) produced significant changes in the individual's ability to process verbal/auditory information.

ADD/ADHD Versus Brain-Related Symptoms in the Academic Setting

Barbara C. Fisher

Brain Evaluation/United Psychological Services, Washington Township, Michigan, U.S.A.

Kathy Albrecht

Fisher Academy, Washington Township, Michigan, U.S.A.

Symptoms of attention deficit disorder (ADD) as the genetic biochemical attention disorder requires far different intervention than attention deficit hyperactivity disorder (ADHD) symptoms (or ADD plus an additional disorder) and/or an additional disorder that is masked by outward attention and behavior problems.

From a general perspective, the symptoms of ADD where inattention is the primary issue, suggests the need for the following accommodations:

- An extra set of books at home to develop study skills
- A notebook that travels from home to school to ensure that assignments are correctly written down
- A system to check homework or classwork being returned and adequately completed
- Regularly scheduled contact with the teacher to provide feedback on academic progress
- A method to make sure that in class notes and assignments are correctly copied
- Extra time on evaluation that is timed
- Preferential seating if necessary to ensure focus
- An amplification system to enhance the voice of the teacher in the classroom above the noise that naturally occurs
- Resource room to complete tests in quiet environment

When the diagnosis is that of ADHD, and its combined or hyperactive subtype, accompanied by an additional sleep or neurological condition (that is either primary or secondary) needed accommodations are substantially enhanced and qualitatively different as noted below:

- Additional school services of speech and language, occupational therapy, and physical therapy
- Accommodations for writing and output in the academic setting
- Co-taught classrooms for math and language
- Specific tutorial help in school
- Contained classroom due to learning or behavioral or emotional needs

- An academic program that addresses symptoms related to problematic frontal processes:

Cognitive or thinking problems:

- Difficulty with sequential analysis and understanding how concepts relate to one another from a temporal (time) perspective
- Poor problem solving skills and difficulty with the abstract
- Difficulty generalizing and applying newly learned information
- Difficulty comprehending concepts that are more abstract and less concrete
- Difficulty learning and retaining information
- Problems related to selective attention and being drawn by novelty without the ability to remain attentive long enough to sufficiently learn new information
- Difficulty expressing themselves; oral and verbal output problems
- Memory difficulties and the tendency to be confused in what they remember
- Easily confused
- Intelligibility
- Difficulty handling any multi-step instruction
- Poor fine motor skills
- Rigid thinking, black and white with difficulty understanding “the grey” or things that are less clearly defined
- Difficulty comprehending how a concept may change with additional variables or conditions
- Difficulty getting the “big picture”

Emotional or behavioral problems:

- Tendency to become distracted by every noise or sound including their own
- Easily frustrated
- Highly emotional and emotionally reactive
- Emotional lability and reactivity that occurs with a preceding causal event
- Disorganization in general
- Poor planning skills
- Periods of disorientation
- Aggressiveness
- Perseveration and becoming stuck on thoughts or events
- Impulsivity
- Lack of attachment to anything other than their own desire
- Difficulty being creative or spontaneous
- Uncomfortable with affection
- Ignores rules, does not feel guilty for misbehavior
- Frequently tired
- Tendency to sulk or pout, easily upset, limited frustration tolerance, especially when things do not go as planned

Social problems and difficulties interacting in a group setting:

- Tendency to tease or be teased by peers
- Difficulty sharing with peers, having empathy to consider the feelings of others
- Difficulty compromising or seeing another side to things
- Poor manners, hygiene, eating habits

- Frequently demanding and manipulative; easily blaming others for mistakes
- Complying with rules
- Lying and cheating to win at games
- Not appreciating efforts of others, not keeping agreements
- Lack of development of skills for listening to others, conversational skills
- Anger management skills
- Empathy and ability to express remorse when hurting someone
- Considering consequences of their behavior in a group
- Respecting the rights and property of others
- Identifying their own feelings with respect to situational encounters or personal interactions
- Admitting mistakes and accepting responsibility for their own actions
- Difficulty maintaining eye contact
- Positive non-verbal skills

GETTING CLASSROOM ACCOMMODATIONS: SECTION 504

The American Disability Act, Section 504 stipulates that classroom accommodations be provided as services to those children needing certain assistance or provisions within the class setting, but not beyond. Generally, if children are diagnosed with ADD/ADHD, parents/guardians can go to the class teacher or the principal and be provided with accommodations that are easy to implement at the classroom level. Primarily, these are extra services that may include providing an extra set of books at home for parent use, extra time if needed to complete specific assignments (involving writing) , and a regular method of communicating with the teachers regarding progress, upcoming assignments and projects and so on.

WHAT IS CERTIFICATION AND WHEN IS IT HELPFUL?

If the accommodations received under the Section 504 act are insufficient for the child's needs which usually involves the need for evaluation within the school setting and/or the use of a resource room or "pull out" services of speech and language help, occupational or physical therapy. Certification occurs with a formal individual education plan (IEP) meeting under the auspices of some type of disorder, which is explained in depth in the chapter on working with the schools for services by Sharon Witberg. The certification should be based upon the child's primary diagnosis such as ADHD, seizure disorder, emotional/psychiatric problem, hearing or visual impairment, and so on. Once certified, children can be evaluated for the services they might require, whether it is resource room help, speech and language services, occupational or physical therapy. Only one disorder from the list noted above requires recertification for the children to continue receiving school services—learning disability. To be certified as having a learning disability requires meeting specific established criteria on intellectual and achievement assessment. A learning disability is established in each academic area (math, reading, writing, speech and language and so on) by the presence of a significant discrepancy between the child's ability and their performance on achievement testing. The type of services that the child requires tends to determine the need for certification.

Unfortunately, evaluations are not always accurate and children may be certified incorrectly, quite frequently as ADD/ADHD. Driven by behavioral symptoms as the primary criterion for the determination of the disorder, the

diagnosis of ADD/ADHD is made based upon parental and teacher self-report measures, too often without regard for other diagnostic criteria. Brain injuries and seizure disorders are often overlooked. Autism is another disorder frequently diagnosed in error. These errors occur, in large part, due to behavioral observations without the necessary testing tools for proper, comprehensive diagnosis.

Who is to blame for this? A finger cannot be pointed at any one person or entity. The school is not equipped with seasoned neuropsychologists who are trained to recognize frontal lobe disorders and who can formulate treatment plans.

I am unaware of any school that other than our own—is specializing in frontal lobe disorders. This is the primary reason we even have the school—as a pilot project to re-write school curriculum to teach this population from a neuropsychological perspective. If we are one of the few, if only, school addressing frontal symptoms directly, then why would a public school be expected to know how to teach such children? Nonetheless, parents expect the schools to fix their children without putting forth additional effort on their own to seek out professionals specifically trained in the field.

Behavioral symptoms and checklists are the primary method existing within the school setting to identify and certify children for help under the label of ADD/ADHD with the additional input of the treating physician and to ultimately determine a treatment plan. The same treatment plan is reviewed every year or every three years like clockwork, without examination of additional causal factors, even though the treatment or services may not be producing the desired result. School staff are frustrated that they cannot treat the children and make a difference. Parents become frustrated and more importantly, so do the students!

Case in point. Recently, I saw a seven year old boy with no language capacity. He drooled continually throughout the initial testing session. He was barely able to maintain eye contact and his participation in the testing session was so minimal that it was brought to a close. This child was diagnosed with autism and assigned to a contained classroom. His parents reported that he had been picking up problematic behavior following other children in his class, which was confirmed in the school records. His mother provided a documented record of diagnosed brain impairment, the presence of a cyst in his brain, the diagnosis of seizure disorder, and abnormal magnetic resonance imaging findings. Yet, he was diagnosed with autism, with a behavior plan as the primary treatment approach and no provision for the cognitive services that he was so in need of. How was this child to progress and learn when these were not goals provided in his treatment program?

WHERE THE SCHOOL CAN HELP

The school has the ability to make major differences in children's functioning. I saw early training from the age of two years onward teach a hearing-impaired child to talk and communicate verbally to a level that was sufficient for her to actually fit into the regular classroom setting. The earlier the intervention, the more that school services can make a difference. However, if the child's diagnosis is incorrect or goes untreated or is not properly treated, the school cannot make the differences they are capable of because of fighting an unresolved medical issue.

These are some of the problematic issues beyond the scope of what school service interventions can provide. Aside from these rather few instances, given the right tools and training, schools can be the front line means of intervention and empowerment in learning. When a disorder involves the frontal processes,

children have to be taught in the specific manner that increases their odds of learning and retaining the information ten-fold. Although there is no guarantee of learning—and the worse the brain injury, the more difficult it is for the child to retain newly learned information—much less incorporate that information into a framework that they retain to learn more information.

For this reason, we started a school for children diagnosed with frontal lobe, executive reasoning deficits. We are modifying statewide approved curriculum (teaching plans) to address the learning issues of those diagnosed with deficits involving the frontal processes. Deficits of selective attention, integration, perseveration, poor sequential analysis, thinking rigidity or black and white thinking, and overall difficulty with the abstract—negatively impacts the children’s ability to learn and retain new information. It has been quite challenging teaching five or six children the information they missed earlier—in building block grades—who have frontal problems and difficulties making use of the information they did manage to learn. Working with a team of a highly experienced staff members that include a neuropsychologist, math specialist, and speech and language pathologist, we are teaching children—who could not be taught in the regular school setting—how to read, how to write a sentence, and the basic concepts and tenets of math from the ground up. Despite our expertise, each day is a struggle to think of new and creative means to teach the child in such a way that the odds are greatly increased they will retain the information over time. Our goal is for the child to learn—as well as to be able to utilize—what they have learned.

This, however, is a heady task considering the layers and layers that comprise frontal functioning and processes that are both varied yet intertwined. Consider the impact when the highest level of brain functioning has deficits. The area of the brain responsible for integrating all the information received from other brain areas in a feedforward connectivity pattern does not operate as it is supposed to. The earlier the damage, the more problems there are, the less time the brain has to learn prior to the damage, and the greater the likelihood of more brain areas becoming impacted through time. Then imagine trying to teach children when their brain is compromised at the highest level of brain functioning.

In the classroom, thinking or cognitive symptoms of frontal lobe problems are as follows: selective attention, problem solving difficulties, poor ability to integrate information and concepts, memory deficits and difficulty placing new learning into compartments for accurate storage, recall and use, problems understanding abstract concepts, concrete thinking, poor sequential analysis, rigid thinking and so on. The following are deficits typically seen that interfere most in the child’s learning and retention of information over time.

- Poor problem-solving skills; difficulty generating alternative solutions when designated solutions do not work out may be due to thinking rigidly, and focusing upon irrelevant information to the degree of total confusion. Symptoms of rigid thinking, a focus upon the minute item while missing the big picture, and an inability to integrate all of the relevant pieces results in the intermittent ability to solve the problem in a concrete situation and an overall difficulty solving the problem in a more complex situation. In the classroom: the inability to shift between subjects or thoughts, poor problem solving, etc. negates independent work as the children become stuck upon encountering a problem they cannot solve. Thus, encountering a problem during an attempt

to complete work results in total work stoppage until some type of external intervention occurs.

- Concepts learned at an earlier time may get lost in the ensuing confusion, negating the ability to separate one concept from another in learned memory compartments for retrieval at a later time and date. In the classroom: Loss of recently learned information while attempting to learn more becomes worse with increased classes in junior-high and high school. Information learned in English is lost when subsequently attempting to learn new information in social studies. In this manner, these children or adolescents are at risk of losing what they have been taught as each new subject information replaces the information learned from the previous subject, resulting in a potential loss of 50% learning on a day-to-day basis.
- Selective attention processes, when not working effectively, allow every noise and sound in one's internal and external environment to become important. As a result, the person becomes easily overwhelmed by too much noise, stimuli and/or information, making it difficult to process and comprehend more complex data. Sustaining attention to the task without becoming distracted by other stimuli results in difficulty even in identifying the problem. In the classroom: Distractions occur continually with every novel stimulus, a pencil dropping, the toilet flushing, whispering of fellow students, and so on. Sounds that we typically shut out are heard and the problem increases with increased noise and environmental stimuli.
- These symptoms increase with increased task complexity and processing demands. In the classroom: Deficits related to frontal processes become worse with each grade, blooming in junior-high and high school, this being the reason that we tend to "grow into these deficits"; it appears as if the brain impairment is worsening when, in fact, we are only becoming more aware of the problem because with a change in school requirements there is an increased dependence upon the frontal processes (consistent with developmental age expectations).
- As problems or test items change in format, the inability to generalize learning and to apply learned concepts promoting learning based upon learning, in other words those moments of epiphany, the "ahas." In the classroom: The child may understand how to complete a specific math problem however when the numbers change, the problem seems all together different to them.
- Concrete thinking exists that is not amenable to abstract thinking processes necessary for problem solving and decision-making. In the classroom: The children have difficulty with math story problems, understanding the use of the literary terms that tend to be singularly applied to math.
- While understanding concepts in the various subject areas, the more abstract and the less concrete the concept the greater the likelihood of problems understanding.
- Difficulty understanding proverbs as well as more abstract questions about any topic is seen in written and oral responses.
- Limited cognitive fluency, memory problems negate the ability to learn basic skills to develop fluency to build upon (such as the math facts, basic language/grammar use, sight words and so on) . Insufficient cognitive skills to learn efficiently, to process information and to apply learning. In the classroom this would affect the learning and retention of primary concepts in all basic academic areas to build and learn in a step-wise manner consistent with the objectives of their grade.

- Word retrieval problems, comprehension difficulties (resulting in either a lack of understanding and/or the tendency to misconstrue information), problems with the subtleties of speech, and limited spontaneous conversation can negatively affect day-to-day communication. In the classroom: The children raise their hand, start to say something and instead the sounds, "ahhh" comes out because they cannot find the word they are looking for and forget what they wanted to say. The child starts to ask the teacher a question, but cannot get the sentence out due to the inability to find the right words.
- Intermittent functioning results in the inability to trust in one's cognitive processes, to build the necessary confidence and self-esteem, resulting in cyclical self-fulfilling prophecies and negative attributions. In the classroom: The children feel very "unsmart" and not bright enough to equal their peers, siblings, parents, and family as a whole. This sets in motion the tendency to anticipate failure, quickly and easily giving up with the ultimate goal of feeling more in control by predicting the worst-case scenario.
- Poor sequential analysis and the difficulty seeing how concepts relate to one another as part of a whole picture. In the classroom: The child has difficulty understanding such concepts as the continuity of history, evolution, time, and money, to cite a few examples.
- Behavioral impulsivity and moment by moment functioning (where only the moment in time has significance) results in continual movement, being drawn by novelty, and difficulty remaining still long enough to learn new information. In the classroom this would affect the child's ability to remain seated, to engage in activities that require non-participation at times, and to sustain attention long enough to comprehend the information they are being taught.

Given the rather all encompassing task of teaching children with a varying degree of special needs, when the frontal processes are involved, the task becomes next to impossible, especially in the public school environment (originally designed to teach the average child). Staff, ill prepared to encounter children that the experts and specialists struggle with, are placed in the unfortunate position of being assigned the educational responsibility of a child who has significant brain-based problems that negate their ability to learn. While the public school is duty bound to provide for the education of every child, there obviously needs to be some type of allowance made whereby the school can rely upon outside professionals for help and assistance. Despite their valiant efforts to create a specific program to teach children suffering from traumatic brain injury, the program was unsuccessful in managing to improve the learning of the particular student that it was originally designed for.

We are currently going into our third year of teaching and re-writing curriculum to address the above deficits related to impaired frontal functioning. Each child presents as a new challenge to figure out, in terms of how to motivate, how to address their behavioral issues, and how to teach them in a way they can understand and retain what they have learned. All of these factors remain complex, multi-factorial, and ever changing.

Part VI: ADD/ADHD: Adult Issues

Barbara C. Fisher

*Brain Evaluation/United Psychological Services,
Washington Township, Michigan, U.S.A.*

Attention deficit disorder/attention deficit hyperactivity disorder (ADD/ADHD) symptoms change and sometimes worsen in adulthood. Individuals who may have been able to cope as a child find themselves overwhelmed and unable to complete the tasks required of them, resulting in loss of marriage, employment, or both. As the stress of being an adult increases in today's demanding world, ADD symptoms naturally worsen. Dr. Smith discusses the amino acid deficiencies, nutritional, and neurotransmitter influences upon ADD symptoms that is enhanced with the advent of menopause. Her chapter points to the need to become healthy and to take time from our busy lives to make sure that we take care of our bodies by understanding the functional approach to ADD/ADHD and the need to address the underlying physiological dysfunctions. This latter point becomes particularly relevant in considering the aging process and the need to take care of ourselves now in order to age gracefully. The different types of common dementia are discussed at length—from diagnosis to treatment suggestions and alternatives. The manner in which ADD/ADHD impact the marriage and the family system is specifically detailed in two chapters addressing the psychosocial consequences of ADD that affect so many people beyond the person diagnosed with ADD/ADHD. Finally with Dr. Avci-Wolf, there is a chapter on women, gender specific issues, how ADD enhances the picture, making the point that women are multi-tasking on a continual basis due to being overwhelmed by the demands of both the family and the job setting. Suggestions are made for balancing the many roles that women have to assume while simultaneously coping with a very stressful and demanding world.

Barbara C. Fisher

*Brain Evaluation/United Psychological Services, Washington Township,
Michigan, U.S.A.*

It must have been about 15 years ago that I went to a marriage seminar and the speaker talked about trees. His contention was that a healthy marriage consisted of two strong trees that stood up sturdy and tall and touched one another. One tree was not on top of the other. These were two freestanding trees that touched, meaning that two people are entities in their own right and they come together to create an even better whole. They do not need each other nor do they depend upon one another; they value each other and join their energies in a synergistic manner. Unfortunately, this is the ideal, rarely occurring in real life.

More often, we marry someone who fills the gaps that we have in ourselves. They have what we don't have. They are social, we are not. They are outspoken, we are not. They are assertive (sometime even aggressive); we are not. They are active; we are not, and so on. Predictably, the marriage become problematic when the spouse changes and alters their personality, meaning they no longer fill in the gaps. Whether it is illness, a revelation spurred by a developmental review period age, or a child becomes ill or troublesome; whatever the event the result is a change that occurs in thinking and ultimately outward presentation and personality.

We may marry someone like our parent (either someone like the father if you are female or the mother if you are male). If there is a conflictual relationship with one of the parental figures, in an attempt to resolve the conflict, we may marry someone similar to the parent that there was more conflict with. Marrying a similar personality provides the opportunity to resolve the unresolved conflict and through another figure ultimately let go of the original conflict with the parental figure. The opportunity is present to resolve these old conflicts by either acting differently than we did as a child and/or trying to change the spouse because we could not change the parental figure. The ideal of course, would be to act differently; unfortunately what happens most often is the attempt to change the spouse and herein lies the problem. People marry, supposedly aware of each other's positive and negative attributes. However, after what I call the honeymoon period (usually 7 years), they now want someone different. As they begin to devote themselves to changing the other person As opposed to working on "their own stuff," the marriage rapidly declines. This is the point that marriages typically get "off track" and the couple who was once madly in love begins to interpret various day-to-day scenarios as significant of the injury they are feeling (or the flaw they want changed in their spouse) regardless of reality.

No discussion is complete without talking about the extreme, addictive relationships. From the female side, a friend of mine calls it "falling for the bad boys." Obviously the attraction to the extreme is based upon the good times. It is the extreme persona that busts through our reserves, shyness, conservative nature and makes us enjoy life by being impulsive and frivolous. The joy of those early

days is indescribable; however, what goes up must come down, and soon life becomes a series of extremes from one end of the spectrum to the other. The addictive quality is formed based upon the good times that are so good, initially sufficient to weather the storm and disappointment of the bad times. Eventually, however, there is nothing that can erase bad times and the wounded person leaves the addictive relationship, usually not until bottoming out and being left without a choice.

None of these relationships is stable. Think of a roommate. You have to live with this person, so it is better if you get along and tolerate each other's idiosyncrasies. Think of the friend whom you can trust to never judge you, to never get angry when you are late, to always have warmth and understanding to offer to you. Isn't that who you would want for your spouse? We all have friends like that but things change in a marriage. Things change when children and responsibility come into the picture. Consequently, when you marry for the wrong reason, when you have two individuals who are not independent, problems naturally erupt. One person does all the work; one person makes all the money; one person feels used and over-used; one person feels less than the other. The list is endless.

The addition of attention deficit disorder (ADD) has the potential to disrupt a marriage similar to that of a crisis or traumatic event, only the problems build slowly over time periodically exploding depending upon the situation. Bills not paid, children not picked up or taken care of, appointments or dates where one spouse is left waiting; all contribute to the erosion of the marriage. The major complaints heard over the years are that the ADD spouse is not reliable, they don't make sufficient or consistent money, they do not follow through on their promises, they avoid problems and do not communicate. The ADD spouse is more apt to walk out without completing the argument or to avoid the discussion in the first place. It is not surprising that attention symptoms would invade the marriage and remain similar to the parental and teacher complaints of childhood. The major issue for the true genetic ADD disorder is avoidance and procrastination; however; now it involves deadlines at work, completion of a major project (particularly those that either will be seen by superiors or tax the person's competence level) and completion of any form of paper records. Turning in the expense account for the month, which affects the family finances, becomes a major battleground. Promotions may be delayed or declined based upon the non-completion of job-related tasks that require paperwork and deadlines. The ADD spouse usually does not discriminate work from home avoiding the boss as much as the non-ADD spouse. There are those individuals who put forth such enormous effort to battle these tendencies at their job that they have no energy left to spend at home. This would produce ADD symptoms at home that are not seen at work; in my experience, rarely does the reverse occur. Spatial symptoms are primarily symptomatic in the form of time management. Lateness occurs due to over-planning (without enough time to accomplish all of the planned tasks), becoming distracted (veering off of the plan to fix a problem that was just noticed), and basically difficulty with multi-tasking.

Rarely does the ADD spouse end the marriage (unless they have had an affair and plan on marrying the person so they leave one relationship for another). Usually it is the non-ADD spouse who can no longer comfortably contend with the broken promises, lack of time management, and chaos that tends to surround the life of the ADD adult. The chaos, however, is more related to the avoidance and procrastination as opposed to the attention symptoms. It is the avoidance and procrastination, as well as the fear of failure that drives the refusal to keep a planner,

organize the day, and live life in a more regimented manner. The fears are so great that it takes the marriage being threatened to finally push the person from their comfort zone into change mode. The problem is that too often, due to the procrastination, they have to be thoroughly convinced that there is a sufficient crisis to move out of their comfort zone. However, by that point it is too late for the marriage. Here is the reason why. Humans have the tendency to become stuck in a decision once they have anticipated and internally worked out the issues associated with their plan. This can occur with something as small as cancelling a date with someone and thinking about how good that would be because you do not feel well or want to go somewhere. By the time you talk to that person to supposedly converse regarding the feasibility of this decision, you have already committed to the end point. Therefore, if they protest, you are already committed to convincing them of the plan that you have now adopted in your mind. The following is an example of what this looks like and the danger of waiting too long to fix things.

I saw this couple for a year or so, week after week. We talked about what he did that she did not like. He never said anything about her. He kept all of his feelings to himself; he just listened to her and did not say anything to counter what she had said. He did not deny her accusations, nor did he agree. However, he never did anything to change or alter any part of his life style or interactions with her to show that he had heard what she was saying to him in the therapy sessions. She continually threatened that one day she would leave and the marriage would be over. He did not listen and continued to show up for the marital therapy sessions and sort of participated. She wanted to take a trip. She planned a trip to Hawaii; he claimed that he was too busy, he had to work, and they needed the money. She went with the kids and had a great time. He thought he was being a wonderful person that no one could complain about. He did not drink; he worked hard; he made money; he did not spend money, and he was stable. What was the problem? He did not talk. Finally, one day she up and left; took the kids with her; moved out of the house into an apartment. He came in so depressed, flattened; he could not believe it. I asked him if he had heard anything she had said for a year; apparently, he had not. He was determined to have her back. But she refused to come back to therapy; she was done. It took all of her courage to leave and she had no intention of coming back; she was past the point-of-no-return. Amazingly, he proceeded to make all the changes she wanted. He dressed differently, he got a hobby, he became social and met people, he participated in all outings and events, he was a big hit at Parents-without-Partners; all the women wanted him, and he liked that feeling of being wanted. He showed a side of himself that I had never seen—entertaining, adventurous, and full of life. They never did get back together—whether it was for the best I do not know.

We have talked at great length in this book about the effects of ADD on learning and early social relationships, primarily from the standpoint of how children/adolescents feel—from their viewpoint. Granted, we have also discussed the frustration that parents and teachers experience in their relationships with an ADD child/adolescent, but being a lifelong partner can, in the same instance, be very much the same and very different too.

The similarities are rather obvious. It can be frustrating living with someone who forgets an appointment you have together or starts any number of projects without completing them. It can make you crazy when your spouse insists that you have never had a conversation about what television programs you have decided the children can or cannot watch. Without a great deal of patience and

understanding, these seemingly small issues can erode an otherwise very loving and stable relationship.

The difference between being married to someone with ADD as opposed to parenting, teaching, or having another peripheral relationship with someone with ADD is that the commitment you have made as an adult to an adult in marriage can be much more egocentric than the feelings of devotion and responsibility attributed to a parenting relationship. Yes, you are committing to love and nurture your spouse, but you are expecting certain things in return as well. The important balance necessary in a marriage can be precariously tipped when one partner is ADD because of the need for the other partner to act in many ways as a parent. Constant reminders about schedules, the need to frequently redirect your spouse in order to accomplish household tasks, and forgotten conversations that were deemed important and quickly forgotten can blur the marriage lines, the essential equal effort. While a marriage under these circumstances presents challenges, they are not insurmountable. Marriage is work, and although as a spouse you may feel that you are carrying more than your fair share of the burden, you have to remember that your spouse is dealing with real issues as well and struggling to overcome them.

Following is an outline and suggestions for maintaining the balance, the love, and the marriage relationship when ADD symptoms are involved.

The following issues are commonly seen in treating couples where one or both spouses have ADD:

- Getting needs met
- Not being angry
- Managing the piles
- Channel surfing
- Marring the conflict
- Asking the question, "Why do I stay?"

GETTING NEEDS MET: A WISH LIST FOR MALES AND FEMALES:

- To be loved all the time even when I do not deserve to be
- To be treasured even if I do not feel worthy
- To laugh because laughter heals anything
- To feel as if I am the most important person in the room
- To know that you will never leave no matter what
- To feel loved even if I feel ugly
- To feel supported in everything I do
- To feel watched over and cared for
- To stop me from making a mistake
- To give me the support to be the best that I can be

AVOIDING ANGER WHEN YOU HAVE AN ARGUMENT:

- Ask yourself if it is truly worth all this energy
- Understand that if you are angry, you are hurt, so show your sadness instead of anger (it is easier to hear someone who is sad as opposed to angry)
- Make sure you understand what it is that you are truly upset about and that you have not focused on the irrelevant (like the dirty dish left in the sink or the remark that you think made you so upset).

This last point is very critical. The better you become in expressing what is really bothering you, the more that you spend the time to rehearse what you want to say, the greater your odds that your spouse will hear you and, better yet, be receptive to future conversations. Identifying what you are truly upset about allows you to refine your conversation to a clear explanation of your feelings. Prior to this conversation spend the time analyzing the issues that are bothering you.

The involvement of our emotions tends to negate our ability to express ourselves calmly and clearly. You may begin the conversation calmly with the best intention to remain calm until your spouse reacts defensively, which then triggers either anxiety and/or defensiveness and anger in you. The classic reaction of “What did I do now?” immediately bristles the spouse who is trying to explain their feelings. This is where what begins as “discussions” turns into an argument when the ADD spouse feels they are being picked on and the non-ADD spouse feels helpless to communicate their dissatisfaction ultimately losing all hope that things will ever be fixed in the marriage.

Another scenario is that it is difficult enough to hear someone talk about why they are not happy with you, without having to endure rambling, unconnected thoughts that are not clear or coherent. When you find yourself saying what is the problem, you may have already had “enough” of the conversation. If added to the mix are uncontrolled emotions of yelling, name calling, bringing other people into the conversation, or stomping off and leaving, the likelihood of further discussion of feelings definitely declines after these types of encounters. Nothing is resolved and the next time that the spouse decides to initiate another “discussion” will have to be after things have built up to such a crescendo that the fear of another problematic encounter is outweighed by the intensity of the frustration, anger, or desire to leave the marriage. It is when the wounded or happy spouse no longer cares that the marriage is truly over and is less likely to be repaired in a therapist’s office. Only a crisis situation has the likelihood of saving the marriage at this point.

Present your feelings in the calmest, most reassuring voice that you have, designed to simply provide information. No one listens to someone who is yelling. Have you ever noticed that you have no recollection of exactly what someone said to you if they were angry in expressing themselves—especially if you grew up with anger or your spouse is angry a lot?

Keep your expectations positive. If you expect to be heard—to be listened to—you have better chances that this will occur. Similarly, if you think it will just end up in a big irresolvable mess, then when things start to skid downhill—instead of attempting to stop the conversation from escalating into an argument—you will simply say in your head, “I knew this would happen,” and allow it to occur.

Be ready to back down for the sake of the marriage. If both parties are dedicated to not losing each other, it is amazing what they can work out. Think of the honeymoon period when you first met; no matter what the person did, you thought it was cute. You did not assign malicious thoughts to the actions of your spouse when they first became your lover; you did not think that they had an ulterior motive; and you did not have those dark thoughts. It is too easy to think the grass is greener, that things are better for other people, and that there is someone better than the person you are married to. The same problems tend to be repeated—you have better odds of success if you work it out in the environment that you already know.

Life is not always as it appears; how often have you heard that? I diagnosed a man with ADD whose wife brought him in. She could no longer stand his

disorganization or the things he said he was going to do and did not do. She was frustrated and angry. Following the diagnosis and his starting stimulant medication, everything was rosy. But pretty soon, the problems started again—not completing tasks, not listening, and so on. She left him. He came in heartbroken. They got back together. In therapy a commitment was made to complete six sessions that were relatively unlimited in time (a range anywhere from two to four hours in length) prior to making any kind of decision about the relationship. This was agreed upon for the sake of the children to make sure that a divorce was the right thing to do. They talked about all kinds of things We got down to childhood hurts; they shared feelings they never shared with anyone else; they got back together as friends and then as lovers and they remain together to this day, 10 years later. Generally, the rule of thumb is to try to stick together especially when there are children involved. I will not even begin to go into the horrors of divorce. However, having said that, it can also be said that sometimes people are not supposed to be together and they have married for the wrong reasons.

MANAGING THE PILES . . .

Oh, the ADD Piles . . .

Piles just seem to appear and reappear. You clean it up, it returns and you start it over. Piles and ADD just go together. It may have to do with trying to multi-task and not doing it very well. My office manager continually tells me, “finish this task before you start something else.” She actually makes me go through each problem one at a time. It could be distractibility—the phone rings, you thought of something else, a crisis occurred and you never came back to that piece of paper with the note on it, that book you were supposed to read, and that bill you were supposed to pay. Then the mail comes the next day, papers just appear magically on top, and the item that you did not take care of becomes buried until you decide to take a vacation, which requires clearing up the old piles before you feel that you can leave. Or you come back and you are amazed at how messy everything is (there is something about living in a situation and how it looks after you have left and returned). There is just far too much paper in the world. A chief operating officer of a hospital made a decision to shred everything. He purchased several shredders for home and work to get rid of all the papers crowding his office—he definitely looked happier when I saw him.

The piles represent unfinished tasks—the tasks that there is no time to complete because you try to do too many things, you don’t budget your time, and there is never enough time. The question remains as to whether you would take on so many new projects if you had managed to complete the old ones? Ask yourself if you keep taking on new projects to feel more productive? Do you need to feel more productive to feel good about yourself? Or do you have so many projects because it is simply a byproduct of a life that is too busy as you try to cram everything into a day that is only 24 hours long that you wish had twice that many hours?

CHANNEL SURFING

ADD people are classically known as channel surfers. Why? Maybe it has to do with the fact that they get bored just sitting and watching television and nothing on the television set is enough to hold their interest long enough to finish a program. Maybe it is because ADD and anxiety go hand in hand and being anxious

does not allow one to sit still comfortably for long unless one is very busy. Maybe it is because ADD people are simply not suited to watching television even though they do it a lot. A lot of undiagnosed adults come home after work so tired that they can do nothing else but sit and watch television even though they are bored and restless. Adults report that once on medication, they find that they have not used up all their energy at work compensating for ADD symptoms. As a result, they are able to come home and still have the energy to get tasks done, which means they attack the piles; they don't have to remain semi-comatose staring at the television set as a variety of scenes scroll across the screen that they don't remember.

MARRYING THE CONFLICT:

- You marry someone like your mother or father
- You marry the parent that you argued with the most
- You marry the parent with the personality you were supposed to fix
- You marry someone like the sibling who was mean and abusive to you or who you were in competition with
- Until you resolve the conflict in some manner, you will tend to have difficulty leaving the marriage
- This may be the reason why you stay too long in an abusive relationship

ASKING THE QUESTION, "WHY DO I STAY?"

- First ask the question of what attracted you in the first place
- Identify one or two traits that you were attracted to
- See if those traits still exist once in awhile (this creates intermittent reinforcement which can go on forever) or most of the time.
- Is the goal to change the person and you still think that you can?
- The belief that divorce is not an option and to leave means that you have failed

Somewhere there is a soul mate for everyone . . . someone who loves you for you, who always thinks you are funny even if you are not funny at all, someone who makes you feel wonderful and good and powerful and important all the time and not because you asked for the compliment. That person may actually be the one you are already married to.

GENERALLY, CHANGES OCCUR IN THE MARRIAGE UNDER THE FOLLOWING CONDITIONS:

- Feelings of dissatisfaction, loneliness, and unhappiness occur more often than they are not present
- You cannot sleep at night as your thoughts take over, creating insomnia and sleep deprivation
- Finances tighten, increased external stressors
- One of the children becomes ill or sick
- A close family member dies
- A baby is born
- An unplanned extramarital affair occurs either because you were looking or because you were not looking and got caught off guard, succumbing to the attention that you have been missing

- Any situation that increases or promotes an awareness of your increased pain, woundedness, and loss experienced in the marital relationship

TAKE HOME MESSAGE:

- Things have a life of their own and happen naturally
- Insight breeds action
- You always have the option of handling things differently
- It is always better to work things out, if you can, with the person you are married to who is familiar to you, especially if you have children
- When you rescue your spouse, you eventually will not like or respect them
- What goes up goes down, putting a spouse on a pedestal only means that they have the potential to fall off
- Making things “look good” does not help the marriage
- Keeping your feelings inside and saving up hurt or anger does not help the marriage
- Accept your spouse for who they are, see the good points, let go of the things you do not like (if you can) return to the honeymoon haze
- Define what really matters to you—you only get three things
- Discuss the three things that truly upset you without confrontation, guilt, or accusation
- Don't spend time trying to change your spouse
- See the good before the bad
- The red shoes are on your feet and you can always click three times and go home to the safe place you have created

As in any relationship, but marriage in particular, knowing the issue is half the battle. Through knowledge comes understanding; through understanding comes acceptance. It can be a wonderful journey, just buckle up for the ride.

The Effect of ADD/ADHD Upon the Family System

Barbara C. Fisher

*Brain Evaluation/United Psychological Services, Washington Township,
Michigan, U.S.A.*

THE ISSUES

- Homework
- Sibling rivalry
- Equal attention for all
- Relationship of the parents
- Impact of extended family
- Medication and treatment
- Time management
- Family arguments
- Family meetings

HOMEWORK

If not scheduled efficiently, homework can be a battle that lasts all evening. Life becomes doing homework and going to bed. Parents and siblings become angry with the attention deficit disorder (ADD) child who takes up all of the family time, leaving no time for anyone else or for family fun. This becomes even more upsetting when the ADD child does not turn in the work that took all night to complete, and then another argument ensues about that. A whining child and a frustrated parent trying to get the child to complete their homework dominates the household, creating a very unfriendly and unhappy environment. Anger begets anger and more frustration for everyone. Siblings dislike and even hate the ADD child and are sometimes mean to them. You would think that this would be sufficient to motivate the ADD child to change his or her habits. However, do not underestimate the power of anxiety, the fear of failure, and the fear of success. As the demand for more success increases, the result is more avoidance and procrastination on the part of the child.

SIBLING RIVALRY

Siblings can be very jealous of one another. No one gets enough attention or "food" in the household and each family member is starving for attention and to be noticed. The household is starving for peace and harmony. In an effort to get attention, the children have to outperform one another and to prove to the parent that they are the best. This means telling tales on one another and reporting any observed wrongdoing on the part of the other children in the household, especially the ADD child who is seen as the one responsible for all of the problems. The ADD

child gets lots of attention but it is all negative, further reducing levels of self-esteem, negating any hope of overcoming the avoidance and procrastination that dominates their life. It is the continual fear of failure that determines whether the child brings the homework home, completes it without an argument, and/or takes it back to school and turns it in to the teacher. Reasons for the fear of failure range from doing the wrong assignment, completing it incorrectly, and generally that the teacher will find something wrong in their performance.

Everything and everyone is caught in this propelling cycle that has a life and motion of its own. Siblings are continually at odds with one another and have adversarial relationships. Sibling roles may vary depending upon the birth order, their competence and individual temperament status. There is the child who is determined to be good, to satisfy the parental need for a "good" child, the child who just tries to stay out of the way and remain invisible, and the child who takes over the household and attempts to "parent" the problematic ADD child.

Everyone in the Family Needs Attention

How much attention they seek, how much they get and how that affects them depends upon specific variables and the combination of those variables in each individual child. Variables of temperament, personality traits, sex, and birth order interact to create the specific reaction in the child.

Personality traits: Dependent versus independent, sensitive versus insensitive, dramatic versus unemotional, introverted versus being more extroverted; are all traits that will affect and interact with the birth order. For example, if the oldest male is more sensitive and introverted and the second-born male is the exact opposite, the second-born male may take over the role of the oldest sibling. A very dramatic and demanding middle child will likely take on the role of power monger, demanding continual attention. If the youngest is more sensitive, they are more likely to retreat and withdraw from the family. However, if the youngest child is more outgoing and in need of family solidarity they will work very hard to keep the whole family together, attempting to please each member individually and getting them together as a cohesive group. The inherent roles of birth order and the personality traits interact to determine the reaction of the child to the ongoing family emotions, which then forms their persona.

The attention that each family member desires or receives is determined by the interaction of all these factors.

BIRTH ORDER

The oldest is the caretaker; however, it is different for male versus female. In other words, the only male may be the second or third child; however, they function as first-born or only child due to being "male." Therefore, take the females and see their birth order separately from the males to understand the role of the oldest, middle, and youngest child. Generally, the first-born is the caretaker, a responsible child, responsible for the physical care of the younger child and given the burden of maintaining the household. The oldest child is the first child to break the parental union leaving them responsible to keep the marriage intact. This may mean physically taking care of the younger children and/or running interference within the parental union to make sure that the parents resolve their conflicts. This may also entail becoming a confidant for one or both parents. The oldest child, by nature, must remain very responsible and if they are neglecting schoolwork, they are responsible at home and take care of what the parent asks them to do most of the time.

The second-born child is a lost child unless there are only two children, and then they become the youngest child. The middle child has no role. They become lost in the shuffle unless they are a star in their own right by being competitive in sports, education, or academic pursuits. The middle child may become either lost in space and not noticed in the household, vulnerable to depression, or a power monger demanding attention and to be noticed. If the ADD child is the middle child, they may continue to upset the family and not complete their work simply to remain in the limelight.

The youngest child is the baby of the family—the last child to enter the group and by definition charged with maintaining the family and keeping them together. Therefore, the youngest child may operate as the glue, keeping the siblings close and parents together by buying gifts for everyone at Christmas time or buying the gift for the parents from all of the children. The youngest will attempt to please everyone in the family and be more susceptible to the opinion of family members. If targeted by an older sibling, the youngest is at risk of lowered self-esteem and self-doubts. The youngest child is least likely to be able to shake off name-calling due to their vulnerability and concern with the opinions of their older siblings in an effort to keep everyone together as a tight family unit.

RELATIONSHIP OF THE PARENTS

Children are obviously going to have greater difficulties addressing their own issues of self-esteem and developing their place in the family when the parental relationship is in jeopardy. The more problematic the parental relationship the more difficult it is for the child to develop themselves and to carve out a place in the family system. Chaos, physical fighting, and alcoholism can definitely create a sufficiently traumatic environment that can actually negate the child's individual development. The combination of ADD and trauma produces a rather hyperactive, impulsive child who can be non-responsive to parental discipline. In other words, a more behaviorally problematic child who remains impervious to outside, external controls. The parental relationship escalates the child's behavior and the child's behavior escalates the problematic parental relationship, setting off physical abuse of all family members, more parental alcoholism and the downward spiral continues. This family system has the potential to become highly volatile.

Now take the family where it is obvious that the parents are not close and do not get along; however, there is no outward anger displayed and they do not argue. The household, however, is very sterile and cold. Children can develop trauma from this household as well. Everything remains hidden, unseen, and certainly not discussed; however, it is potentially as powerful as the above situation in affecting the children emotionally. I once saw a woman who had 15 siblings. They grew up in a small home in very close quarters. Upon leaving the home they ceased to communicate with each other and do not even get together for the holidays.

If the parental relationship is not solid, if it is fragile to begin with, then there will be difficulty withstanding life events that are adversarial. Finances and ill children (behavior, mental, psychological, or physical) are the two biggest reasons for parental discord. If the parents do not somehow take the time to be alone together, they will have no opportunity to patch the hole created by the needs of the child. Stepfamilies are even more at risk to argue especially when one parent is more protective of the child from a previous marriage.

The spouse having children versus having no children has its good and bad points. If the spouse has no children and they bond with the stepchildren, it is the

best of all worlds; however, if not used to children, then the problems can become just as devastating as the family with stepchildren from various unions.

Rule of thumb: The parents need to stick together, to back each other up with the children, to always present a united front. If they do not agree, they should disagree in private.

IMPACT OF EXTENDED FAMILY

The extended family is a problem only if the grandparents are closer to the parent than their spouse or if the grandparents are closer to the children than the parents. Otherwise, grandparents are the wise beings, the place for each child to receive the attention and special recognition they need and the opportunity to feel good about themselves. No matter what the parent does, the grandparent has the opportunity to make things better and to improve the child's emotional condition. The grandparents are the place of safety and refuge. The more individual recognition they can be given, the better things get. Problems with the above ideal scenario occur if the grandparents are mean or abusive or mentally challenged in some respect. If this is the case, the child is far too vulnerable to be used or abused due to the respectful position given to the grandparent. A recent movie depicted the life-long feud of a father and son that became paramount when the son was celebrating a major life event. The movie had a happy ending with all parties united, pointing to the need for children to have positive extended family relationships.

MEDICATION AND TREATMENT

Medication can be problematic when there is a spectrum of side effects that impacts the family system. During this time, the child may become more emotionally reactive in the home. Parents are at doctor visits instead of being at home with the other children. There are always critical phases in treatment that demand more parent time. This can remain positive by recognizing the feelings of the other children and perhaps depending upon other extended family and close friends for help. There is no easy answer other than to allow periods of time for everyone to talk about their feelings, especially if long hospitalizations are involved.

Tried and True Suggestions for the Family

Division of Labor

One of the ways to work through issues related to birth order, to neutralize or balance the family interactions, is for parents to divide their time with each child, switching back and forth. This may mean dividing up homework time, dividing up time taking the child to the hockey practice or the dance class to avoid the formation of a parent-child union around a particular activity. The whole family goes to the dance recital, the baseball game, and even the out of town game if on a travel team. Things always work better with a division of labor, whether it is household chores, homework subjects, and so on.

Household Organization

A more efficient household tends to be a happier home environment. Schedules that are implemented and become routine accomplish this task. A schedule for the morning; who takes a shower when, eats breakfast when, makes their bed

and so on. There are set time frames determining the time and length of each part of the morning routine. Same for the afternoon, dinner, and bedtime. There is a pickup time prior to everyone getting ready for bed to avoid the burden of one parent cleaning up in the morning. Everyone helps with dinner from setting the table to clearing the table to dishes. It can be a time of fun and laughter, put music on and dance together. Family meetings are the place for schedule changes and discussion of upcoming events for the parents and the children. Children do not like to be informed when they wake up that morning that they are going to an activity that afternoon which they had no knowledge of (this does not apply to children with frontal lobe disorders who cannot tolerate transition and anticipation of change only accentuates this). A schedule for homework, completing specific portions with so much time to allow room for the next subject (the math homework gets 15 minutes to allow time to study for the social studies test and spelling words, is helpful). Sometimes getting up in the early morning to complete homework or study for tests is helpful if the child is an early riser and so is the parent. The key is to avoid leaving things to the last minute.

Parent Connection

The best way to develop connections with the parents is elongated individual time. It is also a good way to bond family members and to slowly integrate step-parents and step-children. I only have one suggestion to accomplish this. It is a trip away from home. Once a year each parent takes one child on a trip for two days and one overnight somewhere. This means each child has two trips per year alone with one of their parents. It is amazing how much time you can get out of two days leaving early in the morning and returning after dinner the following day. The trip, with no agenda planned, allows a bonding experience between parent and child to discuss all of the issues the child is feeling upset about. I cannot tell you just how much difference and positive connection occurs from something as simple as one night away from home.

TIME MANAGEMENT

A big problem for the family is time management and the difficulty of the parent with ADD children to manage their time much less the time of the ADD children or spouse if the whole family has this disorder. The problem of time management in my experience is actually the issue of miscalculating the amount of time needed to complete the task. In other words, a task takes 30 minutes with only 15 minutes allowed for completion. If this occurs regularly the result is continual rushing, never enough time, and being late. The answer is to think about the time the task will take, add an extra few minutes, then add up all of the tasks and the time allowed. This process becomes easier when you do it more often.

FAMILY ARGUMENTS AND FAMILY MEETINGS

Keep arguments to a minimum between siblings, between parents, and between parent and child. Replace the argument with a private discussion or time at the family meeting. The family meeting provides the opportunity to discuss the week's events, to talk about upsetting things, and to diffuse anger situations. Given the knowledge of the interaction between anger and hurt, the object is to figure out why or what the person is wounded about as opposed to reacting to the angry voice.

Structure and Purpose of the Family Meetings

- To give a chance for everyone to talk and discuss how they feel.
- To resolve differences that emerged during the week, to air problems that may fester and grow into hurt and anger, leading to arguments.
- To plan the week so that everyone is taken care of and no one steps on anyone's toes.
- To make sure everyone's needs are met.

Family is important. Immediate family, extended family, blended families—all are important as individuals you can trust and count on for help when times get bad, when people age, when we are not as strong as we need to be. There is no bond that replaces the unity built up within the family system. When families are impacted by mental illness, an abusive persona, and/or physical illness, the object is to figure out the emotional capacity of each family member and to consider those few interactions as precious (which may mean mourning the loss of what you wanted as a child). With organization, preparation, and a lot of understanding, any family issue can be overcome and every family has the ability to form some type of close bond and acceptance for all family members.

Barbara C. Fisher*Brain Evaluation/United Psychological Services, Washington Township,
Michigan, U.S.A.***INTRODUCTION**

I would like to begin by making it perfectly clear that having attention deficit disorder (ADD) does not mean that aging will be more difficult for you than someone without it. In other words, the presence of a genetic, biochemical attention disorder does not alter your ability to age gracefully. Aging gracefully is dependent upon how you have lived your life. Have you taken care of your body or did you treat it like a machine that you expected would keep going no matter what? Some lucky individuals have the ability to live a long life regardless of how they take care of themselves. Reliant upon the way that we treat our bodies, the aging process provides the test of time, how much effort we have devoted to eating the right foods, getting the right amount of sleep, and avoiding other addictive and health-threatening habits. A sufficient amount of research exists to support the idea that certain variables decrease the opportunity to age gracefully, such as toxic substances, and that the use of good nutrition increases one's ability to age gracefully. So it really comes down to how well you take care of yourself, although there are factors we have no control over.

What is special about this day and age are the wonderful tools now available, from natural substances to the new medications that allow us to weather our personal storms, work through an illness, and be triumphant against many forms of diseases. So what does it take to really age gracefully? I am going to tell you: the belief and the will. It takes determination to keep on going, to squeeze every possible morsel from life that you can, to live life to the fullest, and to fight any illness that besets you.

Given that ADD runs in my family—diagnosed in my son, as well as other family members—the likelihood of one of my parents having ADD is high. Both, however, are highly organized, which seems to be helping them to age gracefully. My father is 87 years old, soon to be 88. Something happens around this age that makes individuals more vulnerable to illness, more at risk. However, he is the accountant for my business and has been for almost 20 years. He keeps copious records, everything is in its own folder, all is organized; he is extremely compulsive. In November my father had a pacemaker put in. They managed to “strike oil” and get in an extra lead to his heart. He has struggled with heart disease for over 30 years. No sooner was he home from the hospital then, due to bleeding, he was back in surgery again to repair the scar. We had a business meeting two weeks later and he still manages to “hold his own,” to contribute substantially to the conversation; my financial planner and the accountant we asked to consult were impressed.

My parents headed for Florida just before New Year's day. They landed in Florida on the 30th and my father was in such pain that he could barely make it

to their home. The next day he was in the hospital, where he remained for the next six weeks followed by rehabilitation, and emerged in February to finally experience Florida approximately two months later. His age provides testimony as to how fast things can change in the life of the aged, how overnight their lives can become so different. Most important is the impact of the person's will to live, their love of life, and their determination to remain active and whole, which literally directs the course of recovery from medical events. After being in the hospital for a week, the tests were not showing anything, and my father's condition manifested itself and boom, he was rushed into surgery. Two life-or-death surgeries later he was sent to rehab to pick up the pieces of his life. My father is a stalwart, gallant human being, and he has worked hard to survive this crisis; now he has to work hard to walk, to take care of himself. Two months prior to all of this he was playing the last golf game of the season. So my father awakened from this nightmare and as the accountant for the business, he immediately asked for the business checkbook and all of the stuff that he brought with him. He remembers this after being on a ventilator for two weeks. When I arrived again a week later we spend our time completing necessary reports; he dictated, I wrote. He remains a part of the business to this day, despite being swollen, filled with fluid, and in pain. There is a job to be done and this keeps him going. What is the moral of this story? Will and determination. What gives individuals, will and determination? A job, something they love, and something they believe in. My father is active. He plays golf regularly, signed up to help the greenskeeper. He has many friends (they celebrate his birthday with a party attended by no less than 30 people), and he keeps his mind active. He has his routine to maintain the house in Michigan and his routine when he travels to Florida. He completes his day-to-day tasks, which keep him structured and focused. His compulsivity in task completion helps him on a day-to-day basis to keep going. His reason to live is an active life.

So why do some survive long after surgery, while others do not? What is the psychological difference? I am sure that people have attempted to answer this question many times and will continue to try to answer this question for years to come. There are probably many factors and I am going to discuss only a few. One issue is, of course, the will and determination, the bigger goal, the larger picture, feeling needed, and so on. Similar to those people who may become depressed but never commit suicide, there is an attachment to life beyond the individual, something they need to do for others that is larger, bigger, and more significant than their own feelings. Therefore, if the person has lost a spouse, there is no specific person or thing that requires them to remain on earth—when the going gets tough, it is easier to go. Another may be a lifelong attitude that things will get better, the idea of hope as opposed to hopelessness, that the future is better than the present, and so on. Research has proven through time that this sort of thinking process keeps people going through all sorts of adverse situations. It may also be the idea that you just go with the flow, that things happen and you move through it, without getting upset, without the question of "why is this happening to me." People seem to move through problematic situations and crisis better if they realize that it is what it is and you move through it to get to the other side. People who feel as if they are being specifically picked on obviously create a self-fulfilling prophecy and thus draw problems to them to an even greater extent. My parents have a saying, "this too shall pass," which seems to sustain them through all of the events that have beset their lives as they attempt to age gracefully and fight the onslaught of long-term medical conditions.

If you knew that you would be okay in the end, would you be upset in the middle of the crisis or worried?

So how do we age gracefully? We have a reason to exist and we are peaceful in our life; we have coherence.

So how did my mother weather this storm? My mother has always been an active woman, doing many things. People who meet her typically remark that she is “one smart woman.”

At the age of 36 years, my mother, who had three children (the last child had just entered kindergarten), went back to college to obtain her teaching degree. It took her four years to complete the last two years of college and to complete the necessary courses for teacher certification, graduating at the age of 40. She then spent the next 16 years as an excellent elementary school teacher and she still maintains those friendships formed during her teaching years. My early childhood (as the last child who was in kindergarten) was spent in the woods picking flora for a botany class and going to the library for various papers. (It is no wonder that my favorite place, when I was in junior high and high school, was the Detroit main library.). My mother thinks she may have had ADD, that school was harder for her and that she simply learned to study harder and to work harder. So how did she age?

Retirement did not last long and soon she was leading a group of women and doing an aerobics class for a number of years. Everyone graduated into yoga and pilates and so did my mother. She has remained active in a book club, bridge group, lunch dates, maintaining many friendships, and meeting with women on a regular basis. At the age of 82, she traveled by herself to meet me in New York. She brought one small suitcase (for three days) that she took on the plane. While in New York, she managed to research the plays and took me to probably the most risqué play on Broadway at the time (we were sitting in the third row as the men on stage doffed their clothes). My mother has always been very avant-garde, with the latest styles and fashions. My mother maintains that her organization is what helps her today with graceful aging. I maintain that it is her determination to remain healthy, active, and mentally intact. She recently started the brain training program and loves it, as well as beginning a functional medicine program to address her memory concerns.

The following are the helpful hints from my mother that help her remain cognizant at the age of 84 years:

- She works on remaining organized.
- She talks to herself.
- She never gives up.
- She exercises regularly: exercise, exercise, and exercise.
- She joins different groups and does not sit home alone.
- She has a sense of humor and remembers to laugh.
- She laughs at herself and avoids being critical.
- She rides a bike.
- She goes to movies and plays.
- She joins political groups.
- She joins social groups—going with people her own age.
- She reads many different books.
- She keeps up on all the electronics.
- She keeps up on the news and what is going on in the world from different types of newspapers.

- And, most important, she learned how to use a computer and e-mails everyone daily as well as researching the latest recipe, medication, and so on.

It is common knowledge that the following groups are more susceptible to aging difficulties or less-than-graceful aging:

- Divorced men and women
- Men and women without children
- Individuals with a tendency toward negative thinking

Men who have lost a spouse (men were found to have less of a support group than women and to reach out for help and support less often)

We all know that stress alone can create heart disease and certainly exacerbates numerous other disorders, thus this follows the same principle. Stress does not help graceful aging.

WHAT ARE THE SYMPTOMS OF STRESS?

- Feeling overwhelmed
- Too much to do and no time to do it
- Increased distractibility
- Easily frustrated—short fuse
- More tired, energy loss

MEMORY PROBLEMS ARE THE FIRST INDICATION OF DEMENTIA AND LESS-THAN-GRACEFUL AGING: SIGNS TO LOOK FOR:

- More rigid thinking
- Retention of fewer facts in day-to-day life: who they talked to, things to remember, appointments, things to do, who to call, and who said what

If you are questioning the memory of your loved one or yourself, ask the following questions:

- Is there a difficulty remembering things that someone has recently told you?
- Do you forget places where you have been?
- Do you forget the things that you need to do?
- Do you forget where you have placed something just that day or even an hour ago?
- Do you keep getting lost, even if it is the same route to the same place that you have been going to for years and years?
- Do you find yourself forgetting what you wanted to say?
- Do you just think about things, becoming upset, unable to take action to change things?
- Do you find yourself forgetting names of people you have known for years?
- Is it hard to learn new things?
- Do you make the same mistakes? Over and over?
- Do you continually ask for directions to be repeated?

Day-to-Day Memory Issues

- Is it hard for you to make a decision?
- Do you have difficulty taking action?
- Do you lose keys, checkbook, etc.?

Detecting cognitive or thinking changes, the importance of the Sundowning syndrome:

- Realization that memory deficits may not appear until the sun goes down
- This means that people tend to look better at the beginning of the day and worse at the end
- Do not assume that someone is fine if you are only seeing them during the day-time hours.

BEHAVIORAL SIGNS OF DEMENTIA

- Increased agitation: little things become more upsetting.
- Fewer social activities: they go out less and make more excuses to stay home.
- Increased suspiciousness: accusations of taking their things.
- Wandering
- Social disinhibition

EMOTIONAL/PSYCHIATRIC SIGNS OF DEMENTIA

- Personality changes
- Depression
- Paranoid ideas
- Hallucinations
- Misidentifications
- Mania

CLUES THAT DEMENTIA MAY BE DEVELOPING

- You find yourself repeating your sentences.
- Your memory seems worse as you forget things on a day-to-day basis.
- You forget what someone has just told you.
- You find yourself disoriented, lost in familiar places, confused in your directionality, and where you are, in terms of location.
- You have difficulty completing tasks you have done on a daily basis, such as cooking.
- Your decision-making skills are faltering, you are making decisions that are very different from how you would normally act.
- Assumptions are incorrect more often than not.
- You accuse others of taking your things, when you simply misplaced the item.
- There are rapid changes in your mood without rhyme or reason.
- Your conversations are more confused due to not understanding what someone is saying to you and/or losing the words to accurately communicate your thoughts and feelings.
- To avoid the memory issues and/or becoming lost, you restrict your social involvement and go out less.
- Sometimes you become so confused that you cannot separate out what happened in the past versus the present time.
- There is a decreased awareness of time; your ability to account for the time spent in your day is becoming more difficult.
- You are less organized.
- Routine activities are forgotten: the weekly bingo game is missed.

- Getting lost going to the grocery store: getting lost while en route to familiar places.
- New situations become frightening and are avoided.
- Conversations are more difficult: others do not understand what you are trying to say to them as you lose your words and eventually your thoughts.
- Former/old personalities appear, decreased inhibition.
- Increased distractibility, appearing "drifty," and less aware of surroundings.
- Poor social skills: unable to take the perspective of other persons.
- Cognitive or thinking rigidity: cannot shift from an initial thought or idea.

Memory loss can occur with so many disorders; however, it may be the primary symptom for the following:

- Sleep apnea
- Alzheimer's dementia
- Cardiovascular dementia
- Certain medications
- Vitamin B deficiency
- Poor diet, low blood sugar
- Thyroid problems

SYMPTOMS TO WATCH FOR WITH SLEEP APNEA

- Excessive daytime sleepiness, general fatigue
- Males more than females, middle age and older, overweight
- Loud snoring
- Duration of apnea: desaturation and impact upon the heart: tachycardia versus bradycardia
- Awakening, once asleep
- Decreased rapid eye movement (REM) sleep, sleep is no longer refreshing
- Gasping or choking episodes during sleep
- Excessive daytime sleepiness (drowsy when driving)
- Personality changes or cognitive difficulties related to memory problems
- Neuropsychological evaluation reveals memory deficits and frontal deficits.

ALZHEIMER'S DEMENTIA

- Affecting larger percentage of individuals over age 65 years
- Number of people diagnosed is doubling every five years
- Age 60: incidence of 1%
- Age 85: rises to over 40%

Alzheimer's Dementia: End Stage of Any Brain Trauma

- Family history/genetic
- APOE-4 allele
- Down syndrome
- Traumatic brain injury
- Female, lower education and occupation
- Hypertension in midlife
- Depression
- Fragile persona/avoidant reclusive personality
- Toxicity, medication interactions

Thinking Problems Typically Seen When There is Alzheimer's Dementia:

- Misplaced objects, cannot find anything or remember where it is.
- Short-term memory loss (as one of first signs) lack of recall of anything immediately after it is said.
- No recall of conversations
- An inability to learn anything new due to total lack of recall; memory loss severe in beginning stages for new information.
- Remote memory is intact, recall of former years, although initially affected by intermediate stage.
- Memory loss is severe: retrieval and recognition (cannot recall the information or recognize it)
- Visuospatial functioning is immediately affected similar to memory (lost in the familiar department store of 20 year ago)
- Impact of spatial problems results in loss of route to store; unable to trace one's steps, even in the home; loss of sense of direction; everything looks different.

Consideration of Residential Placement Signaling Later Stages, When the Following Is Present, Negating Everyday Living and Self-Care Skills:

- Inability to effectively use the telephone (looking up numbers, dialing, and speaking coherently).
- Inability to go grocery shopping (without getting lost or disoriented in the store and/or forgetting items and/or unable to shop at all due to overall confusion).
- Inability to prepare meals (danger of leaving stove on, burning meals, and recall of ingredients).
- Inability to perform basic housekeeping (completing simple tasks of cleaning and day-to-day upkeep without becoming disoriented and confused).
- Inability to complete laundry (completion of small loads without confusion and loss of step-by-step procedure).
- Inability to drive and/or to maneuver independently around surrounding geographical area.
- Inability to manage own medication use (correct dosage and time).
- Inability to handle own finances (paying of bills and handling of money).

CARDIOVASCULAR DEMENTIA

- Third leading cause of death
- Primary factor for disability
- Affects 700,000 persons yearly: two-thirds survive
- Slow erosion: women equal to men
- Genetic factors versus modifiable risk factors

Modifiable Risk Factors

- Smoking, poor diet, nutrition, and weight
- Alcohol abuse: recent research reveals consumption of three or more drinks per day for three to four days a week was significantly associated with risk for future ischemic stroke
- Lack of exercise
- High blood pressure/stress

Genetic Factors

- Age
- Diabetes
- Family history

Symptoms often seen when there is cardiovascular dementia:

- Memory is confused, accompanied by losses of information as well as intrusions (information not relevant or part of the conversation) the person recalls information however it is incorrect, altered and distorted
- Continually distracted by the irrelevant (information that is not relevant or germane to the issue).
- Constant interference of taking in too much information from the environment; the continual interference of excess stimuli
- The tendency to shift from one task to another without completing any of the tasks.
- Problems in completing a task within a specific period of time.
- Easily losing concentration upon a thought or topic.
- The tendency to interrupt others and to blurt out statements or answers to the question before someone is finished speaking.
- Perseveration (getting stuck on one issue).
- Recalling information is easier than recognizing it due to the confusion
- Early deficits: problems with new learning, confusion in learning any new information, difficulty with instruction on how to work a piece of machinery, a kitchen appliance.
- Difficulty planning, organizing (the paper piles, the day, the conversation, the project that needs to be completed)
- Difficulty making decisions (spending the whole day in pajamas due to continual distractions).
- The tendency to make decisions too quickly and impulsively.
- Inappropriate behavior and judgment, especially socially (saying the wrong thing, interrupting with a statement that makes no sense or is not part of the conversation, doing something that is clearly inappropriate and atypical behavior).
- Loss of inhibition, affects social skills (saying and doing the wrong things at the wrong time) doing things impulsively or saying things without regard for the effect upon others, if aggressive in life can become more aggressive, if aggressiveness part of the past-it now returns.
- Former Type A, Alcoholic personality, that has mellowed through the years, returns
- Loss of the connection or recall of a "personal past" that historically defined who you, your values and beliefs
- Loss of plans for the future based upon your specific value system
- Loss of a sense of self

DAY-TO-DAY SYMPTOMS COMMONLY SEEN FOR BOTH ALZHEIMER'S AND CARDIOVASCULAR DEMENTIA:

- You may have a difficult time learning any novel sequence of action. This could range from learning how to work a coffee pot to traveling from one place to another.

- You may have difficulty recalling any conversation from one minute to the next.
- Dependency upon past learning due to problems learning or using new information
- Tendency to get stuck in the past
- Any type of complex action will become difficult if you have not completed it in the past to the point that it has become over-learned and routine.
- You may forget to turn items off, such as the stove or coffee pot, you may forget a turn, if walking or driving.
- You may skip a step in the completion of any task (such as cooking) and not be able to recall whether you completed that step or you did not.
- Information will tend to become confused due to the inability to store and compartmentalize the information in an accurate manner.
- Problems in planning for events, thinking about the future, and predicting what could occur.
- Difficulty in doing things in the correct stepwise order.
- Inability to verbally describe the exact steps necessary to complete a task.
- Greater difficulties recalling day-to-day information; relying more upon notes to recall appointments; and forgetting where you have left things, events that occurred the day prior—but you still recall some small fact from many years ago.
- Forgetting faces of people or the names of people whom you have known for many years.
- Difficulty finding the right word to express a thought or to complete a sentence.
- While searching for the correct word to describe what you want to say, you lose the entire thought that you wanted to communicate in the first place.
- Problems with drawing or copying designs.
- Not aware of time, poor time management, the picture of time sequentially and as a whole, how events fit into the big picture
- Difficulty anticipating consequence of one's actions due to both memory recall and understanding of the big picture

PRIMARY SIGNS OF LEWY BODY DEMENTIA:

- Initial signs involve the frontal and parietal brain areas.
- May be the pre-cursor to Parkinson's disease
- Mental illness, psychosis is immediately evident
- Visual spatial, visual perceptual, visuocstructional problems

COMMONLY SEEN SYMPTOMS OF LEWY BODY DEMENTIA:

- Feeling paranoid; thinking that everyone is talking about you; they are out to get you; accusing those close to you of taking things; ascribing characteristics that would not be typically descriptive of that person
- Going out less due to feeling uncomfortable in social situations, not liking crowds of people.
- Feeling restless and agitated; unable to feel comfortable anywhere.
- Feeling very different from everyone around you as if you have different feelings; thoughts, moods, attitudes; opinions, and beliefs.
- Crazy thoughts dominate your thinking accompanied by unpredictable behavior.

- Having more fantasies during the day; not always able to separate fantasy from reality
- Emotional fragileness, like you cannot handle one more thing in your life, like things are just "too much."
- Deep depression: feeling as if nothing matters anymore, not caring about anyone or anything.

Depression and the following symptoms increase and are more resistant to treatment. It is harder to change the "crooked thinking" or the thoughts contributing to the depression:

- Loss of pleasure
- Punishment feelings
- Self-criticalness
- Agitation
- Indecisiveness
- Worthlessness
- Change in sleeping patterns
- Irritability
- Tiredness or fatigue
- Going to church more; feeling empowered by God; doing things because "God told you to" not able to separate religious thoughts from reality.
- Visual hallucinations, seeing things that are not there
- Problems seeing the whole picture of things; drawing and copying of designs are distorted and in pieces
- Visual perception distorted; may affect balance and driving
- Difficulty adding or calculating numbers
- Increased impulsivity
- Problems of word retrieval
- Difficulty learning something new that has steps to it
- Problem monitoring and adjusting behavior to fit the situation or environment
- Regulation of attention and inattention factors, continuous distractibility; irrelevant thoughts and impulsive actions.
- Illogical thinking, difficulty ascertaining the emotional relevance of things or events
- Taking things out of context in conversation; misinterpretation occurs frequently
- Increased emotional lability and reactivity
- Increased compulsivity
- Increase in rigid thinking; decreased mental flexibility
- Limited problem solving and creative thinking creating a loss of what to do when things do not work out as planned.
- Distracted by every noise and sound in the external environment and the continual internal thoughts of a brain that is too busy.
- Word retrieval hampers communication and coherent expression of thoughts and feelings
- Difficulty remaining on topic in conversation

EMOTIONAL SYMPTOMS THAT CAN ACCOMPANY ANY FORM OF DEMENTIA

- Easily frustrated and upset.
- Feeling restless and agitated; everything bothers you.

- Feeling so distracted during the day that you forgot what you were doing or what your original goals were.
- Difficulty waiting for your turn or waiting for anything.
- Not feeling satisfied with anything in your life; sometimes you care and sometimes you do not.
- Feeling more quiet and introverted, want to be by yourself; having more private conversations; talking to people less and less.
- Wanting to go out and be with people less and less
- Anxiety or nervousness; feeling fearful, thinking everyone is out to get you, not feeling safe.
- Difficulty falling asleep or getting to sleep.
- Feeling sad or depressed; thinking negatively and that nothing is good,
- the future looks grim.
- Thinking about death or what it would be like to no longer live your life.
- Preoccupation with the small things; making small things into big things

Change in personality, emotional problems, psychiatric symptoms can occur with a number of disorders within the aged population, however may be the primary symptom for the following:

- Dementia involving strictly the frontal lobe (Pick's disease and Creutzfeldt-Jacob)
- Dementia involving the parietal and frontal lobe (Lewy body dementia)
- Dementia specifically involving the temporal and frontal lobe (cardiovascular and traumatic head injury)

Your personality may become different; your values may change, you may revert to an old personality from the past that you worked hard to change:

- Increased impulsivity
- Saying things without thinking or awareness of hurting someone's feelings.
- Feeling like you are the center of your world, like the world owes you a favor; everyone should cater to your needs; you come first, and no one else matters.
- Feeling like you can do anything that you want; not caring about rules, no longer concerned about the "appropriateness of the situation" or what people may think
- Decreased empathy: difficulty appreciating the feelings of others, being able to stand in their shoes, and feel how they might be feeling.
- Nothing bothers you, as the people around you become more and more upset and unhappy and you cannot understand why.
- Getting mad if anyone wants something from you.
- You may think in terms of black versus white and be very rigid in your thoughts; which no one can change no matter how much new information they present
- Tendency to argue over anything, need to be right much of the time.
- Feeling highly stressed, like you cannot handle one more thing in your life, like things are just "too much."
- Feeling as if nothing matters anymore, not caring about anyone or anything.
- Feeling like you have no friends, you feel lonely at times, and sometimes it does not matter.
- Acting in a more immature manner; thinking or acting like a kid—doing inappropriate things in public like belching, poor table manners.

- Disliking your job, being afraid of being fired or laid off, and feeling bored on the job, no idea what type of job that you would like better.
- Problems with finances; not being able to budget money; spending money on anything that you want even if you do not need it.
- Feeling abandoned by God; no longer believing in religion; the presence of a higher power, or being larger than yourself.
- Not being able to relax, having little enjoyment in life; not able to enjoy hobbies or activities that you used to love; and not having any interest in things.

COGNITIVE OR THINKING SYMPTOMS THAT CAN ACCOMPANY ANY FORM OR DEMENTIA:

- You are not always able to benefit from new learning, to utilize feedback to continually reassess, monitor, and adjust your own behavior for accurate learning to occur. So it is difficult to learn from your mistakes.
- Difficulty in continually prioritizing attention, the regulation of attention and intention factors, and rendering you subject to the continuous distractibility of irrelevant thoughts and impulsive actions. You cannot determine what you want to do first and stick with that.
- Problems determining the emotional relevance assigned to various thoughts or events, (making things too big or too small) which can create illogical thinking and periodic statements that often do not make sense, or are out of context to the conversation.
- Diminished ability to modulate and control internal drive states, increasing emotional lability and reactivity, which leaves you not in control of the impulses that emerge internally. Therefore, you become bound to one thing, obsessed, and overly preoccupied with objects, thoughts, or events that have occurred and/or compulsively driven to act, without thinking of the result of your actions. Your actions may seem to occur without rhyme or reason.
- Problems integrating events into a whole perspective to correctly interpret events occurring in your environment, which can leave you confused and socially naive.
- Difficulty remaining flexible in your thinking, the tendency to become stuck, perseverative, hopelessly entwined, and preoccupied with specific thoughts, literally unable to shift your focus. You may think and rethink about specific topics, erase and re-erase, do and re-do tasks over and over, which obviously minimizes or negates any goal attainment or task completion.
- Diminished ability to perceive things over time, unable to assess or to comprehend your own behavior over time. This makes it difficult to recall and use the history of events to understand why people are getting so frustrated and angry with you.
- Problem solving and creative thinking become severely limited by rigid thinking patterns hampering the ability to generate alternative solutions when things do not work out as planned.
- Remaining so distracted that you cannot hold a thought for long, your mind is continually moving to something else before you finish your sentence. You cannot sustain attention long enough to hear what someone else has to say, your brain is too busy.
- Expressing your feelings and thoughts becomes difficult due to word retrieval, while attempting to find the word you totally forget what you wanted to say.

THE SECRET TO GRACEFUL AGING: KEEPING YOUR BRAIN ALIVE AND WELL

- Reduce stress
- Increase exercise
- Increase social activities participate in group activities
- Let things go, don't be bothered by the little problems that occur day to day
- Eat healthy
- Use vitamins and medicines wisely (have medications analyzed for contraindications)
- Participate in cognitive therapy
- Use your brain every day, force yourself to think (crossword puzzles, card games, walking backwards, learn a new word each day)

How to Help Your Loved One Age Gracefully? Tips for Caregivers:

- Structure and routine is best—plan the days.
- Engage in pleasant activities
- Keep physical surroundings pleasant, bright colors, sunny, airy environment
- Keep things simple—do not provide choices.
- Redirect if agitated, distract the conversation to another topic.
- Be flexible because your loved one is not.
- Learn to disregard comments made, understand that things are said and not meant.
- As a caregiver you need to make sure that you maintain your own care- do not give or offer to do something that you truly do not want to do, do not give when it is too “expensive” to give (if you give beyond what you can afford, no one can thank you or recognize you enough for your gift because it is too much of a loss for you).
- Make doctor appointments when you have lots of time to do it and use it as social time to visit with your loved one, plan nothing else for the day and help them get their errands done.
- Set one specific day each week to go to doctor appointments or shopping or run errands or help in the house
- Reassure that all will be fine and do not pick up their worries.
- Learn about your own history, the aged love to talk about the past and their stories are wonderful, learn the things they never would have told you in the past.
- Let your parent or loved one go as the adult in your life.
- Make it a point to preserve the image of your parent or loved one in your mind so that they maintain their dignity.
- Develop your own growth as you emerge from being a child to the caretaker of your parent or loved one.

Things you do not have to do as the caregiver which may ease your feeling of “being burdened”:

- You do not have to give baths or do personal things that will change your parent-child relationship or the memory of it. Hire people to come in to do the “very personal” things for your parent.
- Do not let your parent skimp on things because they need to save money if this is not the case.

- When you want your parent or loved one to engage in an activity that you think will be positive for them, just go. Avoid engaging in a big discussion, just go to the bingo game, the senior center, the group activity, if it does not work out then leave.
- Let your children remember their grandparent as they know them—do they really have to go to the nursing home?
- Separate what you can and cannot do for your parent, keeping the goal in mind that you have completed your role adequately as their child

GOOD SLEEP HABITS

- Regular relaxing routine to unwind at night just before bedtime
- Take a walk at dusk to stay up later if you fall asleep too early and then wake up in the middle of the night
- If you wake up at night, watch the clock and cannot get back to sleep after waking up to go to the bathroom, stay up and leave the bedroom to do something relaxing until you are tired again
- Avoid all products containing caffeine (soda and chocolate) later in the day and evening.
- Avoid smoking and smokeless tobacco.
- Avoid use of alcohol.
- Try to avoid falling asleep while watching television or the movie you wanted to see.
- Establish regular exercise, sleep and diet routine.
- Avoid long naps—limit your naps to 30 minutes or so.

If you have insomnia, consult your local behavioral sleep medicine expert for a program of cognitive behavioral therapy that actually works!

AGING FACTS

- Reading rate stays the same during the aging process.
- There is a slowing in the processing of information with age.
- Memory and cognitive changes or decline really does not occur until the late 80s or 90s in the normal aging process.

NUTRITION

There are many avenues being pursued in terms of nutrition and functional medicine. Consult your local expert in nutrition or functional medicine for a natural method to make aging graceful.

COGNITIVE THERAPIES: KEEP YOUR BRAIN ALIVE WITH USE: INTERACTIVE METRONOME TRAINING-BRAIN TRAINING

- Improved memory.
- Increased focus and attention to task.
- Motivation increased.
- Improved self-esteem.

- Decreased anger.
- Calmer disposition.
- Decreased symptoms of depression.
- Increased sense of well-being.
- Increased overall arousal and alertness—more energy.

TAKE HOME MESSAGE

- The goal is to age as gracefully as you can, to enjoy life—and to be happy

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Menopause, Amino Acids, Nutritional, and Neurotransmitter Influences on ADD/ADHD

Pamela W. Smith

Board of the American Academy of Anti-Aging Physicians, The Center for Healthy Living and Longevity, and American Academy of Anti-Aging and Functional Medicine Fellowship, Gross Point Farm, Michigan, U.S.A.

Menopause is defined as no menstrual cycle for 12 months. Symptoms, however, can begin as long as 15 years prior to menopause. This time is called perimenopause. As a woman approaches menopause she frequently notices that her ability to recall events starts to decline. She may have difficulty remembering names, lost objects, and phone numbers. These are a normal occurrence as the sex hormone levels in the body start to become imbalanced and eventually decrease.

Perimenopause (the time immediately before menopause) and menopause are chapters of a woman's life when she will also notice that her symptoms of attention deficit disorders/attention deficit hyperactivity disorder (ADD/ADHD) may escalate or if they were not noticed before may now become obvious. Warga in her book entitled, *Menopause and the Mind*, describes some of the common symptoms (1):

Thinking Changes:

- Losing train of thought
- Forgetting what one came into a room to get
- Not being able to concentrate as well upon demand
- Feeling foggy, hazy, and cotton-headed
- Experiencing a thought blockade: an inability to pull ideas out at will
- Fluctuating agility in prioritizing

Speech Changes:

- Naming difficulties for long-known names: children, best friends
- Finding a loss for words in how to express something while speaking
- Experiencing, "Its on the tip of my tongue" sensation
- Saying wrong words that are related somehow to the intended one
- Reversing whole words while speaking
- Reversing the first letters of words while speaking
- Relying on "file" words more often, e.g., "whatchamacallit"
- Organizing sentences and ideas less efficiently while speaking

Changes in Attention:

- Listening but not always attending to a conversation
- Blanking-out amnesia for what was just done
- Experiencing increased distractibility

Memory Changes (Short and Long Term):

- Forgetting what was done or past occurrences
- Changing certainty in how words should be spelled
- Fluctuating agility in calculating
- Experiencing changes in the speed and accuracy of memory retrieval
- Forgetting the content of a movie right after seeing

Behavioral Changes:

- Behavior changes, e.g., putting the shampoo in the refrigerator
- Forgetting briefly how to do things long known
- Feeling that automatic skills are not automatic, e.g., driving
- Dropping things more often that require fine coordination
- Leaving out or reversing letters in words while writing
- Forgetting how to write a word in the middle of writing
- Not handling stress as well

Spatial Skills Changes:

- Changing skill in remembering and/or recognizing faces
- Looking and not seeing what you are looking for when it is obvious
- Changing reading skill in seeing and comprehending
- Forgetting how to get to well-known landmarks
- Experiencing familiar locales as momentarily unfamiliar

Altered Sense of Time:

- Forgetting appointments more
- Not anticipating events of personal importance with the same accuracy
- Forgetting important events in one's history

Why does focus and cognition change at menopause for many women? The answer is due to a change in sex hormones. They can alter at other times in life also, for example, after childbirth. Hormones that are most greatly affected at menopause are estrogen, progesterone, testosterone, Dehydroepiandrosterone (DHEA), cortisol, and pregnenolone. All of these affect cognition. Sex hormones also have relationships with other hormones such as thyroid hormone. An alteration in thyroid function can change a women's ability to focus and recall as well.

ESTROGEN AND THE BRAIN

Estrogen contributes to 400 crucial functions in the body. Many of them have protective affects on the brain (1). Estrogen has the following affects on focus and memory (2–29):

- Increases blood flow
- Increases glucose and oxygen to the neurons
- Regulates membrane channels
- Keeps the blood-brain barrier working
- Protects neurons
- Decreases the seizure threshold
- Affects gene expression
- Increases serotonin's effect (calming neurotransmitter)

- Boosts by 30% NMDA receptors in the hippocampus (part of the brain involved in creating long-term memories and learning)
- Increases norepinephrine effect
- Increases dopamine
- Decreases dopamine receptor sensitivity
- Increases the production of choline acetyltransferase needed for the production of acetylcholine, the brain's main neurotransmitter for memory
- Increases Gamma-aminobutyric acid (calming neurotransmitter)
- Increases verbal fluency
- Affects brain development and aging
- Increases sensitivity to nerve growth factor which stimulates the growth of dendrites and axons in the brain
- Improves the function of neurons
- Decreases neuronal generation of Alzheimer's beta amyloid peptides (decreases the risk of developing Alzheimer's disease)
- Reduces inflammation
- Decreases the toxicity of excitotoxins such as glutamate
- Acts as a natural antioxidant
- Increases dexterity and agility
- Helps with hearing, smell, vision, and fine touch
- Increases short-term memory
- Decreases distractibility

Estrogen, therefore, has an effect on many of the neurotransmitters in the brain. The neurotransmitters help the brain cells to communicate. Neurotransmitters regulate memory, thirst, sexual interest, pain, weight, appetite, muscle growth and repair, sleep, and mood. Estrogen also reacts with receptors in the brain to modulate serotonin, which is another neurotransmitter. A rapid change in estrogen levels can lead to a decrease in serotonin levels, which can cause depression.

Several clinical trails have also revealed that estrogen helps maintain memory:

- Estrogen use in postmenopausal women may delay the beginning and decrease the risk of developing Alzheimer's disease (27,30).
- Women on estrogen are less than half as likely to get Alzheimer's disease than women who do not take estrogen (31,32).
- A Stanford University study showed that name recall was better in women who took estrogen (14).
- McGill University in Canada also found that women taking estrogen had better verbal memory than women not taking hormone replacement therapy (33).
- A recent study conducted on 1889 older women in Utah revealed that women who had taken hormone replacement therapy were 40% less likely to develop Alzheimer's disease. Furthermore, the longer they were on hormone replacement the lower was their risk (34).

In short, estrogen helps maintain memory in postmenopausal women. Estrogen is the "transmission fluid" of the brain. It does matter, however, what kind of estrogen is used as estrogen replacement. A women's body makes three different kinds of estrogens:

- E1-called estrone
- E2-called estradiol
- E3-called estriol

ESTRONE

Estrone (E1) is the main estrogen the body makes postmenopausally. High levels stimulate breast and uterine tissue and many researchers believe E1 may be related to an increased risk of breast and uterine cancer (35).

Before menopause, E1 is made by the ovaries, adrenal glands, liver, and fat cells and is converted into estradiol (E2) in the ovaries. Postmenopausally, little E1 becomes estradiol since the ovaries are no longer working. E1, later in life is made in the fat cells and to a lesser extent in the liver and adrenal glands. Therefore, the more body fat a woman has the more E1 she makes and the higher her risk of breast cancer. Also, routine alcohol consumption decreases ovarian hormone levels and shifts the estrogen to E1.

ESTRADIOL

Estradiol (E2) is the strongest of the three estrogens. It is the main estrogen the body produces before menopause. High levels of E2 are associated with an increased risk of breast and uterine cancer. E2 is responsible for most of the 400 functions of estrogen. It is the estrogen that greatly declines at menopause, although most women make some E2 up to the age of 80 (36).

ESTRIOL

Estriol (E3) has a lower stimulating effect on the breast and uterine lining than E1 or E2. E3 has been shown not to promote breast cancer and considerable evidence exists to show that it protects against it (37,38). E3 blocks E1 by occupying the estrogen receptor sites on the breast. Asian and vegetarian women have high levels of E3 and much lower rates of breast cancer (39). E3 does not provide the bone, heart, or brain protection of E2, however (40).

Consequently, E2 and E3 estrogens are the ones that should be prescribed when taking hormone replacement therapy. Together they are known as bi-est, which is a natural hormone replacement. E3 estrogen is not patentable and consequently drug companies do not make it. E3 is a prescription made by a compounding pharmacy specific to each patient's needs. One size does not fit all. The dose is customized for each individual person. This is called bio-identical or natural hormone replacement, which is the same chemical structure that a woman's body makes. Clinicians who specialize in this field are called antiaging physicians and they have completed a two-year fellowship. For a more in-depth look at this subject, read my book entitled HRT: The Answers (41).

PROGESTERONE

Progesterone has many functions in the body. Some of them affect focus and cognition. Without progesterone, a woman may have symptoms of insomnia, anxiety, mood swings, irritability, and depression. All of these can affect her ability to focus. It is important that progesterone be replaced as prescription bio-identical progesterone. It, unlike progestin (synthetic progesterone), helps to resolve the symptoms of progesterone loss. Progestins can make the symptoms worse and have been linked to an increased risk of heart disease (42). Frequently, women lose progesterone before estrogen begins to decline.

TESTOSTERONE

Testosterone also has many functions in the body and some of them are involved with focus and memory. Testosterone helps to maintain a woman's sense of emotional well-being, self-confidence, and motivation, all of which are needed for focus (43). Testosterone also helps maintain memory (44). New research shows that in order for testosterone to work optimally, E2 (estrogen) must also be optimized. Without enough estrogen, testosterone cannot attach to the receptors in the brain (45). Like the other hormones mentioned above, it is critical that testosterone replacement be with bio-identical testosterone. Synthetic testosterone has been linked to an increase in liver cancer (46).

DEHYDROEPIANDROSTERONE

DHEA is a hormone that is made in the adrenal glands of the body. A small amount is also made in the brain and skin. DHEA production declines with age, however, DHEA levels can be low at any age. Stress and cigarette smoking can also lower DHEA production (47). DHEA is responsible for making the other sex hormones. Consequently, if a woman's DHEA level is low it can affect memory and focus.

CORTISOL

Cortisol is the only hormone in the body that increases with age and like DHEA is made in the adrenal glands. Cortisol elevates to help the body deal with stress. However, cortisol levels should decline right after a stressful event. If cortisol remains elevated then many symptoms can occur, including sleep disturbances, confusion and memory changes, and inability to concentrate (48). Elevated cortisol levels cause the dendrites in the brain to shrivel up, which can decrease focus and memory. This effect can occur after only two weeks of stress (49). Dendrites can regenerate when the cortisol levels go back to normal. Furthermore, if cortisol levels remain high then thyroid hormone becomes more bound and less active (50). This also leads to cognitive changes. Decreased estrogen levels are themselves a stressor to the body and can raise cortisol levels. Likewise, if cortisol levels are increased, it decreases the body's ability for making progesterone. Cortisol competes with progesterone for common receptors (36).

When the adrenal glands are in a state of "emergency" because they have been stimulated for a long time, they can weaken or "burn out." This is called adrenal fatigue and cortisol levels plummet. Sugar, coffee, and soft drinks are then commonly used as a source of energy. They only make the situation worse. At this stage it is very hard to focus and cognitive abilities decline.

PREGNENOLONE

Pregnenolone is the precursor (makes) to DHEA, progesterone, estrogen, testosterone, and cortisol. At age 75, most people have a 65% decline in pregnenolone compared to age 35 (51). Pregnenolone enhances nerve transmission. It also improves energy both physically and mentally and increases resistance to stress. Pregnenolone is the main hormone of memory in the body.

THYROID HORMONE

It is common for thyroid problems to begin to appear at menopause. The ovaries have thyroid receptors. Your thyroid gland has ovarian receptors. Therefore, the loss of E2, progesterone, and testosterone from the ovaries that occurs at menopause can change the thyroid status of the body.

An imbalance of the thyroid hormone can affect every metabolic function in the body. The thyroid gland is the body regulator. It regulates energy and heat production, growth, tissue repair and development, and stimulates protein synthesis. Furthermore, thyroid hormone modulates carbohydrates, protein and fat metabolism, vitamin uses, digestion, function of the mitochondria (energy makers of the cells), muscle and nerve action, blood flow, hormone excretion, oxygen utilization, and sexual function. Thyroid hormone is also needed to maintain memory and to keep the body's concentration and focus sharp.

- Thyroid stimulating hormone is made in the pituitary gland located in the brain.
- T4 is made in the thyroid gland and is called thyroxine.
- T3 is made in other tissues and is called triiodothyronine.

The body produces both T4 and T3. If the body's thyroid function is low, it is important to replace both T3 and T4. If the T4 pathway only is replaced then symptoms of low thyroid function may still be present. Clinical trials have shown that replacing both T3 and T4 to be more effective than replacing T4 alone. One study revealed that 35% of people on T4 and T3 replacement scored better on mental agility tests. Sixty-seven percent of these people studied stated they had an improvement in mood and physical health. Likewise, benefits have been shown by adding T3 for people already on T4. They have improved mood and brain function (52).

AMINO ACIDS AND ADD/ADHD

One of the symptoms of amino acid deficiency is ADD/ADHD. Amino acids are the building products of proteins and muscle. They comprise all of the body's enzymes and many of its peptides. Proteins are also one of the sources of energy in the body and promote repair of damaged tissue. Physicians can test patients for amino acid deficiency by using urine or blood tests. A compounded prescription for amino acids can then be written by a physician if the body is deficient in amino acid intake. Vitamin B6 is needed to help the body to metabolize amino acids. Amino acids are also used to treat ADD/ADHD even if the body is not deficient in some of them. L-carnitine, for example, has been successfully used to treat ADD/ADHD (53).

NUTRITION

This book covers many of the causes of ADD/ADHD. Besides amino acid deficiencies, diet, food allergies, high fever, brain injury, metal toxicities, Eicosapentaenoic acid/Docosahexaenoic acid (EPA/DHA) deficiencies (pre-natally), and zinc/copper imbalances also play a role, as does genetic history (54). One major environmental factor that modifies gene expression is the individual's nutritional status. Furthermore, nutritional deficiencies become more common with age.

Nutrition can improve performance on repetitive tasks and it can also expand academic skills even after menopause. The following are supplements, which have undergone clinical studies showing their effectiveness in treating ADD/ADHD. Dosages are for adults or children weighing over 100 pounds. Dosages are also for people with normal kidney and liver function. These nutrients have not been studied in pregnancy.

Supplements (54–64)

EPA/DHA	500–1000 mg
Magnesium	250–500 mg
L-carnitine	4000 mg
Zinc	25–50 mg
American ginseng	200 mg
Ginkgo	60 mg twice a day
St. John's wort	300–1200 mg (cannot take if on an antidepressant)
Phosphatidylserine	100–500 mg
Gamma linolenic acids	240–720 mg
B complex vitamins	50–100 mg
Selenium	100 µg
Boron	5–10 mg
Probiotics	
Vitamin B12	500–1000 µg
Folic acid	500–1000 µg
5-HTP	100–200 mg

DOPAMINE AND SEROTONIN IMBALANCES AND ADHD

Dopamine levels are reduced in the frontal brain of adults with ADHD (65). Also, genetic abnormalities related to dopamine transporter proteins have been reported in people with ADHD (66). Therefore, symptoms of ADD/ADHD may result from the body's depletion of dopamine. When dopamine is low in the body, receptors can become modified and proteins can change conformation. Dopamine receptor activity is also altered by the methylation of phospholipids. This may be the reason that folic acid has been found to be helpful in the treatment of ADD/ADHD. Folic acid is a cofactor in the production of tyrosine hydroxylase, which is the rate-limiting step in the synthesis of dopamine. Folic acid is also a cofactor in the making of tryptophan hydroxylase, which is the rate-limiting step in the synthesis of serotonin. Much of the current research on ADD/ADHD is centered on dopamine and serotonin imbalances since science now has the capability to measure these neurotransmitters.

CONCLUSION

The goal of this functional approach to ADD/ADHD is to not just treat the symptoms, but to look at the underlying physiological dysfunctions. As medicine moves in this century from a disease-based approach to a more patient-centered system that can address biochemical individuality to improve health and function, we discover and create more tools to treat ADD/ADHD.

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Maintaining Multiple Roles as Wife, Mother, Professional, Daughter, and Sibling: Is There Any Time Left?

Barbara C. Fisher

Brain Evaluation/United Psychological Services, Washington Township, Michigan, U.S.A.

G. Avci-Wolf

Avci Medical Center, Waterford Township, Michigan, U.S.A.

A woman needs the approval of her mother. Her mother believes that:

- the needs of the family take precedence,
- the woman is the primary caretaker,
- everyone in the family needs to be happy and it is the job of the woman to make sure that this happens, and
- the woman can only fulfill her own needs when everyone else primary in her life has been taken care of

WOMEN NEED THE APPROVAL OF THEIR MOTHER

Being a woman means that you are handed a role where multi-tasking is inherent. There is the need to maintain the role expectations of being a female, while attempting to develop and/or maintain a sense of self. While women like to believe that they are different from their mothers they struggle with the same historical issues. The struggle to be accepted remains paramount. It does not matter how powerful or how many accomplishments that woman attains; she still craves the approval of others. She still craves outside confirmation and recognition, and above all, the approval of her mother. Sometimes, the price of the mother's approval is the requirement of taking a step back in time to maintain the expected "traditional" female role of taking care of the home, children, and spouse. It is expected that the needs of the family are primary in her life and her own needs are secondary.

Agreement to this system has far-reaching consequences. It means that her career cannot take precedence. It means that she has to leave work or whatever activity she is involved in and go home to take care of the crisis involving her children, her spouse, or an extended family member. These values are so powerful and quietly pervasive that they have stood the test of time, the test of the women's rights movement, the test of world wars, and the changing of America. Consequently, there is only a small percentage of mothers who would not have passed down these values to their daughters.

Women who do not crave the approval of their mothers tend to be a small percentage of the population.

- This can occur when the woman has either formed a very close bond with her mother or she has no bond at all. If the bond with her mother is close, then she

may be supported and allowed to deviate from the norm in terms of not always putting the family first

- If the bond is based upon the same career identity and the daughter is fulfilling the mother's unmet dreams, then the family does not have to be first
- The close bond with the father has the potential to fill the gap left by unmet needs emanating from a mother–daughter relationship that is not close. Father-daughter bonds tend to be less intense if there is a close mother-daughter relationship

The Needs of the Family Take Precedence

The degree to which a mother has changed or altered her life to meet and accommodate the family, with the family taking precedence, sets the stage to form the demands the mother makes of her daughter. If the mother has given up career opportunities and is unhappy with her choice, the tendency is to demand (to an even greater degree) that the daughter change her life and follow in her mother's footsteps. This statement is based upon the general rule of cognitive dissonance. We cannot emotionally cope with two opposing thoughts. In this case, it would be the thought of the mother that she had made a mistake sacrificing her life; however, she cannot undo it at this point in time, so she is stuck. The opposing thoughts are that she made a mistake that she does not want to believe or acknowledge. The solution is to advocate for her daughter's decision to follow the same path, thus refuting her concern about having made a huge mistake. The more that we invest physically and emotionally in an idea, the more we are going to advocate for others to accept that idea.

The point is that in order to remain close to her mother, the daughter accepts the conflict that the mother had earlier questioned as the right decision to make. This system demands that her needs remain secondary to the system she supports. In other words, women are raised to be self-sacrificing—to give away their last ounce of breath, their last piece of bread, their last bit of money, their last bit of time. I have to confess, I would not be comfortable putting my needs before my child. My child's needs have always come first. As a mother recently told me, "If I had a child in trouble, I would strap him to my hip and take care of him until he recovered. I do not care how old he is."

The problem is that because of their history, women are more comfortable giving than receiving. My mother is forever reminding me, "I do not need any help." Therefore, if the child is sick and needs to stay home or to come home from school, the mother is expected (and feels more comfortable) being the parent to leave work and rush home to take care of the child. This occurs even if the woman is the primary money earner of the household.

This is the reason why au pairs and day care facilities have become so popular. These systems offer relief to the mother as an integral part of the family system. However, no matter how familiar the child is with the au pair, the family friend or how comfortable it is at day care, the mother is still seen as the designated parental figure. When the child cries and says, "I want my . . .," how often do you hear the word "father" as the child's request?

If the woman is unable to balance things with the work setting, which notoriously will come second, then various scenarios may follow:

- The woman works harder, staying longer at work to make up the time she has missed (however, when considered for promotions, this issue will arise, as problematic). No matter how much effort the woman expended to make up

for the lost time, when needed on the job, the criticism will still be that she cannot be counted on to be there 100 percent of the time, which is true.

- Promotions, job opportunities, or a higher-level position requiring more energy become issues when attempting to always balance the family against the job, with the family taking precedence
- The requirement that the family comes first naturally hinders the opportunity for job advancement and for increased self-esteem resulting from job accomplishments. Instead, all too often, rather than offering a place to bask in one's accomplishments and skill, the job becomes another battlefield, difficult to maintain, and adversarial to the family system.
- The woman is left to struggle in attempting to balance home and work, and the unforeseen problems that occur in both settings.

Unfortunately, too often the woman feels pulled; she cannot devote enough time to her job, to her family, to her children, or to her marriage—no one is happy with her. She is certainly not happy or content. The discontentment can become pervasive, leading to depression. A working mom seems to be forever tired. Too tired to spend time with the children. Too tired to spend time with her spouse or friends. Typically, by the time that she arrives home at the end of the day:

- She is too tired to make dinner
- She is too tired to help with homework
- She is too tired to make lunches for the next school day
- She is too tired to hear about everyone's day
- She is too tired to have fun
- The children pull on her
- Her husband pulls on her
- No one is happy

If there are children with special needs, their needs are even greater, demanding more time and energy that she does not have. Thus begins the succession of "all nighters" to catch up. Intermittent sleep deprivation becomes a permanent condition. Depression and distractibility eventually become part of the picture. Sex life diminishes. Exercise becomes a thing of the past. Laughter is rarely heard and life takes on the description of drudgery. Then, add menopause to the picture. Next, add stress from work, home, or finances. Factor in the developmental ages of the children and their needs (the younger they are, the more they need). Then, add attention deficit disorder/attention deficit hyperactivity disorder (ADD/ADHD) symptoms. Usually, at this point women are in a state of nutritional imbalance, suffering from the effects of stress upon their bodies. The fatigue they feel daily results from neurochemical changes related to prolonged stress, which exacerbates attention symptoms even further, as indicated by Dr. Smith in her chapter.

What is the answer? Maintain regular sleep hygiene. Get up at the same time and go to bed at the same time. Ask your husband if he can maintain the same schedule. Have the children sleep in their own beds. Set aside time to accomplish the tasks that you feel you need to complete when you arrive home.

Solicit agreement and support from your children and spouse primarily to ensure that their expectations of your arrival at home includes this time. In other words, the children do not greet you at the door to drag you to their side to help with homework unless homework time has been pre-arranged. Too often I find

that children become dependent on their parents to complete homework, waiting for them to arrive home to start work that they could have been doing hours prior. Homework by definition does not mean work with the parent; it is work for the child to complete at home based on the assumption that they have adequately learned the concepts covered in school. The purpose of "homework" is twofold: to ensure the child's understanding of the lesson that day as well as offering a review of the material and opportunity to cement the learned concept.

Set aside time to just walk in the door, relax, play, and laugh for a few moments with your family.

Do not multi-task when you arrive home. You have been doing this all day and likely will be too worn out at this point to perform well at any one of the jobs you attempt to do at the same time. Instead, remain focused on one job at a time. If you find the household too noisy or there are too many interruptions, strap on headphones and music "with a beat."

Refrain from altering the schedule that you have planned to impulsively be distracted by a task that is not on the agenda for that day. Unless it is an emergency or emotionally critical to one of the family members, operate in the manner you have planned, this makes you feel more in control of your life.

The Woman as the Primary Caretaker

One of the values passed down to women is the job of taking care of everyone. This specific job is assigned primary precedence status, meaning that women must take care of the household members or extended family prior to recognizing or addressing their own needs. This concept becomes so integrated into the woman's persona that she literally stops thinking about her own needs, typically remaining unaware of the stress that is building, that she spends less time alone or with friends. Her life becomes her family; she does not think about going on trips with friends or spending time after work meeting a friend because she is expected home. Women have difficulty admitting they are tired, that they need time off, or that they have any needs at all. Thus, it is not surprising in tabulating our initial results of self-report measures completed by women that I have diagnosed with ADD (via neuropsychological evaluation ruling out other disorders) over the past 15 years, reported primarily symptoms of depression and anxiety, feeling fatigued, and suffering from memory loss, with only one of the primary symptoms related to attention. This data needs to be analyzed in depth and will be reported in a future book; however, the point is that women with ADD report more emotional symptoms than attention problems in adulthood due to the issues noted above and the likely change in their physiological status related to stress.

Given the monumental job of being responsible for the family, women have to maintain the belief that they are indestructible and can do anything they set their minds to. They have to believe that they have the power to protect their family from harm and to maneuver life in the manner the family requires to survive. This is from an emotional perspective, not financial, unless the woman is a single mom. Women typically feel guilty spending money on themselves, although they may spend money flagrantly to escape depression. Women tend to feel the need to justify why they are purchasing something for themselves unless directed to do so by someone else. The husband says, "Go on a cruise honey and relax, you need it" and she can go. If she does not receive this confirmation, there will be hesitation and indecisiveness until the time that she is scheduled to leave on this trip that she requires

outside approval to take. If the woman manages to go, she becomes terribly guilty if anything goes wrong at home or a family member calls with a problem. Women purchase things for the home and for the family if they have bought too many items for themselves. They have the items they purchased for themselves shipped home privately, where it goes into their closet, escaping the "eye" of the family. She may wear the new outfit quietly, responding negatively if complimented on this new purchase. Caretaking is a primary part of the female's role in the family. Women are counted on to fix the problems in the home, to mend the hole in the heart or in the sweater. They are not expected to have feelings or to operate as an individual. How often did you think of your mom as having feelings? How often did you think of your mom as the person who will be there for you no matter what?

Everyone Needs to Be Happy and It Is the Job of the Woman to Make Sure this Occurs

The woman is happiest and most content when everyone around her is happy. It has become ingrained as part of her persona or basic nature to ensure that everyone is happy; this is her primary job. The woman is the first person at the scene to attempt to resolve the arguments among siblings. She is the first person the children turn to for help in this situation. In the work setting, this practice is repeated and too often women feel responsible to respond to the person who is upset. The woman feels immediately responsible to contact the teacher if the child arrives home with a note regarding problems that occurred in school that day. Depending upon her role in the family system, she may be the first one to try to work out disagreements among the parents. The list just goes on and on. Women will tend to feel and be most affected by tension when present in the family atmosphere. The more sensitive the woman, the more aware she is when those around her are upset. If the woman is in a group and someone needs something to help them, the woman will find herself volunteering when she has promised herself that she will do nothing of the kind.

The Woman Can Only Fulfill Her Own Needs when Everyone Else Primary in Her Life Has Been Taken Care Of

The historical female role is to be at the bottom: the last to eat, the last to sit down at the dinner table, and the last person to go to bed at night. I am not sure how or why this concept historically has occurred; however, it is clear that women have this concept ingrained in their memory and incorporated into their persona. This role overlaps to the work setting. Regardless of the job position, women tend to find themselves in some type of caretaking capacity. Who volunteers to get lunch and bring it back for everyone? Who volunteers to stay late to solve the crisis? Who volunteers to help a fellow employee in trouble? If you are female, how often have you done something for a co-worker who never returned the favor in any capacity. Women typically feel responsible to volunteer to organize the holiday party, to orchestrate or bring the food, and so on.

By the time that the woman has granted herself the lunch out with friends or the shopping day, the event has taken on such importance that the tendency is to overdo. The response to deprivation tends to be gluttony. Thus, the tendency for women, once released from indentured servitude, to go overboard when shopping or finally out with friends. Themes like "enjoy the moment because it will be gone," "the opportunity will never occur again," drive excessive behavior at this point and foster extremes.

Guilt tends to be a huge complicating factor. Recognizing the generality in these statements, in my experience women are far more susceptible to guilt feelings than men. Women are far more likely to feel badly, to worry about a passing remark, and to be highly sensitive to the opinions of others. In this regard, men do not appear to be as overburdened by all this "self-questioning" behavior. Men do not appear to be as burdened or as susceptible to guilt.

Birth roles can have an impact upon the degree of guilt women feel. Oldest and youngest females tend to have the most guilt given their characteristic caretaker roles. The oldest is more physically responsible as the "assistant mother," while the youngest female has the job of emotionally keeping the family unit emotionally close and bonded together. So, if a family member is still hungry after dinner or an errand needs to be done and it is already late at night, no matter how tired she is, the woman is in the car going to the 24-hour store to buy poster board for the school project the child forgot was due the next morning. Regardless of the time she has to get up in the morning for her job, the woman may be the one staying up at night with the child to get the project completed. Now it is not as if the woman asked for help. Too often, despite how detrimental to her emotional and physical health, the woman will assume responsibility and take over without even thinking to ask the father to pitch in and help. We can hardly blame the spouse when the woman clearly communicates her desire and determination to run a headlong course of "burning the candle at both ends."

The "emotional bank" for the woman is typically empty; usually, she is on deficit spending due to continual emotional withdrawal and lack of equivalent deposits. It is not surprising that more women suffer from insomnia and depression given their tendency to give away more than they receive. Consequently, women are often left empty, feeling unappreciated, and undernurtured. But whose fault is it really? The woman who is ingrained with the belief system that her role on earth is to take care of others, holds others responsible for her behavior. Statements like "my children take me for granted," "they assume I will be there" are the result of a system involving primarily the woman as the driving force. So, when the woman complains that her husband does not pay attention to her, is this not the result of the system she integrated into the household?

The truth is that actually no one specifically is to blame. Women are part of a century-old system that fosters guilt if they take care of their own needs (especially at the expense of others), and does not promote a sense of self that is strong enough to deny the needs of those around them. In other words, women are their "own worst enemy" as they create, participate in, and feel most comfortable with a system that does not promote their singular identity. If a woman desires a career, she pays dearly for it, staying up nights to bake, so she can attend class or study in the morning. She denies herself sleep, food, exercise, and stress management time in the attempt to make everything work and not have her own educational or employment goals have any negative effect on the family. Typically, women may refuse the help offered by their spouse in the mistaken belief that they have to be responsible for their own problems and should be able to handle these situations by themselves. Failure feelings tend to emerge if help is accepted from the spouse as this means that she performed poorly, necessitating the need for help. With all of this circular thinking, is it truly surprising that men are frustrated with women when they complain of receiving no help around the house or the frustration of women when they place the father on the pedestal "and he is never

home?" The father is applauded for coming to the game once, while the mother is expected to be at the child's game weekly without fail.

The rules are not fair, but women continually participate in their own demise. Despite her efforts, the woman's career is negatively affected by her guilt and the demands she places upon herself. Her career suffers as advancements are withheld, denied, or avoided. She is passed over as she cannot be trusted to place work as primary (because if she does not, she would have to place herself as primary and that does not occur).

Guilt and being unable to ask that her needs and wants be satisfied affects women sexually as they remain unfulfilled. Women feel guilty about the time that their partner needs to spend with them to bring them to orgasm. Often, they may be so stressed and distracted that they cannot focus sufficiently and/or relax to allow their bodies to respond naturally. So, the system is inherent, albeit subtle and present on so many levels that the woman must make sure that everyone is taken care of before she can take care of herself.

The Consequences

- Why are women hassled, harried, depressed, stressed, angry, frustrated, and generally not happy? Everyone else comes first, emanating from an innate need to make sure that everyone is okay before taking care of themselves
- Why do women cherish time spent alone when men are usually afraid of it? Women tend to be excited about time by themselves, while men dread it and look at the time spent alone as indicative of their loneliness.
- This may be part of the reason why research tends to find that women cope with divorce or widowhood far better than men. They are part of a network that needs them beyond their marriage partner. Ensnared and overwhelmed by the needs of others, women cherish time spent alone
- Most women are distracted. This may or may not be due to ADD but instead the result of long-term stress and poor self-management. Diagnosed ADD symptoms may be exacerbated for the same reason

In diagnosing women as having ADD, it is critical to rule out similar appearing diagnoses of posttraumatic stress disorder, depression, sleep deprivation, and, of course, stress. Those unfamiliar with the telltale signs of ADD will have difficulty making this separation. Generally, female history of attention problems is less well-known. Reading may have been difficult, but they read more to compensate, which eventually made reading easier. School may have been difficult, but this would be attributed to not being smart as opposed to ADD symptoms. Feeling that they are not smart, it becomes easier to give up when school or work becomes difficult and they doubt their ability to be successful. Sometimes, women have to abandon their "softness" and emotional side when they pursue careers in jobs typically filled by men. The more competitive the atmosphere, the more frozen women become as they attempt to cope with the critical and judgmental atmosphere that surrounds them. They are at great risk to become critical and judgmental themselves, ultimately losing a sense of themselves, as they struggle to maintain credence and respect in a male-dominated world.

In Summation: Being Female and Having ADD Means:

- Being ADD and a spouse
- Being ADD and a mother

- Being ADD and the all-around fix-it person in the house, the caretaker of everyone
- Having multiple roles and multi-tasking on a continual basis
- At greater risk for distractibility, anxiety, and symptoms of depression
- Becoming more compulsive and perfectionistic as life spirals out of control
- Missing information but thinking that you have all of the information
- Missing meetings at work or appointments for your child due to poor time management and feeling overwhelmed
- Your spouse thinks you do not listen and this creates arguments
- You do not use the written directions to do something because you think it takes too long and you are faster figuring it out yourself
- Forgetting to return phone calls
- Forgetting what you need at the grocery store
- You return home several times when trying to leave for work due to forgotten items
- Calling someone and forgetting who you called until they say hello
- Performing poorly on timed tests
- Difficulty with time management; planning time efficiently
- Difficulty estimating how long things really take
- Always late
- Tendency to underestimate than overestimate time
- You are not good at rearranging furniture because it is hard to see how it fits in a space
- It is difficult to use a map
- You either feel overscheduled or you avoid scheduling anything and feel unfulfilled
- You take too long to make decisions or you make them too quickly without considering all of the consequences
- You live on the edge of fear
- You tap, you dance, you jiggle, you touch, and you play with everything
- You never know what to pack when going on a trip
- It takes you a full day to get packed
- You bring too much, so the next trip you do not bring enough
- You miss your plane, being up all night to “get the packing right”

Always Remember the Good Things About ADD:

- You have a sense of humor
- You never give up
- You are a great problem solver

Try Not to Underestimate:

- Your ability
- Your courage
- Your power
- Your strength; and your ability to survive despite all odds

It is easier for women to downplay their assets and to accentuate their liabilities to make others feel better. As natural caretakers, taught through history and time, the most difficult task for women is to take care of themselves.

SECTION C
The Assessment Process: Differential Diagnosis

**Part VII: Accurate Assessment Means Accurate
Diagnosis and Accurate Treatment**

Barbara C. Fisher

*Brain Evaluation/United Psychological Services,
Washington Township, Michigan, U.S.A.*

Attention deficit disorder has become a catch-all or bin. It is where we place anyone who is overly active, defiant, and noncompliant in the home or school setting. Generally speaking, the first diagnosis of any child following a brain injury is attention deficit hyperactivity disorder (ADHD). Autism is the up-and-coming future bin. A possible brain injury becomes lost and irrelevant in the search for treatment for an attention disorder. No one considers that attention problems automatically tend to follow a brain injury and are commonplace in their presentation.

Nonetheless, a primary means of treatment for ADHD is a variety of stimulants that may or may not work due to the lack of accuracy in the diagnosis. I once saw a case record in which the therapist diagnosed a child as being non-compliant and having oppositional defiant disorders, because the child refused to maintain eye contact. She was later diagnosed with a seizure disorder that included staring episodes. The child was mistakenly hospitalized as an inpatient on a psychiatric floor prior to her physicians considering the presence of a brain injury. How can things go so wrong? Where is the thorough history to rule out early brain injury, birth injury, or sleep disorders? Where is the thorough evaluation that accurately diagnoses based upon testing and evaluation?

Accurate neuropsychological assessment has the power to identify cognitive deficits associated with the frontal processes, the memory processes, and to rule out or rule in a genetic attention disorder versus an acquired attention disorder versus language problems.

The radiological procedure provides confirmation, the neurologist provides clinical confirmation, and the diagnosis is multifaceted based upon contributions from various professional disciplines working together to provide scientifically based and accurate diagnoses. Unfortunately, this unified attempt does not occur as often as it should. Treatment is provided without completing a full psychological evaluation. Evaluations are inadequate; just a personality assessment is completed without the accompanying projective measures that every psychologist is taught to administer. Inaccurate diagnosis leads to inaccurate treatment. The treatment plan begins with diagnosis. To treat any disorder accurately, you have to have an accurate diagnosis. This would require evaluation and thorough assessment.

Obviously, I have a bias toward neuropsychological assessment, being a neuropsychologist for more than 20 years. I have seen over and over the need for evaluation to rule out look-alike disorders and work closely with the medical community to firmly establish the diagnosis. Time and again, treatment does not work because the wrong diagnosis is being treated. I think as a "fix-it" society we tend to treat symptoms as opposed to the disease or disorder. We become lured by the parent or adult complaints, their plea for help, and urgency that is expressed to treat symptoms rather than to take the time to find and isolate the diagnosis. Parents get tired of waiting for answers and want their child fixed as soon as possible. This is enhanced when there are behavioral problems (e.g., the child is being sent home from school, there are phone calls of disobedient behavior, etc). Adults in pain or discomfort want the problem to be over. The hardest thing for a clinician to do is to not try to please the patient; we all want happy patients, and to present the need to find the accurate diagnoses. Even when the process becomes arduous, a winding and sometimes wandering road, the problem is always whether the time can be taken to isolate the diagnosis.

Radiological procedures can be at odds with neurologists offering varying opinions as to whether the presence of seizure exists or not, as explained by Dr. Tolia in his chapter. Like any field, including neuropsychology, everyone has an opinion and it is going to be dependent upon how they were trained. Another example is the sleep study in which various professionals and sleep technicians produce different reports and data despite very strict scoring rules. The problem with all this is that no one agrees on the causal problem for treatment or finds the causal problem for treatment. I begin the search, having already found abnormalities on neuropsychological testing, using paper and pencil measures designed to assess brain behavior function. These measures and the patterns they reveal have been shown through time to be an accurate scientific method to diagnose cognitive deficits related to brain impairment.

I once had a sleep neurologist tell me that I treat testing like an "art form." At first, I was offended; what did he mean, "an art form?" However, upon closer consideration, I found that I was in agreement with him. I do treat testing as an art form. Working with children as a pediatric neuropsychologist, as well as adults and the aged population, I am an avid advocate of spending the necessary time to ensure that the diagnosis is correct and that sufficient testing has been done to rule out other possible variables. My peers' main complaint about my evaluations is that they are too in depth, too lengthy, involve too much testing, and, of course, are too involved. However, rarely if ever do I make mistakes with children, only because I will devote extraordinary amounts of time to studying them, watching them work, and testing with all types of instruments to find out what the problem is. One of my main tenets is that we cannot go back with children and say, "Oh, I am sorry I made a mistake," because the damage is occurring on a continual basis when diagnoses are left undiagnosed or unresolved and the costs are not replaceable. In my experience, when neuropsychological evaluation is completed, and completed thoroughly, the odds are 100% of being successful.

Opinions may vary depending on circumstance and experience. My concern is when that opinion hampers the treatment for children, adolescents, adults, and the aged population, and when something could have been done, but was not; because of that opinion, the patient suffered, not the doctor. Working in pediatrics, you see all kinds of situations that make you sad to

think: How did this child get ignored? How did this happen? How was this condition not diagnosed?

So, what is the answer? I do not know. The best I can tell you is, in my corner of the world, I do my homework. I test as needed and make sure that my diagnosis is right. I would ask others in my field to do the same, to have a social conscience about their impact upon a developing child or an adult's life, and to function professionally based upon the motto that they will evaluate carefully and systematically to rule in or rule out the correct diagnostic criteria and not use a cookie-cutter approach to testing in order to make it easier. I feel that we are relying on the computer too much and losing the art form of testing. A computer does not replace a neuropsychologist trained in brain-behavior relationships as a scientist to make observations, evaluate hypotheses, and determine correct conclusions.

The questions become why different neuropsychologists choose different tests, why they choose tests for each person they evaluate, and what is the scientific principle behind their testing? If they cannot answer that, then they are operating in a cookie-cutter fashion, which totally negates testing and the purpose of evaluation. There are numerous occasions when individuals I have tested are tested by another neuropsychologist who has a totally different opinion. However, it is not very often that they repeat all of the tests that I have administered to provide sufficient scientific evidence to make that statement. Most of the time, I am not in the position of doing a re-evaluation and comparatively assessing test results prior to testing. When this does occur, I will try to readminister as many test measures as possible to scientifically determine changes in functioning, even to the point of purchasing tests I do not normally use to accomplish this task. Unfortunately, I rarely see testing that I have done repeated beyond one or two measures. Instead, the neuropsychologist completing the re-evaluation administers a totally different set of tests, proclaiming a different diagnosis, when they never repeated the same measures to scientifically assess the individual's functioning. Everyone has an opinion; I just wish that it was steeped in scientific theory rather than one's belief system and arrogant assumptions, which are too often financially driven. Can we truly afford to be arrogant when we are affecting someone's life? Too often, no one really cares anymore; they do not care enough to speak up, they do not care enough to spend more time, they do not care enough to provide accurate diagnoses, and they do not care if they are wrong in 10 years time.

The ideal would be that neuropsychologists work together, do not hide behind board certification, do not regress into an arrogant belief system, leave themselves open to the art form of evaluation and scientific theory, remain excited about understanding the nature of brain-behavior relationships and how brain problems produce specific symptoms, and that everyone would be dedicated to the greater good of helping people rather than becoming isolated in self-serving niches, allowing themselves to be used by attorneys and insurance companies with money as the driving force.

In closing, I offer one last bit of evidence. Neuropsychologists are still saying that pediatric brain injury is not as devastating as adult injury and that the prognosis is better. How do they ignore the overwhelming evidence of cellular damage over time when there is any type of injury to the brain, the changes that occur within the brain when there is cell death, and the plethora of research that is behind the notion that anyone who has an injury is at risk for Alzheimer's

dementia, which was based upon a study of Downs syndrome children? Even after this study, which surfaced several years ago, do you think anyone is bothering to perform electroencephalograms (EEGs) on this population, and how often do you hear that their only medication is an antidepressant?

Evaluation is the window to understanding the brain. Given the discrepancies in radiological evaluation, the ideal is the marriage of the two fields. In this manner, the neuropsychologist works hand in hand with the neurologist to determine the correct diagnosis. Neurologists will tell you that a normal or abnormal EEG does not rule in or rule out a seizure disorder; it is the clinical symptoms in combination with the EEG findings that tells the tale. Neuropsychological evaluation can fill that gap if done properly and will provide diagnostic criteria that will surface over time. The different disciplines of medicine and education need to work together to provide the best treatment. School systems are in the position of having to work with a child who is often not medicated properly, not evaluated, and then they are expected to teach a child who is struggling with a disorder that remains both undiagnosed and untreated. Too often, a doctor tells parents that they simply have to adjust to what their child is, whatever that is, diminishing the belief that things can change and that accurate diagnosis is essential. The parent is encouraged instead to become a strong disciplinarian; they complain that doctors do not understand what happens in their home and how their entire family is affected by this one child, who remains untreated. They become hopeless; parents divorce and the family splits up. No one wins.

CASE IN POINT

I completed an evaluation on a six-year-old child for ADHD. While finding clear-cut evidence of a genetic attention disorder, I had concerns regarding other problematic brain processes. I completed further evaluation and found discrepancies among the testing sufficient to question other diagnostic issues. His primary-care physician referred him for a sleep study. While in the process of completing the sleep study, the physician noted evidence of frontal lobe seizures. Sleep apnea was diagnosed and the child was referred for an EEG. Seizure disorder was diagnosed based upon clinical evidence and the EEG abnormalities. The child received treatment for both disorders and continues to receive treatment. Cognitive rehabilitation has been implemented to address the deficit areas identified. A 16-year-old girl was not as lucky. Her diagnosis of seizures took five years to make, and remains a subject of controversy and questions as every professional offers a different opinion. However, the fact remains that her neuropsychological evaluation clearly revealed a pattern consistent with cognitive deficits related to impaired brain functioning. The fact remains that there has been a consistent decline in assessments of cognitive abilities within the school setting, and the fact remains that she is not functioning, spending much of her time in and out of hospitals as everyone searches for the cure to the disorder they decided that she has. To date, she has been hospitalized no less than five times in the last two months and placed on medications ranging from antiseizure to antipsychotics. Her diagnosis remains unclear to date; however, she cannot attend school, she runs away, and she threatens suicide continually; when she is not threatening suicide, she is threatening to hurt others, and her conversation rarely makes any sense.

In writing this story I cannot help but imagine what would have happened if a round table discussion including professionals from various disciplines met to

discuss this child's case. While this continually occurs in some settings, more often private practice precludes such interaction. Perhaps there is way to somehow create a bridge between the various disciplines to provide state of the art diagnosis and assessment that forms the cornerstone of a treatment plan that is slated for success.

Step by Step Assessment of ADD/ADHD for the Clinician: Patterns to Look for in the Evaluation

Barbara C. Fisher

Brain Evaluation/United Psychological Services, Washington Township, Michigan, U.S.A.

It has been my experience that using intellectual assessment, cognitive assessments, and/or achievement testing does not and will not isolate the characteristic pattern of attention deficits to sufficiently diagnose attention deficit disorder (ADD) over time. I have been using neuropsychological test measures to diagnose ADD/attention deficit hyperactivity disorder (ADHD) since the late 1980s. Individuals have returned as many as 10 years later and repeated the same evaluation with extremely similar results—in some cases with the exact same scores. The pattern never varies, allowing for the diagnosis of an attention disorder that is genetic in origin versus some other condition that may vary with time. One woman who was on stimulant medication for approximately 12 years had practically the same test scores providing confirmation of the temporary status of the stimulant medication, which is indicated by the medical community. In this manner, a genetic attention disorder can be diagnosed, and then again, patterns seen over time allow for the diagnosis of additional disorders that tend to exacerbate specific tests included in this assessment. For example, on the Trail Making Tests when there is an additional disorder of suspected brain impairment, these scores will be higher and more problematic, often with more errors on Trails B. When distractibility is highly evident, as is the case with Post Traumatic Stress Disorder (PTSD), the Symbol Digit Modalities Test (SDMT) will be more problematic in the oral condition as opposed to the written condition—when usually the reverse is true.

I have used the following test protocols to assess ADD/ADHD for almost 20 years with excellent results over time in terms of diagnostic conclusions.

Input: Measurement of input in the brain is accomplished with the following measures:

- Speech Sounds
- Seashore Rhythm

Information Processing: Determining if the information is being processed to get to the high levels of the brain is assessed with the following measures:

- Children's Paced Attention Serial Addition Test (CHIPASAT)
- Paced Attention Serial Addition Test (PASAT)
- Wisconsin Card Sorting Test (WCST)

Distractibility: The ability to maintain divided attention, to multitask and still recall information, to process information without becoming distracted by

all of the sounds and noises from the environment. Symptoms of distractibility are measured by the following:

- Stroop Color Word Test (SCWT)
- Cancellation Test

Processing Speed (Cognitive): The impact of timed evaluation while performing various tasks that range in complexity. Measures used for assessment are the following:

- SDMT
- Color Form Test
- Progressive Figures Test
- Trail Making Tests Parts A and B
- Symbol Search
- Wechsler Intelligence Scale for Children (WISC-IV) or Wechsler Adult Intelligence Scale (WAIS-III)

Spatial Issues: Finally, the telltale signs of the long-term presence of a genetic attention disorder are seen in the following measures revealing the visuospatial difficulties and the compensatory process that results in difficulty with decoding. In assessing these measures over time, the same types of mistakes as well as mistakes with the same words tend to occur regularly as a typical protocol. The following measures are used:

- Bender Visual Motor Gestalt Test
- Wechsler Test of Adult Reading (WTAR)
- National Adult Reading Test-Revised (NART-R)
- Wide Range Achievement Test 3rd Edition (WRAT-3)

For the age of five to seven years the following assessment is used:

- Bender Gestalt Visual/Motor Test
- WCST
- Symbol Search Subtest Wechsler Preschool and Primary Scale of Intelligence
- Reitan-Indiana Neuropsychological Battery
 - Color Form Test
 - Progressive Figures Test
- SCWT (age seven years only)
- Verbal and NonVerbal Cancellation (Tests of Vigilance)

For the age of eight years the following assessment is used:

- WRAT-3 (Spelling and Reading)
- Bender Gestalt Visual/Motor Test
- WCST
- Symbol Search Subtest WISC-IV
- Reitan-Indiana Neuropsychological Battery
 - Color Form Test
 - Progressive Figures Test
- SCWT
- Verbal and NonVerbal Cancellation (Tests of Vigilance)
- SDMT

- Halstead-Reitan Neuropsychological Battery
 - Trail Making Test parts A & B (TMTA, TMTB)
 - CHIPASAT

For the age of nine to fourteen years the following assessment is used:

- WRAT-3 (Spelling and Reading)
- Bender Gestalt Visual/Motor Test
- WCST
- Symbol Search Subtest WISC-IV
- SCWT
- Verbal and NonVerbal Cancellation (Tests of Vigilance)
- SDMT
- Halstead-Reitan Neuropsychological Battery
 - TMTA, TMTB
 - Seashore Rhythm Test (SRT)
 - Speech Sounds Perception Test (SSPT)
- CHIPASAT

For the age of fifteen years through adulthood, the following assessment is used:

- WTAR
- NART-R
- SCWT
- Verbal and NonVerbal Cancellation (Tests of Vigilance)
- Halstead-Reitan Neuropsychological Battery:
 - Trail Making Test Parts A and B
 - SRT
 - SSPT
- WCST
- SDMT
- PASAT
- WAIS-III (Symbol Search subtest only)
- Bender Gestalt Visual Motor Integration Test

The specific measures used over time to assess ADD, to rule in or rule out the presence of a genetic attention disorder versus ADHD—or an additional disorder resulting in impairment to brain processes—are the following.

THE TEST MEASURES

Measuring Input into the Brain: SSPT

- Assesses slow paced verbal information
- Takes approximately twenty minutes
- Involves listening to a tape and hearing a series of nonsense syllables
- The person is asked to underline the syllable that they think they have heard
- Tends to be a boring task for people who draw designs on the page while waiting for the next word; errors usually not seen unless there are additional issues beyond ADD
- Normative data for age 9 to 14 years and adults, aged 15 years and up (Halstead Reitan Neuropsychological Test Battery)

Measuring Input into the Brain: SRT

- Test of fast paced non-verbal information
- Approximately 4 to 6 minutes to complete
- Involves listening to a tape and discriminating pairs of rhythmic beats
- Measure of sustained attention to maintain attention and not lose one's place
- Normative data for age 9 to 14 years and adult, aged 15 years and up (Halstead Reitan Neuropsychological Test Battery)

Measuring Information Processing: CHIPASAT and PASAT

- Performance of a simple addition task
- All of the numbers are under 10
- Adding the last number to the next number and calling out the answer
- Requires the child or adult to take in information, perform a simple calculation, and process it
- The pace increases with each trial
- Total of five trials, four are scored with normative data ages 8 to 14/15 years, and adult ages
- Child or adult may have difficulty if he or she has memory problems and cannot recall the last number to add it to the next number and/or he or she do not have sufficient math fluency to respond quickly

Measuring Information Processing: Wisconsin Card Sorting

- New and novel learning task involving the matching of cards to a key
- Requires the child to process information from examiner to determine the correct match
- Or to figure out for themselves the correct learning principle to accurately determine matches
- Use feedback from the examiner to determine if correct or incorrect on this new learning task
- Clinically assessed, although normative data available

Measuring Distractibility: Stroop Test

- The subject has 45 seconds to read the word, the color, or the color of the ink
- Compares three conditions, reading the word, reading the color, and reading the color of the ink
- Measures the ability to gate out stimuli and focus in on other stimuli
- Normative data ages 7 through adult

Measuring Distractibility: Cancellation Test

- Four trials: two trials are circling A's (structured versus unstructured or scattered) and two trials are circling a *
- Children and adults are asked to circle A's or the * while the examiner removes and replaces their pencil after every ten items circled
- Scoring is the number of omitted items per trial, the pattern the child used to complete the task is drawn in detail, and the time taken to complete the task, including checking and rechecking (which is noted)

- Measures structured vs. unstructured setting pattern of response, time taken to gate out and focus in on specific items, number of omitted items, improvement for each trial
- No normative data; clinical study only

Measuring Cognitive Speed: Trail Making Tests Parts A and B

- Part A: Measure of sequential ability—the time taken to connect letters in sequence laid out in dot to dot pattern, number of errors scored
- Part B: More complex; requires switching from number to alphabet set in alternating order—maintain a set while switching sets
- Normative data for ages 8 to 14, and separate normative data for ages 9 to 14 and adult aged 15 years and up (Halstead Reitan Neuropsychological Test Battery)

Measuring Cognitive Speed: Progressive Figures and Color Shape Tests

- Recording the time, as well as errors on both measures
- Progressive figures require the child to shift from the inside figure shape to the outside figure shape (matching the shapes from one point to the next)
- Color shape requires the child to shift from the same shape to the same color and so on, must recall whether shape or color without prompting from examiner
- Both have sample trials prior to scored trial
- Normative data for age 5 to 8 and for each individual age (Reitan Indiana Neuropsychological Test Battery)

Measure of Cognitive Speed: Symbol Search (WISC-IV)(WAIS-III)

- Subject asked to quickly discriminate visual—spatial items on speeded task performance of two minutes
- Measure of pure speed with less demands upon cognitive processing
- Normative data for ages 6 to 16 years and adult

Measure of Cognitive Speed: SDMT

- Assesses overall brain functioning
- Matching of symbols and numbers under speeded condition of 90 seconds—the goal is to correctly match each symbol and number as fast as possible
- Score = number of items correctly matched for 90 seconds—written and oral condition
- Employs the use of speed, analysis and synthesis, left and right hemisphere, and short term memory
- Normative data for girls vs. boys for each age range—from 8 years to 18 years and adults from age 18 to 75

Measuring Visual Spatial Functioning: Bender Visual Motor Gestalt Test

- Children and adults are instructed to copy a total of nine different designs on one sheet of paper
- They are shown each design, printed on cards, one at a time
- Time is recorded to rule out impulsive performance of poor effort

- Normative data for errors ages 5 years to 15 years; used clinically as primary measure to confirm spatial issues
- Spatial issues seen as correlating measures on WISC IV and WAIS-III Block Design, and WISC III and WAIS-III Object Assembly and Picture Arrangement

The following patterns are typically seen using these measures to rule in or rule out a genetic attention disorder, seen consistently for over 15, almost 20 years:

- Input of Information
 - Seashore Rhythm last trial sustained attention seen in error pattern (rule out hearing disorder or frontal deficit)
- Processing of Information
 - CHIPASAT trials show decreased number of correct items significantly discrepant from normative data-decline of performance with increased speed (rule out math fluency and memory)
 - WCST pattern of logical deductive, hypothetical reasoning and non-response to examiner input (rule out confusion of executive reasoning deficits)
- Distractibility:
 - Stroop: Interference score is 30 to 50 percent less than word or color score (rule out PTSD, hypoglycemia, stress, reading problem)
 - Cancellation: Initially high speed and high number of omitted items-resolved by last trial (rule out selective attention and becoming overwhelmed by too many items on the page seen with frontal deficits)
- Slow Cognitive Speed
 - SDMT: Higher oral score than written = provides evidence of higher level of cognitive reserve, slow speed seen with ADHD, spatial confusion of symbols tended to be present (rule out brain impairment, frontal deficits)
 - Trail Making Tests, Progressive figures, Color Shape scoring varies, Part A spatial problems decreases speed, greater difficulty with alphabet for Part B, difficulty with spatial for Progressive figure, distractibility for Color Shape (rule out memory problems and frontal deficits)
- Spatial Deficits
 - Bender drawings reveal difficulty with one or both designs involving greater spatial analysis relative to their own performance (rule out brain impairment)
 - Pattern of deficits seen on other measures in assessment as well as on intellectual assessment (WISC III and IV)

In clinically teasing apart what is ADD from additional issues beyond that of a genetic attention disorder, cognitive deficits related to impaired frontal processes, the following characteristic symptoms have been seen:

- Problem of word finding or word retrieval resulting in loss of what the person wanted to say in spontaneous conversation and when responding to verbal open ended questions
- Ability to learn, benefit from repeated learning trials
- Ability to cope with two concepts at the same time, requiring integration of the concepts
- Ability to inhibit, shift sets, change
- Intrusions in memory testing, (distracted by the irrelevant), adding words to a word list that are not present

In clinically assessing memory functioning I am looking for some of the following issues, to tease apart different types of dementia (if an adult) from other types of disorders for children and adolescents. For example, Alzheimer's dementia presents differently from cardiovascular from Lewy Body at different stages of the disease process. Further, in assessment of children, frank sleep apnea presents differently from a sleep disordered breathing problem present for much of their life, which is different from a brain injury, which is different from trauma and so on. It is the patterns of the various variables that comprise the scientific method of neuropsychological assessment:

- Recognition vs. retrieval tasks (ability to recognize information previously given or learned versus recalling the exact information from memory, (presenting the learned stimuli in the paradigm of "Was this word on the list that I read to you?" and the person picks out the target stimuli, as opposed to asking them what they remember from the story or word list you read to them).
- Short term vs. delayed memory (recalling the information immediately versus recalling the learned information after a period of time has lapsed)
- Verbal vs. visual information to recall: (the use of verbal information such as stories, word lists or names versus recalling designs shown to them or drawing the designs from memory that they were shown or discriminating faces seen)
- Ability to cluster material for recall (is the person using a method of clustering, placing the information into a compartment for easier recall or using compartments provided inherently in the list or story read to them)
- Confusion vs. total lack of recall (does the person recall any information, are things totally gone, versus becoming confused by the information they were given)

In completing visuospatial testing, I look for a number of variables: integration, visual memory, if there are perceptual problems significant of a problem with brain functioning or the typical visual spatial problems typically seen accompanying a genetic attention disorder over time. The following types of tests can diagnosis visuospatial, visuoconstructive and visuo-perceptual deficits.

- Copying of designs, (note if distortions are present, extra arms on the ends of things, this usually affects straight edges and not circles)
- Recall of shapes and designs shown for visual memory (if there is confusion in the recall tasks, assessing recall versus recognition tasks)
- Visual perceptual: (discriminate different designs, ability to close up a design using its parts, to hold a design constant and see it as similar despite changes in color or size, to recall a design visually shown and recognize among an array of designs)
- Problem solving, using puzzles, various objects, specifically targeting the tactual modality if eyes are closed

Language is a primary area that requires evaluation and tends to be ignored or not pursued in neuropsychological evaluation. In children, this is particularly problematic given the focus of language acquisition as a necessary prerequisite to future learning and a marker of academic difficulties if not sufficiently acquired. Language assessment for children can be highly valuable in assessing frontal processes at earlier ages, and primary in creating a treatment program. I cannot emphasize enough the importance of language for young children as a diagnostic tool and necessity as part of any treatment intervention. For adults there are many

measures used by speech and language pathologists that the neuropsychologist can use to assess their needs and carve out a treatment plan. Thus, for any person being evaluated, the evaluation of language is critical and, unfortunately, rarely seen in a neuropsychological evaluation. This is where the question arises of the purpose of an evaluation and if it is truly targeted towards helping an individual for treatment. Language assessment for children and adolescents is a vast area comprised of many sub-areas that needs to be addressed for adults as well. Any language assessment needs to include the following areas of assessment:

- Overall language functioning
- Expressive and receptive language
- Pragmatic language skills
- Oral reading and reading comprehension
- Written language expression
- Oral language expression and comprehension
- Phonological processing
- Auditory reasoning and processing

With a genetic attention disorder, the primary problem is that of decoding, which results in a reading comprehension problem due to the difficulty of understanding what they have read while attempting to read at the same time. Historically, reading problems resulting from the long term presence of a genetic attention disorder tend to be related to problematic comprehension resulting from continual word substitution, skipping lines on the page and/or omitting words, thus changing the meaning of the sentence. Otherwise language processes are relatively intact.

The following are some of the hallmark signs of additional issues suggesting the presence of a disorder either in addition to or beyond that of a genetic attention disorder, typically implicating some type of brain involvement.

- Word Retrieval, loss of thoughts
- Meaning associated with words is atypical, the more abstract the word, the greater the difficulty
- Difficulty with proverbs, interpreting them literally (still waters run deep)
- Problems of inferential reasoning for sentences presented verbally which affects understanding directions and instructions
- Difficulty with reading retention of longer, more syntactically complex sentences and paragraphs
- Poor vocabulary and understanding the meaning of words and their use in a sentence
- Difficulty being mentally flexible with the use of words or words that have different meanings
- Malapropisms (use of a similar word, bleach for beach)
- Inappropriate use of language
- Idiosyncratic language-development of their own language
- Speech comprised of articulation irregularities
- Sentences are not understood (example: Makeingthty Lava, The sentence was: Making them laugh)
- Writing a sentence takes an inordinate amount of time due to the output problems (it once took a young man all day to write one sentence, which was

incorrect grammatically) of managing writing as well as grammar as well as remembering what they wanted to say, totally overloaded by output demands

- Lack of understanding of basic sentence structure
- Poor thought organization
- Poor sequential analysis, difficulty visually or auditorially differentiating incorrect use of grammar, word order, word meaning
- Difficulty integrating information that is in sentences or paragraphs sufficiently to recall it on a short term basis
- Tangential output, rambling thoughts, non-completion of thoughts due to word retrieval, and spontaneous changing of subject due to processes of selective attention (and continual attending to the irrelevant)
- Problematic pragmatic or social language, difficulty with comprehension, understanding the nuances and the subtleties, as well as expression and what to say in a given social situation

First, in any testing situation the “art form” is to be aware of all the things that could affect the testing situation and to factor it into your test results also used diagnostically. It becomes important to address the following issues and to have enough of a rapport with the person being evaluated to be aware of such issues. In other words, no matter who is being tested, there needs to be a comfort zone, the establishment of a setting where the person can feel relaxed to enable you to assess more than just the test scores, but the patterns in their performance and functioning during the short time they are in your presence. It is important to ascertain as much information as possible which is negated by a more sterile testing atmosphere. The problem of using technicians for too much of your testing is that they have to (by nature and lack of knowledge of the far reaching aspects of the tests they are administering) remain highly neutral which creates a more sterile testing environment.

Secondly, using a technician no matter how much they write about what took place, does not substitute for being there as the neuropsychologist or psychologist and observing the person from a clinical perspective. This is why when I go to test children in their home area and spend two or three days with them, I really know that child when we are finished. There is no substitute for that kind of time spent. Evaluations that are more sterile, produced primarily by a technician, whereby a computer is used much of the time, is a rather sad and sorry statement about the scientific “art form” of neuropsychological evaluation. If you want to find out how committed a neuropsychologist is, how dedicated to what they do, ask how much time they actually spend testing the person themselves. This is the same principle that underlies the statements that you cannot test babies or three year old children. And you ask well- how do the rest of the professionals test such children to provide early intervention services?

Thirdly, during the testing session as a clinician the task is to make sure that the measure has measured what it purports to measure. A neuropsychologist should be making continual accommodations for the following emerging issues (provided that these changes are in keeping with the test manual and specific test instruction or recorded as testing of the limits).

The following variables need to be continually addressed and monitored throughout the evaluation process:

- Motivation: anticipation, fear of failure (provide continual reassurance, sometimes testing needs to be stopped to address this issue)

- Anxiety: repeat measures if affected, testing of limits, providing intervention to see if they can accomplish the task with cues when not compromising the testing
- Malingering: repeated measures, look for a consistent pattern
- Fatigue, hunger, attention issues, sleep; all factors that need to be continually addressed, (I typically will test memory and attention at different times of day and night, especially with the aged population due to sun downing, tendency to become worse at night)

Fourthly, in completing any evaluation, the continued “art form” of assessment is ascertaining the meaning of the test results. This is accomplished using the response pattern, the clinical data and the scores. What is the significance of the scores? It is only relative to the person. In other words if you have a bright individual then average scores are problematic. Too often professionals indicate the absence of problems (that could have been fixed easier had they been caught earlier) by citing average scores. However average scores have no meaning if the person is really smart and average scores represent a significant discrepancy in their functioning. The question arises as to the meaning of an average score, the determination of when an average score actually represents expected ability and when it represents a regression to the mean (whereby higher level cognitive ability has been utilized to compensate) thus masking an undiagnosed condition or deficit area.

Case in point. I evaluated a young girl of four years until the age of 10 years with four repeat evaluations. At the age of four years her performance on the tests administered ranged from very superior to average limits. By the time of the last testing her scores ranged from low average to average limits. The problem was the most obvious when evaluated at the age of four years in seeing the highs and lows than when things had deteriorated to more of a flat line due to a diagnosed seizure disorder resulting from a significant head injury at the age of six weeks.

Professionals wanting to skew the scoring will reference percentile citing average limits when a scores falls with the 26th to the 75th percentile. This means that someone functioning at the top quarter of the population is the same as someone functioning at the bottom quarter. Does this make sense? Then there is the problem of defining performance as problematic. When a person is defined as functioning within low average limits, they are at the bottom 16 percent of the population. It is generally accepted in the field that a score has to have a discrepancy of two standard deviations to be significant. This means that the score, using percentiles has to be either at the 93rd percentile (out of 100 people in the top seven) below the 7th percentile (out of 100 people in the bottom seven) to be significant of anything. Or scores have to have two standard deviations difference to be significant which ends up covering much of the bell shaped curve. Again, using percentiles, by the time performance is indicated as severe, the person is functioning at the first percentile with 99 percent of the population functioning above them. Either as a society we are not terribly bright and functioning below the 20th percentile is okay or using percentiles to define performance is problematic unless that performance is within severe limits. When attempting to tease apart subtle issues, they can become easily missed using percentile scoring. This is the reason that standard deviations and means are available and that more importantly it is the clinical method of performance not the score that makes the real difference.

Fifthly, the “art form” of testing is the method used to complete the test measures, the pattern of the test results. Test results may reflect a brain problem based upon the pattern of the performance even though the score is within average limits. The time honored principles of neuropsychological evaluation, the “art form” is the ability to analyze test results and brain behavior principles to predict probable functioning in the future, to see issues that may not emerge for years on radiological assessment. This was the situation with the child I tested at four years of age. Her performance clearly suggested brain impairment however scores remained within very superior to average limits. Professionals in my field as well as her teachers disagreed and felt that she was fine. At the age of nine years her brain was so impaired that every area revealed electroencephalogram abnormalities, alarming her treating neurologist. However, prior to that time, everyone in her world thought things were fine, classifying her as lazy, uncaring and defiant when there were academic tasks that she refused to do which actually were tasks that she could not perform.

Finally, and sixthly, there is the problem of the terms used. The intellectual assessment cites the word “borderline” which to the public means borderline average scores which in reality means borderline functioning to that of mental impairment or retardation. In other words borderline functioning is actually at a percentile of on the intellectual assessment, so when we say “borderline” and people think that this means close to average, what is being referencing is the bottom 6th to 7th percentile of the population.

To summarize, the “art form” of the evaluation process, (based upon over twenty years of evaluating the age range of infancy through the life span to the aged population), is the suggestion to think out of the box, to use your intuitive sense, to observe carefully the responses of the person (what processes did they use or how did they arrive at the response they provided) and finally, to comprehend the power of neuropsychological evaluation which if done correctly can provide a vast amount of information. This information becomes paramount in predicting and anticipating problems become they balloon into disasters. This information can be used to accurately treat disorders with medication when the treating physician agrees with the diagnostic impression. In this manner the value of the neuropsychological evaluation is infinite and together with the treating physician, accurate assessment means accurate treatment and even more importantly, accurate prevention.

Part VIII: Accurate Diagnosis Means Accurate Treatment: Developing a Treatment Plan Following the Evaluation

Barbara C. Fisher

*Brain Evaluation/United Psychological Services,
Washington Township, Michigan, U.S.A.*

INTRODUCTION

Consensus studies have shown problems with a wide variation of treatment as well as the difficulty of defining what attention deficit disorder (ADD)/attention deficit hyperactivity disorder (ADHD) actually consists of. Parental ADHD was found to be a further complicating factor in terms of increased family conflict. Treatment means separating the genetic attention disorder of ADD from the additional disorders that comprise the ADHD symptoms to form an accurate treatment plan. Thorough evaluation is critical to rule out additional disorders, rule in or rule out the presence of genetic versus acquired attention problems, and to accurately diagnose ADD/ADHD as well as the co-existing disorders. Chapters by Dr. Picchetti, Dr. Walters, Drs. Yu-shu Huang and Guillemainault, Drs. Pelayo and Lopes, Dr. Smith, Dr. Savage, and Dr. Korotkin address the impact of co-existing conditions. The importance of diagnosing all co-existing conditions, medical or neurological, is that it will impact the treatment regimen and affect medication management as discussed in other chapters in this book, particularly by Dr. Antonucci. The key to treatment is remembering that this is a multifaceted patient population and that treatment needs to address all issues—not just attention concerns.

Following the diagnosis, a treatment plan is developed based upon the test results and the history provided by the child, parent, or adult. Coping mechanisms are suggested specific to the deficits isolated in the testing. Coping mechanisms consist of things such as music to help with distractibility (the inclusion of music lightly playing in the background helps with the control of extraneous thoughts that continually enter the mind); tips such as completing term papers or research papers in component parts (producing the body of the paper first and then the introduction and conclusions); and watching movies or going to museums to bring subjects to life are just some of the creative means to work around or work with ADD symptoms and symptoms of the co-associated disorders.

Generally, for children, it is critical to establish structure and routine from morning to night, beginning with a schedule for getting up, having breakfast, hygiene needs, and getting ready for school on time with everything they need tucked in their backpack; coming home after school and establishing a routine of having a snack and then working on homework for an hour before going out to play; to maintain control of the evening hours so the entire night is not spent attempting to extract homework from a tired and noncompliant child. This means not listening to the child who adamantly maintains that they have no homework.

Structure implemented during younger years forms the base or core upon which to build the good study skills necessary to complete a high school education and to go on to college if so desired. Too many individuals do not pursue an advanced education due to the lack of structure or study skills and fear of not being able to develop such skills.

Adults require similar organizational help, the implementation of a similar structure to complete tasks at home or work without building mountainous paper piles that become avoided due to their enormity. Getting help from the school setting or business environment may provide additional aids to address attention symptoms and primarily symptoms associated with additional disorders. Maintaining basic systems of food and sleep are paramount to establishing good coping mechanisms.

Schedules are created to manage time and organize daily activities for the most productive and efficient task completion. Task completion times are ascertained based upon the person's best performance for the type of task, thinking processes needed, taking into consideration sleep habits and patterns. For example some people are night owls, others are early morning risers. People function on specific tasks better at different times of day such as writing papers later at night while doing math tasks during the day. Suggestions for adults in completing paperwork, arrival time at the office, when to work at home, holding phone calls, setting specific times to complete a specific job function. Working with the child's teacher, school meetings, determining when to certify for school services, getting a set of books at home, setting exact study times as well as times for social and play activities are interventions typically employed following the testing. Having the child participate in the setting of their daily schedule, establishing positive parent-child interaction, and basically attempting to address additional issues that may compromise the treatment plan are typical interventions at this juncture.

Historically, the first line of treatment for the specific attention deficits identified by neuropsychological evaluation has been that of stimulant medication. It was a major breakthrough when adults were able to take stimulant medication to address their attention symptoms and lives changed dramatically. Stimulant medication has been consistent throughout almost twenty years of testing in showing significant differences on tests of attention used to diagnose ADD/ADHD. However, not everyone can take medication, and there are concerns that stimulants are being over and/or inaccurately prescribed using trial and error, as opposed to a scientific approach. The effect of non-stimulant medication designed to address attention symptoms has been disappointing, showing no difference on attention test results between medication and no medication conditions, although extremely helpful for anxiety relief.

While the above interventions, as well as additional suggestions that were more individualized, have been helpful, the result is management of attention symptoms, never resolution. The spatial issues affecting things like time management and, most importantly, reading skills remained unresolved, eventually negating the above interventions. Medical management was relied upon to address the attention symptoms during the day; however, children and adults continued to struggle with the far reaching impact of the long-term presence of a genetic attention disorder, and treatment remained only partially successful in addressing the primary problems of emotions and language. Cognitive training has been a major breakthrough in the past five to six years in finally providing the missing component to actually "treat" the symptoms of a genetic attention disorder through time by addressing the spatial issues previously untouched by any intervention that was implemented.

COGNITIVE THERAPIES

Cognitive therapy provided by our facility consists of two programs—Interactive Metronome (IM) and Brain Training. The IM is a program that we implement with some adaptations, which we have found substantially improves the quality and long term benefit. Using both clinically seen results as well as pre and post-testing, the IM program has been found to substantially improve ADD symptoms as measured by the attention evaluation explained in the chapter on cognitive rehabilitation; graduates of the program (or their parents) provide clinical confirmation of the positive results of this program reporting improved academic and reading success, enjoyment of school, as well as positive behavioral and emotional changes.

The Brain Training program involves the use of a computer program (Brain Train) which specifically addresses frontal and memory (temporal) cognitive deficits. Additional hands-on manipulative materials provide further support and treatment for memory functioning and frontal processes of integration, selective attention, and problem solving. While the IM program has resulted in substantial benefit to the spatial functioning and specific attention symptoms, it has not been shown to substantially impact the frontal and temporal cognitive systems that are addressed by the brain training program.

The effects of the IM program as well as its limitations became obvious approximately three to four years ago when administering post-testing to a father and daughter who had both been injured in an automobile accident. During the course of the program, and near its completion, the father and daughter reported positive benefits from the program, noticing improved memory and focused attention as well as increased energy. Reevaluation revealed significant improvement on tests of attention. However, tests of memory and executive reasoning, and frontal processes showed little or no improvement. We have since found that beginning the Brain Training program following completion of the IM program resulted in improvement in all areas of brain functioning. While the IM program is generally completed in 20 to 25 sessions, the Brain Training program is specifically designed and individualized without a specific number of sessions.

The use of cognitive training has been essential, greatly enhancing our treatment services and allowing us to have unprecedented success in treating ADD/ADHD and its co-associated disorders over the last five to six years. We have many stories to tell of lives being changed—positive changes that have remained for years following treatment and are ongoing to date. There are so many examples of children who have progressed well beyond their expectations, as well as our expectations, that my staff and I have become believers in the power of cognitive training. Our staff remains dedicated due to stories like the following:

One young man came in with difficulties adjusting to stimulant medication. He hated school and was dependent upon his mother to help him complete homework assignments, reports, research papers, and to study for tests. During the IM cognitive training program, he began to tell his mother that he could “do it alone” and started completing homework himself. This progressed to writing research papers without her help. He then began to actually prepare for tests without her assistance, something he had never done before. To our surprise, at the end of the program he asked if he could stop taking the medication for school and only use it for tests (we convinced him of this latter point, he actually wanted to stop medication completely). His mother reluctantly agreed. This young man has

continued to progress. Last year a mutual acquaintance indicated that he was in high school and "doing great."

Testing before and after the cognitive training (either IM alone, Brain Training alone or both programs) has consistently revealed significant improvement in attention functioning equivalent to the use of medication, in some cases improving over medication. This is not to say that cognitive training should replace the use of medication. The cognitive training allowed medication to become a tool rather than something people have to rely upon to get through life. Even more importantly, children and adults are feeling "smart" and able to think better. Another example is of a girl who thought that she was "stupid" and at the time we did the training she had just been caught cheating from her neighbor's paper in order to pass her classes. Perhaps the most important change that occurred that summer was that she began to read for the first time on her own without direction or prompting. When she first picked up a book and started to read, everyone in her family was shocked. It is understandable why she hated reading when on the pre-testing prior to starting the IM program, she thought that the nonsense words she was asked to read to determine her phonetic, word attack skills were "real words." Imagine my surprise when I learned following the testing that she was in tears because she could not read the words she thought were "real." Testing that followed completion of the program showed progress from a third grade to college level (grade of 16.9) on this particular measure of word attack skills. This girl returned to school that fall and became an "A/B" student (prior to the program she was a "C/D" student). She has loved school since that time and recently starred in the school play.

Those individuals who are bright get brighter following cognitive training; those with problems improve to function within average limits. College students have been helped, study skills have improved, as well as attention and concentration on the same measures administered to diagnose their attention disorder. Their attitude towards school and even life improves. One woman in her fifties claims renewed energy and memory as well as the ability to recover from some of the "fogginess" she felt since entering menopause.

The aged have also been helped and we are using this program for treatment of dementia. One man who was in his 70s when he started cognitive training showed initial improvement completing the IM program; however, more importantly, in continuing the brain training (which he has been doing for approximately five years now) he has been able to "weather the storm" of life events of diagnosed sleep apnea, the death of his wife, and a worsening cardiovascular condition. Today, as he moves into his late 70s, he is still functioning close to average limits for his specific age range, showing minimal decline from the dementia and continued improvement from the original assessment prior to starting cognitive training.

The IM program has also been helpful in addressing some of the emotional disorders associated with ADD such as anxiety and depression as well as post traumatic stress disorder (PTSD). I always tell people that one cannot be anxious and complete the program, which forces people to give up their anxious feelings during the program, ultimately decreasing anxiety when not doing the program. Eventually their own belief system in combination with realization of improved functioning in their daily life results in increased self-esteem and diminished depression. We have used IM to "break through the presence of trauma, the flat affect and disassociation that is present in these patients."

The Brain Training program, usually implemented following the IM program, has revealed improved memory functioning when comparing pre and post-testing results, specifically pointing to the help received in the use of memory strategies, as well as remediation of the cognitive deficits associated with the executive reasoning, frontal processes.

Decreased thinking rigidity, improved problem solving skills, and processing information more efficiently are some of the improvements noted to date on evaluation and by clinical report. Improvement has been obvious enough to be seen by the professionals treating these individuals, teachers in the school setting, the treating neurologist, the parent or spouse, or the individuals themselves.

Pre and post-testing revealed continued significant improvement in a woman in her late fifties who had been involved in her second car accident. My parents recently began the Brain Training program and report feeling more alert and that their day-to-day working memory is better. Children from age five years and up enjoy this program, which systematically helps cognitive deficits associated with the frontal processes: selective attention, integration, sequential analysis, abstract reasoning and problem solving, as well as word retrieval. The various activities on the computer and played as games enhance written and oral output skills as well as the integration of the knowledge the child does possess, resulting in their ability to use what they have learned, augmenting their academic learning in the school setting. No one from age 5 to 88 years complains about this program and instead they look forward to every training session.

Case in Point

A 10-year-old boy who is the oldest of four children living with his grandmother due to his mother's illness, grew up in a number of different households and went to several schools. Following IM, he connected to his grandmother for the first time, his emotional tone or affect became less wooden, and he began to relate to peers and not just adults. He had emotions.

Case in Point

An adult was allowing his boss to berate him and abuse him until he became suicidal.

After IM training, he was able to talk about his family and learned that his boss had the same qualities as his father. He began to experience emotions sufficiently to negate the effects of his abusive boss (the boss did not change) to connect with his own family, as well as his family of origin, for the first time in 10 years he was close to people.

Treatment for PTSD clinically resulted in the following changes:

- A general increase in emotions
- Increased facial expressiveness
- More energy and less fatigue
- The greater tendency to take risks in relationships in any situation where the possibility of failure exists, such as at home and school or when performing in sports

Finally, in addition to cognitive training there are a range of programs that we have found necessary to provide a full range of rehabilitative services at our facility:

Additional services/programs to enhance success and treat diagnosed deficit areas:

- Summer camps that focus on language, reading, mathematics, and social skills.
- Home tutorial programs that provide one-on-one study skills, including the organization of the child's study time and addressing the needs of each of their classes
- Study strategies: Addressing memory, organization, writing sentences, and studying for a test. Methods employed to maximize their time and performance
- Mathematical concepts: Addressing the principles of mathematics and learning how to anticipate and comprehend the use of numbers.
- Speech and language help: Remediation of speech problems, language and output writing problems, and the skills necessary for reading.
- Fisher Academy: the rehabilitation school designed to specifically address frontal lobe disorders, cognitive symptoms specific to deficits related to impaired frontal processes which prevent/negate learning in the academic setting. This is a project to re-write school curriculum which began in 2004 and continues to date.

SECTION D

Treatment Options: Directions and Pathways to Success

Part IX: Neurochemistry of ADHD: Treatment and Implications

Donna Lynn Antonucci

*Department of Pediatrics, Children's Hospital of Philadelphia, St. Christopher's Hospital for Children,
and Private Practice, Neurodevelopmental Pediatrics, Philadelphia, Pennsylvania, U.S.A.*

INTRODUCTION

The definition of attention deficit hyperactivity disorder (ADHD) has changed over the years, but the core symptoms of this neurobehavioral syndrome continue to be defined by specific behavioral characteristics, which include persistent difficulties in inattentiveness, hyperactivity, and impulsivity in the different subtypes (88,145). George Still described the disorder in 1902 (171). He described a group of children who had "morbid defects of moral control." He postulated both organic and environmental causes for the behavior. The changing diagnosis of ADHD echoes the altering conceptualization of the disorder. Because more scientific data is collected and research tools become more sophisticated, the concept of the disorder and diagnostic criteria will continue to evolve and become more refined. Better understanding of the neurochemistry of ADHD will be a crucial building block in this process.

The prevalence of ADHD is fairly consistent across diverse geographic, racial, and socioeconomic populations. Differences in reported prevalence rates among countries are largely a result of definitions used and not from geographical differences (98,99,104). It is estimated that ADHD affects up to 8% of school-age children (100). At least half of those, who have ADHD in childhood, continue to experience functional impairment into adulthood (101,102,104). The effects of ADHD reach into many aspects of an individual's life resulting in impairment of peer, family, and adult relationships, school or occupational function, leisure activities, and self-esteem (105).

The etiology of ADHD is most likely a complex interplay of factors, which include neurobiologic, genetic, environmental, and central nervous system (CNS) insults. This chapter will focus on the neurobiochemical underpinnings of ADHD and the treatment implications.

During the more recent past, the conceptualization of the mechanisms underlying psychotropic drug action has been modified dramatically. The neuron's internal working has been unraveled by molecular biology. Simple models of deficit or excess of specific neurotransmitters have developed to one of complex interactions and interconnected events happening within rather than among the

cell membrane walls. Neurotransmitters and synapses are only a part of this mechanism.

Psychopharmacology has been greatly influenced by the advances in genetics. Pharmacogenetics will play a vital role in clinical practice in the future. Genetic Influences on drug effects are pharmacogenetics (9). Pharmacogenetic knowledge may greatly contribute to therapeutic choices (1,9).

NEUROBIOCHEMISTRY

There are many neurotransmitter systems in the brain (2,3). Clinical psychopharmacology basically concerns itself with six systems, which can be subdivided based on anatomic characteristics, neurotransmitter receptors, and the intracellular integration of receptor-mediated responses. Anatomic organization of neurotransmitter systems determines the behavioral affiliation, while the neurotransmitter receptors modulate the electrical or biochemical properties and receptor-mediated responses, which lead to immediate or delayed effects on neuronal function (2,3,123).

The most prevalent and widely distributed group includes the glutamatergic and GABAergic neurotransmitter systems. Because of their widespread distribution, these two neurotransmitter systems affect many neuronal systems and consequently have significant functional implications (2,3,123).

The cholinergic, serotonergic, noradrenergic (NE), and dopaminergic (DA) neurotransmitter systems contribute to the second group. All four systems begin in small groups of neurons, which are densely packed in a defined area of the forebrain or brainstem. Typically long-range fibers project to a specific target area. Modulation of selected neuronal systems produces a more circumscribed effect (2,3,123).

ADHD is best understood by the action of multiple neurotransmitter systems. DA and NE are catecholamines (127). Dysfunction in both the DA and NE pathways and abnormalities in the frontal networks (frontal striatal dysfunction) are among the factors implicated with ADHD (3,8,10,12–15).

About half of all the NE neurons are located in the locus ceruleus (LC) and the remaining are distributed in the tegmental region (2). NE neuron cell bodies, which are located in the locus ceruleus, provide extensive innervation to the cortex, hippocampus, thalamus, cerebellum, and spinal cord. These pathways mediate behavior, cognition, mood, emotions, and behavior (3). Dysfunction of the LC is hypothesized to underlie disorders in which mood and cognition overlap, such as depression, anxiety, attention and, processing information (3,48). NE is synthesized in specialized cells of the LC. The LC plays an important role in the regulation of NE through its reciprocal connections in other parts of the brain (48). Once NE is released from the LC, NE stimulates the prefrontal cortex (PFC) via long axons (3,48).

The work of several groups (133,177,178) has supported the neuroanatomical basis for the NE theory. Several networks are involved by selectively inhibiting the processing of irrelevant sensory stimuli and priming the PFC for processing task-relevant stimuli (1,128,133,178). These networks include the prefrontal–posterior parietal-locus ceruleus pathways (1,128,133,178).

In normal human volunteers, NE manipulation influences certain cognitive processes, especially those which are dependent on an intact PFC (174). Tests of sustained attention, working memory, and planning, and certain forms of covert orienting of attention are included in these processes (174). NE has a significant

role in regulating the capacity for conscious registration of external stimuli (175,176). NE manipulations seem to modulate performance of paired associates' learning and sustained attention (174).

When considering disorders of attention, concentration, working memory, and speed of information processing, "alpha-2 postsynaptic receptors may be important in transducing postsynaptic signals regulating attention in postsynaptic target neurons" (4,48). Both presynaptic and postsynaptic NE receptors are involved in NE theory of deficit in ADHD. Stimulation of the presynaptic receptors puts the "breaks" on the LC, while stimulation of the alpha-2a receptor makes postsynaptic neurons more responsive to specific inputs (48).

Preclinical studies have suggested a possible role for clonidine and guanfacine in enhancing cognitive function in the PFC. A relatively small number of clinical studies have documented a positive behavioral response with less-clear benefit regarding cognition (49). Although not Food and Drug Administration (FDA) approved, the alpha 2-agonist medications such as clonidine and guanfacine, have been shown to decrease ADHD symptoms (125,126).

The "DA hypothesis" postulates that the primary sites of action of the stimulate medications are the dopamine pathways (mesocortical and nigrostriatal) (13,18,147,178). Several research groups have confirmed that the DA pathway is the primary site of action of methylphenidate (MPH) (124,140,141,180). The DA system is extremely complex secondary to the multitude of DA receptor types and subtypes, their locations and functions (3). The mesocortical pathway is the most relevant to the ADHD discussion. The DA cell bodies arise in the ventral tegmental area of the brainstem and project to areas of the cerebral cortex (82). The mesocortical pathway is important with cognitive functions, concentration, arousal, and attention. DA enhances the signal. Mesocortical DA projections play a role with many cognitive functions. These functions include verbal fluency, serial learning, vigilance for executive function, sustaining, and focusing attention, prioritizing behavior, and modulating behavior based upon social cues (3). Separate mesocortical DA systems project to the dorsolateral and medio-orbital cortices (3,82). Dysfunction of the dorsolateral area involves impairments in attention to detail, poor generation of response alternatives, inappropriate preservation, and difficulties with working memory (3,82). Dysfunction of the medio-orbital area involves greater difficulties with impulsivity, social functioning problems, and greater emotional liability (3,82).

DA manipulations influence certain cognitive processes in human volunteers. DA is predominantly involved with maintaining information online (174). DA has an important role in regulating the capacity to respond to external stimuli (175,176). Executive functions, which include planning and attention-set shifting are influenced by DA manipulations (174). The mechanisms by which DA modulates cognitive functions are only starting to be elucidated and better understanding will come in the future with more refined research tools used in conjunction with tests that assess cognitive function.

The PFC is of paramount importance for guiding behavior using working memory (2,3). Working memory is constantly updated. Information is refined, reprocessed, and integrated. Cortical-striatal-thalamocortical circuitry can enhance a signal or inhibit a distraction. This circuitry appears to be central to the pathophysiology of ADHD (3,137,138,139).

The pattern of neuropsychological deficits found in individuals with ADHD implicates deficits in executive functioning and working memory (19,134,138,139).

This pattern is similar to that found among adults with frontal lobe damage. This finding suggests that the frontal/PFC or pathways projecting to it are dysfunctional (138). The term frontal–cortical is used to describe behavioral or cognitive dysfunction that appears frontal in origin, but indeed may be influenced by subcortical projections (5–7).

NEUROIMAGING

There have been several controlled neuroimaging studies done with ADHD children, adolescents, and adults. The number of subjects in each of the studies is small. Subtle anomalies have been described in the frontal cortex and in projecting subcortical structures (132). Further evidence is found with functional brain studies (132,140,141), which support the frontosubcortical system involvement in the pathophysiology of ADHD (96). The frontosubcortical system is rich in catecholamines. Zametkin and Rapoport (8) have postulated that ADHD consists of dysregulation of inhibitory influences of frontal–cortical activity (predominately NE) on lower striatal structures (predominately DA). In other words, striatal structures are driven by DA agonists, which then are modulated by higher inhibitory structures sensitive to adrenergic agents (8,96).

Many of the neuroimaging studies involving ADHD subjects have investigated structural and functional predictions drawn from Barkley's inhibitory control theory of ADHD (19). Anatomic measures using neuroimaging techniques [computed tomography (CT) and magnetic resonance imaging (MRI)] consistently show an approximate 10% decrease in the size of the ADHD-associated regions of the brain in subjects with ADHD as compared to controls (12–17). Nonspecific abnormalities, atrophy, symmetry, and heterogeneous findings have been found in some CT studies (129–131). MRI studies have shown smaller associated areas, which include the basal ganglia (caudate and globus pallidus) (15), cerebellum (16,17), and frontal lobes (132) as well as a smaller prefrontal region (132) and abnormalities in the corpus callosum (132). These areas are dopamine receptor-rich or linked to dopamine receptor-rich regions. These initial reports support a biologic basis for the disorder and that group differences exist (131,132). This is group data. Neuroimaging measures are research tools only, not diagnostic instruments (38).

Neuroimaging using different techniques has supported physiological differences in brains of individuals with ADHD (132). Functional MRI has demonstrated decreased blood flow to the anterior cingulate and increased flow in the frontal striatum (28). Positron-emission tomography has been used to examine cerebral metabolism. Cerebral metabolism is a measure of neuronal activity. Adults with ADHD showed decreased metabolism compared with controls (10). Both global and regional glucose metabolism was found to be reduced in studies completed by Zametkin (96). The greatest reduction in metabolism was demonstrated in the premotor cortex and the superior PFC. Single-photon emission CT (SPECT) imaging could be used to visualize dopamine transporter (DAT) in the human brain (135). Using SPECT imaging, Krause demonstrated that there was increased striatal DAT protein in adults with ADHD as compared to controls (11).

Functional neuroimaging studies are beginning to shed understanding into the many brain regions involved in inhibitory control. Any of these many regions may be dysfunctional in ADHD. Regions of particular importance might include the right and left PFC, anterior cingulate cortex, and the ventral and medial PFC (10,20–22). Evidence supports that the right inferior PFC may be important

for recognizing inhibitory stimuli and stopping an influential response (23–27). Recruitment of working memory may occur from this action. This would involve the dorsolateral PFC (28,29). If conflict is involved, the anterior cingulate cortex may be recruited (30). The anterior cingulate cortex may further recruit the dorsolateral PFC to allow greater cognitive control on subsequent trials, thus avoiding future error (31). The ventrolateral and medial–frontal areas may play a role in assessing risk and reward value of stimuli, “biasing” the individual’s tendency to respond (32–37).

Diffusion tensor imaging is a novel noninvasive visualization technique of white matter fiber tracts in the human brain (39). Projections among brain regions can be seen in three-dimensional diffusion tensor dataset, according to the directionality of the fibers. Systematic studies of both development and disease progression can be potentially followed. Preliminary data from Ashtari et al. support the hypothesis that alterations in brain white matter integrity in the frontal and cerebellar regions occur in patients with ADHD (40). These findings may implicate the corticopontocerebellar circuit in the pathophysiology of ADHD. This suggests that the circuit, which connects the frontal lobe and the cerebellum, is not efficient in subjects with ADHD (40). Ashtari (40) also found that fiber pathway abnormalities were less pronounced in ADHD children who had been treated with stimulant medication, compared with those who had not.

Neuroimaging studies support that brain abnormalities in the frontal–subcortical networks exist and are associated with ADHD (38). Collectively, studies support that specific components of attention involve widely distributed but distinctive cortical systems, with mechanisms associated with perceptual control in both selective attention and divided attention involving primarily parietal and inferior frontal sites, and executive function engaging distinct anterior–frontal regions (41). Although studies demonstrate that dysfunction in arousal, behavioral inhibition and attention associated with ADHD may result from structural abnormalities in the frontostriatal regions (127,134,136), which result in diminished activity essential for normal function, neuroimaging techniques are not valid tools for the ADHD diagnosis (38). Results display group mean differences. Imaging measures are not sensitive or specific enough to be used for diagnostic purposes in individual patients. The overlap in findings among individuals with and without ADHD has high rates of false positives and false negatives. At this point in time, neuroimaging techniques are research tools.

GENETIC CONSIDERATIONS

Many twin studies have provided support that ADHD is a highly inheritable disorder (50,51). Heritability estimates for ADHD in many twin studies ranged from 0.64 to 0.98 (54–58,77). Findings support that the behavioral traits of attentiveness and hyperactivity–impulsivity have different genetic determinants (52). The mode of transmission is more than likely due to many genes, each exerting a small effect (77,85).

Dopamine genes were the initial candidates for molecular studies, based on the DA theories of ADHD (13,124,147). Numerous animal and human molecular genetic studies link the genetic polymorphisms of the 10-repeat allele for the DAT1 (42–47), as well as the 7-repeat allele for the D4 receptor gene (DRD4) (86), and more recently D5 receptor gene with ADHD (172). Genetic polymorphisms at three NE genes (alpha-2a receptor, alpha-2c receptor, and dopamine

beta-hydroxylase) were additively associated with an increased risk for ADHD in a population of individuals with Tourette syndrome (53).

The coloboma mouse strain exhibits the synaptosomal-associated protein 25 gene (SNAP-25) deletion and demonstrates hyperactivity behavior, which is decreased with D-amphetamine (D-AMP) but not MPH (148). Both agents act at the presynaptic terminal, but increase synaptic DA concentrations by different mechanisms (91). The mechanism of action of MPH occurs by blocking the DAT (91). It is ineffective without available DA. D-AMP reverses DAT (91). This results in DA release. This mechanism of action is not inhibited by reserpine pretreatment (a drug that depletes vesicular stores of catecholamines). Genes such as the SNAP-25 may be contributing a role in drug response (106,142,143). The human analogue of the SNAP-25 gene was investigated in which a genetic inheritance of ADHD was suspected (143). There was not significant linkage detected between the human SNAP-25 and coloboma mouse loci (173).

DAT knockout mice were described by Caron et al. in 1996 (146). This strain of mice lacks the gene that encodes for the DAT. The DAT controls DA activity by reuptake of DA from the synapse into the presynaptic neuron (2,3,78,88). Extracellular striatal levels of DA in mice lacking functional DATs are approximately five times that of wild-type mice (149). DAT knockout mice demonstrate profound hyperactivity in novel and stressful environments throughout the circadian period, but not in the home cage (146,150,151). Both MPH and amphetamine (AMPH) work in the DAT knockout mice, but their effect does not appear to be mediated by increased striatal DA but by the 5-HT (serotonin) system (152).

Children with ADHD have not been found to respond to serotonergic agents (96), but researchers have not yet identified and treated DAT homozygous knockout individuals that may have a similar response as the animal model. There is increasing information concerning extensive interaction between the 5-HT and catecholamine system (169) as well as the fact that 5-HT agonists may reduce motor activity in the rodent model of ADHD (168). Reviewing multiple studies, the 5-HT system does not appear to play a major role in ADHD, but it may have a significant role in the modulation of aggressive behavior, which is often associated or comorbid with ADHD (170).

The animal models are very helpful and necessary. These rodent models are encouraging and provide a means to evaluate potential etiologies and neurological alterations possibly occurring in humans.

Genes play an etiologic role in ADHD, but results from segregation analyses suggest that environmental factors also are involved in the pathogenesis of ADHD (59-61). Candidate DA- and NE-gene polymorphisms are found widely distributed in the population. Finding one of the gene polymorphisms increases the relative risk for ADHD, only slightly. Other genetic factors are contributory. Moreover the genetic epidemiology of ADHD suggests that not only does a candidate gene likely interact with other genes, but also environmental factors [psychosocial stressor (62-66), toxic insults (67-76), and physical assaults on the brain] play a role to produce ADHD. Psychosocial adversity in general and low social class, maternal psychopathology, and family conflict increase the risk for ADHD and associated morbidity independently of gender and other risk factors (165). Paternal ADHD and maternal smoking during pregnancy have been identified as independent risk factors for ADHD (166,167).

Genes influence susceptibility to ADHD. This is a very complex mechanism, considering that aberrant genes that create a vulnerability to ADHD are not always expressed in all environments (77). It is unclear if environmental insults are needed

for ADHD to emerge. Evidence supports the possibility that ADHD is genetically heterogeneous (77). No single pathophysiologic profile of ADHD exists, but studies support that dysfunction in the frontosubcortical pathways are implicated (79). The frontosubcortical pathways control attention and motor behavior (79). Evidence from animal models of hyperactivity (48,49,80–84) and clinical experience demonstrating the effectiveness of stimulant medications (90) support that catecholamine dysregulation is at least one source of ADHD brain dysfunction.

The genes are the blueprint and code for important proteins and enzymes needed for cellular function. The genetic underpinning and its relationship to ADHD are probably indirect. There are many mediating factors that are related to the neurochemistry and neurophysiology.

PHARMACOTHERAPY CHOICES

ADHD is the most commonly diagnosed neurobehavioral disorder of childhood (145). Treatment options for ADHD need to include a multimodal approach. The Multimodal Treatment Study of Children with ADHD (MTA) trial, sponsored jointly by the National Institutes of Health and the Department of Education found that stimulant medication used in conjunction with behavioral modification was the most effective treatment option for ADHD (103,108). The MTA study is a formidable collaborative effort, which brought together empiric data to the ongoing controversy concerning the safe and effective treatment for children with ADHD. Medication treatment with stimulant medication was consistently superior to behavioral treatments alone. There was an added benefit of psychosocial treatment for key symptoms underlying dysfunctional behavior. Treatment of ADHD should include consideration of pharmacotherapy. Stimulants are among the most well studied and safest agents used in pediatrics (87). The stimulant class of FDA-approved medications for the treatment of ADHD includes MPH and AMPH. Non-stimulant medications that are FDA-approved to treat ADHD include atomoxetine.

Pharmacotherapy for ADHD had its beginning with synthesis of AMPH in 1887 by L. Edeleano. Ephedrine, which is an extract from the ephedra plant, was used to treat asthma and was in limited supply in 1927. Gordon Alles, a graduate student at the time was assigned the job of synthesizing it. Although he did not achieve success with this job, he did discover that an extract he made did increase alertness and decrease fatigue. After patenting the extract of racemic AMPH in 1932, he sold it to Smith Kline and French. The product was marketed as Benzedrine for the treatment of nasal congestion and asthma (164).

In 1932, Charles Bradley found that when Benzedrine was administered to children with nervous disorders, a significant improvement in schoolwork occurred (160,161). Benzedrine was utilized in patients after they underwent lumbar puncture procedures to obtain cerebrospinal fluid (CSF). Frequently patients experienced headaches associated with the procedure, which were thought to be secondary to CSF lost during the procedure. Bradley postulated that Benzedrine would increase the rate of CSF production by the choroid plexus and would minimize the headache (162). Headaches were not reduced, but teachers noted significant improvement in schoolwork. Bradley investigated these findings further. He documented with several neuropsychiatric measures that both behavioral and academic improvement occurred (160,161). In 1950, Bradley published similar results for D-AMP (163).

MPH was first made in 1944 by Panzion. It was a cyclized derivative of AMPH (159). In 1954, the synthesis was replicated by Mier and it was marketed

by Ciba-Geigy as a geriatric medication (143). Because of the similar chemical structure to d-AMPH, MPH was used in children with behavior disorders.

Stimulants are sympathomimetic drugs that are structurally similar to endogenous catecholamines (NE and DA). AMPH and MPH are believed to act in the CNS and peripherally by enhancing DA and NE neurotransmission (88). Studies have demonstrated that AMPH and MPH block the reuptake of DA and NE into the presynaptic neuron (89–91). When AMPH is taken up into the presynaptic neuron, it not only blocks the transporter protein, but also affects many aspects of neurotransmitter release, uptake, and storage. MPH more specifically inhibits the transporter protein only (91).

Because stimulants have somewhat different mechanisms of action, some patients may respond preferentially to one or another (92,93,106). Optimal treatment may not be achieved until a trial of both stimulants has occurred. A trial of both stimulants is not unreasonable and may help tremendously in tailoring the medication regime. Studies comparing the stimulants have demonstrated comparable efficacy, but there exists much individual variability (93). The response rate for any one stimulant is about 80%. No predictors of a response have been identified (93).

Reviewing the older literature, in a 1968 article, which appeared in the *Journal of American Medical Association*, Millichap stated “methylphenidate is the drug of choice and AMPH sulfate is the second most successful drug” (153). This conclusion was based on all reported cases at the time treated with MPH (337 patients; 84% improvement) and AMPH (patients; 69% improvement). Other issues such as response measures, patient populations, or dosing were not considered. This misinterpretation has persisted for many decades (143). For example, the 1980 edition of Gilman’s pharmacology text (143,154) not only endorsed MPH as being superior to AMPH, but also supported MPH as the choice for hyperkinetic children based on Millichap’s conclusions. MPH was used widely in research studies during the 1970s and 1980s (78,155). Ritalin was heavily marketed in scientific and clinical journals, which increased MPH’s acceptance as the drug of choice. It was believed that MPH was very different from dextroamphetamine (143). Despite Barkley’s 1977 review article (15 studies using AMPH showed 74% improvement, 14 studies with MPH showed 77% improvement) (155) and multiple placebo-controlled studies (156,157), the misperception continued. Articles by Elia (106) and others (92,142,158) review comparative studies showing similar efficacy and safety profiles, which support the notion of preferential responders and a trial of both agents is needed to determine which one works best and has the least adverse effects in a patient. Because various stimulants have somewhat different mechanisms of action, patients may respond preferentially to one or another (92).

Atomoxetine is a potent inhibitor of presynaptic NE transporter (reuptake pump). It is a newer compound for the treatment of ADHD. Clinical effect is similar to NE-selective tricyclic antidepressants (TCA) (i.e., imipramine and desipramine) without the plethora of TCA-mediated adverse events (94,95). Atomoxetine has minimal affinity for other NE receptors or other neurotransmitter transporters or receptors (94,95). The mechanism of action in ADHD is very specific to the adrenergic system with no direct effects on the dopamine system (94,95).

A meta-analysis of 55 studies found greater effect size as expressed by standard means differences for both long- and short-acting stimulants as compared to nonstimulant medications such as Atomoxetine (107). Comparative studies have supported clinical findings—Atomoxetine is effective, but for many patients, it does not work as well (143).

PRACTICAL CLINICAL GUIDELINES

Choosing a medication for pharmacological treatment of ADHD can be quite challenging. Safety profile, adverse events, and dose-response efficacy are of paramount importance to know and need to be incorporated into a doctor-patient discussion. Other practical points include how well tolerated the medication is, frequency of dosing, design of the delivery system (i.e., rapid onset and extended duration of effect), formulation of the medication (i.e., sprinkle), and range of dosing strengths available to facilitate the titration to optimal dose. Last but not least, recalling the established neurobiochemistry of ADHD, it is important to consider when choosing a medication. Having a pharmacological treatment that directly works both on DA and NE is important to keep in mind, especially when choosing a first choice medication.

Dosing to optimal response is extremely important and needs vigilance not only when pharmacotherapy is begun, but also throughout treatment. Frequent assessments obtained from multiple settings are necessary. Assessment techniques vary from objective rating scales to subjective narratives and verbal reports. Assessments need to be done regularly to provide optimal treatment.

Long-acting preparations of stimulant medications (MPH and AMPH) are excellent first-choice agents for ADHD. Hundreds of short-term and several long-term studies continue to reinforce the safety record and efficacy of stimulants (78). Response rates approach over 80% for each of these agents and higher when both agents are considered together (106). It is important to keep in mind that both AMPH and MPH target the DA and NE neurotransmitter system. It is imperative that a trial of both MPH and AMPH be considered for each patient so that pharmacological treatment can be optimized. Optimization of treatment (both pharmacological and nonpharmacological) is the standard of care.

Several long-acting stimulant preparations are available, which have revolutionized the treatment of ADHD. These agents can provide a patient with extended coverage over 8 to 12 hours (depending on the preparation). Long-acting stimulant medications are not new drugs, but the same compounds using different delivery mechanisms. There is a tremendous need for once-daily dosing forms of medications to treat ADHD. ADHD permeates into many aspects of a patient's life. According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) (145), symptoms persist across multiple domains of functional impairment. ADHD is a persistent and chronic disorder. The American Academy of Pediatrics treatment guideline (144) confirms that ADHD is best treated to maximize function across multiple domains, including schoolwork, homework, social stigma, and peer-to-peer interaction. There is increasing recognition for the need of symptom coverage that will apply to extracurricular activities and social interactions with peers, coaches, and families, as well as to be effective during homework time. There are numerous problems in using multiple daily doses. Privacy is one. Self-esteem can be affected in a negative way if a child needs to report to the nurse on a daily basis. Security and diversion of short-acting stimulants is a potentially dangerous problem and needs constant surveillance.

Despite the need for long-acting stimulant preparations, short-acting preparations still play a vital role; for example, to augment the duration of action of a long-acting medication or to adjust a dosage regime on the weekends or holidays, when full day coverage may not be needed. Only after a discussion between the patient/family and healthcare provider, can a decision be made. Careful monitoring and consistent periodic feedback is of paramount importance.

SUMMARY

In summary, the pathophysiology of ADHD is complex and appears to involve several neurotransmitter systems; the most likely are DA and NE systems. The mechanism of action of stimulant medications involves both the NE and DA systems. Atomoxetine appears to work mainly through the NE system, with no direct effect on the DA system.

Many psychotropic medications are available to treat ADHD through a lifespan. The challenges of treatment are many. Psychopharmacology is brought to life by ongoing advances in not only neurobiochemistry and basic pharmacology, but also genetics and neuroimaging. It is not unreasonable to project that in the future an individual's specific and unique pharmacogenetic information, which impacts on neuropathophysiological and metabolic characteristics will permit clinicians to target treatment that will maximize and possibly enhance optimal response, while minimizing adverse effects.

ADHD is a common, heterogeneous condition (99,109). ADHD is a developmentally sensitive disorder (110–115). Neurodevelopmental lag is at least part of ADHD. Functional impairment associated with ADHD symptoms can continue throughout a life span. There are a variety of symptoms that vary in severity throughout a lifespan. The specific symptoms and the functional impairment often change over time. The natural history of the disorder can be described using longitudinal follow-up studies (116–120). The risk of serious morbidity from ADHD and associated comorbid conditions is highest during adolescence and young adulthood (121,122).

Information to make the diagnosis of ADHD needs to be gathered from multiple sources—child, parents/caregivers, teachers, coaches, etc. Careful history taking from the patient (or parent) that also includes family members' medical/mental health assessment, needs to occur not only at the first visit, but also updated at subsequent visits. Attention to possible comorbidity needs to be considered at each visit. Careful differential diagnostic assessment, which includes psychiatric, social, cognitive, educational, developmental, and medical/neurological history as well as a physical/neurological examination needs to be part of the evaluation and ongoing follow-up appointments. Pharmacotherapy is part of the treatment plan, not instead of other interventions or after an intervention has failed.

The concept of executive dysfunction is a useful way of considering the underpinnings of ADHD. The neurotransmitters, DA and NE, play key roles in the brain circuits that support executive functions. These brain circuits include, but are not limited to, the PFC, the basal ganglia and the cerebellum, as well as other areas in the brain, particularly in the right hemisphere.

Treatment strategies regarding ADHD have a developmental perspective. Both medications and behavioral treatments affect brain function. Expectations of treatment need to be realistic. The healthcare provider and patient/family must have ongoing discussions throughout treatment. Included in this process is a careful definition of target symptoms, goals, and probable results of a consistent, compliant treatment program.

One of the major ingredients for successful intervention with medication is based upon realistic expectations of pharmacotherapy. Before medication is begun, the patient/family needs to be aware of the risks and benefits of pharmacotherapy, as well as the availability of alternative treatments and the likely adverse effects associated with the medication. It is imperative to discuss the consequences of untreated ADHD. Therapeutic intervention must start as early as possible. A delay

in treatment can negatively impact on the patient's social capacity, the chronicity, as well as the severity of the disorder, and the occurrence of complications.

Long-acting pharmacological preparations can provide extended coverage and should be considered first, when deciding upon a medication as part of the treatment. The stimulant medications, AMPH and MPH compounds, remain the first choice agents for ADHD not only because of their proven efficacy and safety throughout the decades (78), but also because the response rates are over 80% for each of these agents (106), probably because stimulants target numerous neurotransmitter systems. Because preferential responders exist (106), a trial of both AMPH and MPH should be considered during pharmacological treatment to determine the medication that works the best and has the least adverse effects.

Pharmacotherapy as well as treatment of behavioral and emotional disorders needs to be incorporated into the treatment management plan. Target symptoms must be identified. Any effective optimal treatment protocol must include a multimodal approach, which is vigilantly updated and revised throughout a lifespan.

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Part X: Addressing Sleep: Why Is Sleep So Critical?

Barbara C. Fisher

*Brain Evaluation/United Psychological Services,
Washington Township, Michigan, U.S.A.*

A lack of sleep is both dangerous and life threatening—a signal of an undiagnosed underlying disorder that needs to be diagnosed and treated (1). In short, people cannot operate without sleep. Therefore it is just as important to diagnose the presence of a sleep disorder as it is to treat it. The following chapters discuss the more common sleep disorders, especially those disorders often seen accompanying attention deficit disorder (ADD)/attention deficit hyperactivity disorder (ADHD) whose primary treatment is behavioral. Insomnia is the most common sleep disorder affecting 30 to 50% of the general population with 9 to 15% reporting significant daytime sleepiness and impaired functioning (2). Cognitive behavior therapy is emerging as the single most effective treatment which is detailed in depth in the chapter on Behavioral Treatment for Sleep Disorders. The chapter by Drs. Rosen and Yu provide a unique treatment strategy for enuresis, a disorder that occurs in 10% of the 6 year old population diminishing to 3% by the time the child is 12 years of age. Finally, the sleep related breathing disorders, consisting of obstructive sleep apnea and upper airway resistance syndrome (UARS) is emerging as one of the leading causes of daytime sleepiness (3). Sleep apnea and UARS is a commonly seen co-related disorder that results in the “real ADD” turning into the ADHD hyperactive or combined subtype. This is a very serious disorder with far reaching consequences that requires the help of professionals from different disciplines to thoroughly address the problem. Suggestions via a decision tree approach are provided in the chapter discussion options for sleep related breathing disorders.

The recent interest in sleep is the result of public awareness of just how serious a sleep disorder can be, especially insomnia involving a perpetual state of sleep deprivation and a sleep-related breathing disorder whereby the neurological and physiological consequences can be pervasive.

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What We Should Expect: Normal Sleep Statistics

Barbara C. Fisher

*Brain Evaluation/United Psychological Services, Washington Township,
Michigan, U.S.A.*

In 2003, the National Sleep Foundation conducted a survey and interviewed approximately 1500 households. The majority of the population they studied was married and the maternal figure was the primary caregiver with an average age of 36 years and some college education. The population was predominantly Caucasian, and the average income was approximately \$72, 840 per year. A portion of the caregivers did not work, and of those who did, their work hours did not exceed an average of 38 hours per week. In short, you have your average professional or semi-professional household consisting of two parents in white, middle class America. The findings however are interesting in telling us what kind of a society we are becoming, realizing that 1500 people are not the entire population although in all likelihood representative of the population. For the most part the findings listed below are similar to what I see in my private practice.

Here are the caveats:

- Before the age of two years almost all children nap on a daily basis, however by age four years the frequency as well as the amount of sleep time decreases. By the age of six years only 2% of children nap, significantly reduced from the 15% that characterizes the five-year-old child.
- Children, 10 years and younger, sleep 9 to 13 hours. So, naps disappear and once the child sleeps, it is good solid sleep, allowing them to jump out of bed and continue running until they drop at bedtime. This means that children do not have the ebb and flow of adult sleep. It is a straight shot—they are awake and then they are tired.
- A significant number of parents, 1 in 10, felt that their child had a sleep problem. The marker was the time it took for their child to fall asleep and if exceeding 30 minutes, this seemed abnormal or if their child awakened during the night. Additionally, parents want to tuck their child in bed and know that they have fallen asleep. Thus they would be bothered by their child continuing to lay in bed after the entire sleep routine has been followed, still awake.
- A significant number of preschool children (52%) resist going to bed. They appear sleepy or tired during the day and 26% of the children snored. A good portion of the children, 19%, had difficulty waking up in the morning. School aged children had the most difficulty waking up.
- Now this is the surprising part; almost one half of the parents said that their doctor did not ask about sleep and only 24% indicated that their doctor even inquired about snoring. The older the child, however, the more the doctor asked about snoring.
- The most frequent bedtime routine was the parent reading to the child or the child reading to himself or herself, as well as brushing their teeth and taking a bath.

Children who read as part of their routine appeared to get more sleep than those children who watched television and played video games prior to bedtime.

- Parents spend less time in their child's room by the toddler age and this drops even lower for school age children. There was a correlation between children who had nighttime fears or nightmares and the presence of a parent in the room when they fell asleep. Other children, who did not have their parent in their room, woke up less.
- Most children do use a night light, however, school aged children were also likely to have a television. Television viewing did not yield positive results. Children tended to get less sleep due to later sleep times. Furthermore, those children who got less sleep at night were more likely to spend two or more hours watching television. Consequently, going to bed with the television on is not a particularly positive sleep experience as opposed to music playing throughout the night.
- Probably the most disturbing news is the following: children were more likely to have at least one caffeinated drink each day once they got older and the use of caffeine increased with the age of the child. Thus the pattern that children get less sleep and go to bed late, when they drink more caffeine.

So the question becomes what we are doing in our society to affect our children in this manner?

In other words, look at how many children have activities after school. It used to be that they might have one sport a week, or maybe they had scouts or a church group meeting. But now we have travel teams and that means several times per week and on the weekend. Even the recreational teams sponsored by the city or county meet several times a week now to practice before just going on and playing the sport. Everything has become more intense. The question is whether this is healthy or not. We have more substance abuse to worry about, more people with insomnia due to anxiety, and more people on medication for psychiatric disorders that often relate to the world we live in. We rush from here to there. There is so little time for anything. No time to get homework done, no time to just relax, no time to take a bath, no time for the dinner hour, no time to talk about your day. Do these children even remember all of these activities when they grow up?

Parents are tired; they come home from work, grab a fast food meal, and take their child to whatever scheduled event is planned for the day. Households tend to require two incomes to exist in today's society and meet the demands required in terms of finances. Or the children do not see their father because he works all of the time. What is the goal? Where is the right road? We are a video game society moving pieces and parts as fast as we can. Our children cannot wind down to sleep and neither can their parents. How many cups of coffee are sold per day? Then you say to the parent, well your child needs to get at least 9 to 13 hours of sleep per night, and the goal is probably at least 10 to 11 hours. In response, they groan, get frustrated, become overwhelmed, and reply: "How do you expect me to make this happen when there are all of these things we have to do after school, and when do we get homework done?"

So, what is the answer? Right now there is no easy answer except that everybody gets sick more often due to a worn out immune system and children go to school trying to learn only they are sleep deprived and less apt to recall the information they supposedly learned that day. Maybe we need to turn back the clock? Slow things down. Go back to the living of earlier times when you had to wait to get across town in a slow horse and buggy.

Barbara C. Fisher

*Brain Evaluation/United Psychological Services, Washington Township,
Michigan, U.S.A.*

In this book, there are chapters addressing the various sleep issues that may be associated with attention deficit disorder/attention deficit hyperactivity disorder (ADD/ADHD). These chapters provide the necessary information to determine if symptoms are significant enough to suggest the need for help from a sleep specialist to rule in or rule out the presence of a sleep disorder. Diagnosing the problem is more often 50% of the treatment. Therefore, by the time the diagnosis portion is completed, treatment has already begun. Chapters authored by renowned sleep specialists address symptoms and treatment for sleep-disordered breathing problems, restless legs syndrome (RLS), and periodic limb movements disorder (PLMD), targeting the major sleep disorders that are associated with ADD/ADHD. Doctors Yu and Rosen provide a very famous technique and script that has been a successful behavioral intervention for bedwetting.

The following are some general additional tools that can be used to treat commonly found sleep disorders. In working with a behavioral sleep medicine sleep specialist, the best method can be chosen for trial and tracked for positive effects. Changes are continually made until the problem is resolved. Generally, behavioral therapy is a short therapeutic process. Realizing that there are far more sleep disorders than those indicated below, the following disorders are included due to their connection with ADD/ADHD.

BEHAVIORAL TREATMENT FOR CHILDREN FOCUSES ON THE FOLLOWING:

- Bedtime limits
- Setting a bedtime routine and creating a positive bedtime hour
- Establishing the bedroom as a great place to sleep
- Common bedtime issues that may or may not become problematic with time
- Address insomnia if present, (see adult section)
- Address behavioral component of other disorders that are also treated by the sleep medicine specialist or sleep neurologist, such as narcolepsy and CPAP compliance (see adult section)
- Address behavioral component of psychiatric disorders that are also treated by the psychiatrist (see adult section)

Bedtime Limits

Set a bedtime limit that is appropriate for your child's age and consistent with his or her peers. In other words, if all the six year olds are going to bed at 7:00 or 8:00 in the evening, do not make your child go to bed at 6:00. It is very hard to get a child to bed when it is light out, so realize that bedtime naturally becomes later in the

summer. Do not acquiesce on the bedtime hour; this is limit setting and if you change, it becomes difficult to establish this structure. Children quickly learn which parent is going to follow through on what is said. Even if your child gets out of bed 10 times, they still go to bed at the same time.

Setting a Bedtime Routine and Creating a Positive Bedtime Hour:

- Create a specific bedtime routine that is followed every night. Maintain this as much as possible even on the weekends or when out of town. This consists of:
 - A snack that involves a dairy product: avoid candy or products with caffeine. I suggest a bowl of ice cream
 - Hygiene routine (e.g., washing up, brushing teeth, and face), putting on pajamas, getting the bed ready (e.g., cover off or stuffed animals)
 - Then, read a story to your child, dim the lights (creating a good bedtime atmosphere), and perhaps play soothing instrumental music in the background
 - Lie in bed and read to your child. You want your child to relax and go to sleep, so do not read a book that is very exciting, and if you have them read, this takes energy, so you might want to do that at another time of day because you want them to be lulled by your voice and fall asleep, not expending energy necessary for reading
 - Leave music on or have complete quiet; the television is truly problematic. First, it changes like the radio; second, you have no idea what your child is listening to at night, and finally, the kiss good night is the grand finale even if this includes kisses for the stuffed animals

Establishing the Bedroom as a Great Place to Sleep:

- Do not use the bedroom for time out or discipline; this is supposed to be a wonderful place to sleep
- Keep the room clean and environmentally conducive to sleep. It should feel comfortable—not too cold, not too hot, safe, and cozy
- Use low lighting for a soft atmosphere
- Use soft instrumental music

Common Bedtime Issues That May or May Not Become Problematic with Time:

Your Children Are Not Ready to Go to Sleep

Your children may have a delayed internal clock and are not tired. Let them read in bed until they go to sleep to adhere to bedtime or use bedtime fading. Bedtime fading is a method of helping to re-set the internal clock. Start with the bedtime at which your children are sleepy, which actually may be quite late at night, and gradually have them go to bed 15 to 30 minutes before that time, then waking them up with bright light in the morning consistent with the amount of sleep they need. This can become problematic if your child is not sleepy until 3:00 in the morning, similar to adult delayed sleep phase syndrome; however, you could start at 12:00 and work your way backward. The same system works with adults; however, you begin at 3:00 or 4:00 in the morning working your way backward by 30-minute increments using melatonin if needed to get to sleep and bright light in the morning

to wake up. Melatonin can be used with children as well; just make sure it is by prescription or in a pure form. There is also help from the functional medicine field that would make this process easier.

Your Children Do Not Want to Go to Bed

Your children are hungry; they are not tired; something lives under the bed; they want a glass of water; they are thirsty again; they want you with them; the dialogue goes on and on. Stand your ground, supply what is needed, and back to bed. Give one response for being thirsty, going to the bathroom, wanting to be tucked in, and kissed good night, checking the room, and stop. Then, do not respond no matter how loud the protestations; this is the time children determine who is in control, you or them.

Your Children Continue to Cry or Call from Bed or Actually Get Out of Bed

Structure and continuity are critical variables. If the parent gets up two times, this costs the child one job. If the parent gets up three times, it is two jobs the next day, and so on. These are rules set up during the day in a special ceremony where the rules are presented in written form and explained, and then posted on the refrigerator in the kitchen. Rules should always be printed and discussed in a formal meeting, then posted at a place where everyone sees them on a daily basis. I find that children do better with behavioral discipline that involves jobs. First of all, they have to do something; they do nothing when you take away something. Second, there is some "good" that comes from the discipline; you get your bathroom cleaned or dog stuff picked up. Third, you have something to be happy with your children about when they complete this task and it takes the negative out of discipline for both you and your children. It is the negative that results in people not wanting to administer discipline.

Every night that the children do not call out earns them a point, and then stagger the points. Initially, they earn a special dinner treat or fun activity of their choice at night for one point (one night equals one point). When the child has four good nights, then shift to earning one point for two good nights. Following four good nights, shift again to earning one point for three good nights, and so on. By the time you get to five nights the problem is already handled.

Your Children Have Nightmares and Begin a Pattern of Coming into Your Room to Sleep at Night

- Determine if there is a specific time that this occurs and rule out other sleep disorders
- Consider an overnight sleep study to rule out a sleep-related breathing disorder, especially if you hear gasps or snoring or mouth breathing.
- Talk with your child at length to figure out what is actually waking them up, and why they come into your bedroom. What do they feel that they need at that point?
- If there is a recurring dream, rule out the presence of some type of trauma in your child's life, for example, from someone picking on them continually in school or some event involving another person or place
- Create imagery prior to bedtime of confronting the feared stimulus and being successful in this confrontation. Arm your child with special powers, a coat of armor, identification with a superhero; create an imagery scene of

the child conquering the feared stimulus. Have a ceremony of conquering the fear, using all of the extras such as candles, special music, and so on. The more "hype," the bigger the impact upon the child. Sign a special document obtaining a promise to not be afraid, acknowledging internal strengths and capabilities

- When the child is successful, have a recognition ceremony. Repeat how strong and capable they are on a continual basis
- Teach hypnosis to calm themselves prior to sleep, and factor in positive concepts or images of handling the feared nightmare event

Your Children Have Night Terrors, Sleep-Walking Episodes, Rhythmic Movement Disorders (Body Rocking, Body Rolling, Head Rolling, or Head Banging)

- The first key is safety. Use gates, locks, closed doors, or alarms to keep the child safe from harm
- Do not attempt to wake the children; guide them back to bed if sleepwalking and do not discuss the event the next day
- Maintain a regular sleep schedule; avoid sleep deprivation
- Increase the length of sleep, with short naps or increasing naptimes, or an earlier bedtime, to avoid sleep deprivation and/or too much deep sleep to recoup lost sleep
- Medication is a final option when behavioral interventions are not successful
- Scheduled night waking for confusional arousals if the child has these events with regularity and they can be awakened prior to the time they would typically have the event

BEHAVIORAL TREATMENT FOR ADULTS FOCUSES ON THE FOLLOWING:

- Good sleep hygiene
- Rule out long-term psychophysiological insomnia and treat if present
- Rule out insomnia related to another sleep disorder, treat the associated insomnia, refer to sleep medicine or sleep neurologist for treatment of the sleep disorder creating the insomnia, if present
- Address behavioral component of other disorders that are also treated by the sleep medicine specialist or sleep neurologist, such as narcolepsy, CPAP compliance, safety issues, and family concerns related to rapid eye movement (REM) sleep behavior disorder, sleep related eating disorder and sleepwalking
- Address behavioral components of diagnosed psychiatric disorders that are also treated by the psychiatrist
- Address behavioral components of circadian rhythm sleep disorders (chronotherapy and sleep schedule alteration)

Behavioral Treatment for Any Sleep Disorder Always Begins with Good Sleep Hygiene

- Good sleep hygiene begins in childhood with the parent establishing a good sleep environment, structure of bedtimes and pre-bedtime routines, behavioral patterns that become routine and remain as an established process throughout an individual's life. Any structure that remains historical throughout one's life always helps to maintain continuity when times get bad, when the adult feels

affected by events beyond his control. Routines provide structure and stability (especially if historical since childhood), allowing the adult the comfort he needs to remain intact when he feels as if life events are swirling around him and he cannot cope anymore. This is also the reason why insomnia becomes so fearful, especially if associated with a traumatic event, and becomes so disturbing that the adult feels that he cannot control his sleep or thoughts. It is at that point that the loss of internal control in combination with the loss of external control renders the individual totally helpless and eventually hopeless, creating and maintaining depression in a hopeless spiral. So good sleep hygiene provides structure through time. Basic tenets of good sleep hygiene are as follows:

- Maintaining a consistent wake up and sleep time and using it consistently to match your lifestyle. (Alternating bedtimes by even one hour on the weekends can increase or bring back a return of insomnia or any other disorder that requires a specific structure around bedtime and rise time.)
- Determine how much sleep you actually need (Are you a short sleeper, long sleeper? Average sleep for an adult generally ranges from 6.5 to 7.5 hours per night, although this varies from person to person.)
- Develop a bedtime that is consistent with feeling sleepy (which involves, addressing circadian rhythm sleep disorder.)
- Use the bed only for sleeping (so the bed is not for worrying, eating, doing work, watching television, arguing or holding emotional life-changing discussions.)
- Avoid mental activities in bed that are going to be stimulating (There are people who read to get to sleep and it relaxes them.)
- Determine whether exercise prior to bedtime is a deterrent for you or helps you to relax and sleep better (Swimming often relaxes people more than it arouses them and they feel that they sleep deeper.)
- The general rule is to avoid daytime napping, determine if the power nap of 20 minutes bothers your sleep
- Make sure that the sleep environment is friendly. This includes lighting, clutter, comfortable mattress and bedding, temperature, and so on. Make sure that you are comfortable in your bedroom, examine alternatives if there is trauma associated with the room you sleep in
- Limit caffeine and alcohol use
- Have a light bedtime snack, if needed, that requires little digestive activity
- Use continual music throughout the night that is successful in limiting distracting thoughts, the tendency to review your day and think while lying in bed ready to go to sleep
- Draw the curtains at night so you awaken with bright light. (This may be problematic if a street light is outside your window or your bedroom faces a busy street, which may prompt consideration of changing the location of your bedroom.)
- Avoid long periods of remaining awake to curb sleep deprivation, which affects the quality of your sleep and can eventually lead to insomnia. People can become more depressed if they are awake during hours when the world is asleep
- Keep track of your sleep thoughts and problems by using a sleep log

Behavioral Treatment Approaches to Insomnia:

- Work with the treating sleep medicine specialist or sleep neurologist to rule out and treat disorders creating insomnia (i.e., restless legs, periodic limb movements, obstructive sleep apnea, upper airway resistance syndrome, parasomnias, narcolepsy, circadian disorders (especially shift work), night terrors, rhythmic sleep disorders, posttraumatic stress disorder, pain, fibromyalgia, menopause, thyroid disorders, sleep deprivation or sleep debt, depression, panic disorder, gastroesophageal reflux disease, Parkinson's disease, cardiovascular disease, pulmonary disease, dementia, seizures, other medical disorders or medications affecting sleep)
- Diagnose the type of insomnia (e.g., sleep onset, maintenance, early awakening): Adjustment or acute, inadequate sleep hygiene, psychophysiological, paradoxical, idiopathic, if it is related to childhood, substance abuse, medication use, medical condition, psychiatric or mental disorder. Did the insomnia precede the depression or vice versa?
- Addressing misperceptions about sleep, the anticipatory anxiety that develops toward sleep (worry about going to sleep once the person goes to bed), unrealistic sleep expectations (remaining in bed for long periods determined to go to sleep, the more determined the more anxiety and the less sleep one gets). The worry about sleeping should never be underestimated as the causal factors of insomnia. More worry about anything takes anxiety to new heights and ensures the development of a phobia. Once a phobia develops, then the problem takes on a "life of its own" and is clearly harder to treat, although still possible
- Address the thinking issues around sleep that drive insomnia: the three P's.
 - The predisposing factors (i.e., the person's temperament, anxiety level, tendency to make things worse or worse than they actually are, and low drive for sleep)
 - The precipitating factors (i.e., those events that triggered the first episode of insomnia; events that increase anxiety or arousal; loss of a loved one, hospitalization, fearful event, upsetting, or traumatic events in one's life)
 - The perpetuating factors (i.e., poor sleep habits, continual thinking and worrying about sleep, daytime naps, irregular sleep and wake times, less active lifestyle, and eating at night)
- Depression and insomnia often coexist due to the inherent predisposing and perpetuating factors present in depression: feeling empty and too sad to sleep (although the person could sleep more often initially, eventually they lose their drive to sleep, leading to more agitated and angry depressive states) and not caring enough to keep regular bed and wake times
- Separate out and consider the effects of individual sleep and psychiatric disorders, and develop behavioral intervention specific to the diagnostic factors inherent in the disorder.
- Separate out all of the variables surrounding the diagnosis of insomnia:
 - Children who have insomnia are at risk to have insomnia throughout their life. They may develop insomnia early due to personality and temperament characteristics of being more fragile emotionally, more sensitive to their environment and the opinions of others, and of course, more anxious. They typically have difficulty going to bed due to problems falling asleep unless

specific conditions are met: toys in the bed, blessing the toys in the bed, letting go of the problems of the day, letting go of the worrying, making sure the parents are not going anywhere, and so on. The insomnia may be associated with a lifelong depression genetically present in the family. Difficulties initiating sleep need to be distinguished from other disorders that would affect sleep

- Insomnia tends to be seen more often in women and during the aging stage of life. It can also be present in adulthood or young adulthood or be associated with emotional and physical factors related to a developmental change time such as menopause. Insomnia tends to increase whenever there is a major life-changing event, such as having children, a residential move to a completely different state or time zone, retirement, marriage or divorce, or death of an immediate family member
- Exercise has been found to improve sleep quality as well as mood. Exercising prior to bedtime may make some people more active. Generally, exercise resulted in improved sleep quality as a result of increased social and physical activity. The more people exercise the more they feel like sleeping
- Treatments address behavioral issues of excessive time in bed, irregular sleep activities in bed that do not enhance sleep (and instead keep the person more active) and poor sleep hygiene habits that maintain insomnia. Many people do not understand that continually changing their waking and sleep time leads to more insomnia; changing their time by even an hour makes a difference. Napping (if longer than 20 minutes) during the day is a sure-fire way to have sleep problems at night. The longer the nap the bigger the problem
- Use of specific treatments for insomnia. The cognitive therapies are:
 - Cognitive behavior therapy—incorporates the therapy types listed below that have been the most successful in treating insomnia. Cognitive therapy addresses the problematic thoughts around sleep, the misperceptions that create the performance anxiety around sleep, and the worry about what will occur if unable to fall asleep
 - Stimulus control—going to sleep only when sleepy, if not sleepy get out of bed and do something relaxing until sleepy, addresses the arousal associated with sleep while increasing the drive for sleep by making the person get out of bed
 - Sleep restriction—specifically addresses the drive for sleep and immediately cuts down the excessive time spent in bed; the person is limited to only the amount of time they actually sleep plus 30 minutes
 - Relaxation methods—targeting the primary arousal stimulus or issue that keeps the person awake. (This may be specific thoughts, learned behavior if childhood insomnia that has been in place for years, nightmares, or trauma related to sleep.)
 - Sleep hygiene education—what is a good bedroom environment, problem of napping, getting sleep in regimented manner with regular wake and sleep times, understanding the ability to control sleep, working with sleep drive and arousal state

Use of Hypnosis to Get to Sleep at Night

- Either have a tape made by a professional trained in hypnosis via a professional organization or learn hypnosis by working with a professional

- Generally, I find that making a tape accomplishes both of the above. As the person uses the tape each night, he eventually learns self-hypnosis as he is saying internally what the tape is saying externally
- I use a combination of approaches that I have found works best, but this is an open area of creativity. I use a relaxation method that is shorter than what is usually used (whereby each body part is involved) and that counts from 1 to 10
- Starting with the number 1, I begin by teaching breathing and then start to introduce relaxation for each body part by number 3. Relaxation shifts to a more direct approach of either the body becoming heavier, sinking deeper into hypnosis, and so on, by the count of 7. This continues until the count of 10, at which time it is reiterated for several minutes that the person is totally relaxed
- The tape can stop there or the therapist can provide several agreed upon sentences prior to starting the hypnosis to either address anxiety arousing issues, reinforce positive sleep habits, and/or reassure the person that his sleep will be great that night
- Some people may want to use imagery. This can be combined with the counting and initial breathing
- Children may require the more structured method of breathing and relaxing each body part
- Consult with a specialist in functional medicine to work through complicating undiagnosed physiological issues
- Put faith in the fact that you can control your own sleep
- Try to keep your same sleep patterns when traveling across time zones; even one time zone makes a difference

Address Behavioral Component of Other Disorders That Are Also Treated by the Sleep Medicine Specialist or Sleep Neurologist, such as Narcolepsy, CPAP Compliance, Safety Issues and Family Concerns Related to REM Sleep Behavior Disorder, Sleep-Related Eating Disorder and Sleepwalking

- Narcolepsy benefits from a sleep schedule that is maintained, scheduled daytime naps, maintaining accurate records, and working with the sleep medicine specialist or sleep neurologist on the beneficial use of medication for daytime arousal, and general awareness of the types of triggers that will result in a REM attack during the day. It is also important to address the disorders typically accompanying narcolepsy, such as sleep apnea
- Address CPAP compliance by ruling out the complaints associated with its use, whether it is the request for a different mask to address the type of sleeper the person is (i.e., mouth breather or side sleeper) or use of a heated humidifier. If uncomfortable and anxiety arousing, start with using the CPAP with short naps and/or short period of time during sleep and gradually attempt to wear it for longer periods of time. Following behavioral principles, the person should try to use the CPAP daily even for a short period of time; the more time away the more they have to desensitize themselves to using it again
- Address need to lose weight by referral to a nutritionist, identify ideal weight loss program, work through compliance issues, establish regular exercise routine
- Consult with a specialist in functional medicine to work through complicating undiagnosed physiological issues

- Work with family members to address the safety issues around REM sleep behavior disorder, sleep-related eating disorder and sleep walking, including clearing pathways, putting up road blocks to avoid falling down the stairs, limiting available things to eat in the kitchen, tracking the food or other substances the person seems to find and removing them

Address Behavioral Component of Diagnosed Psychiatric Disorders That Are Also Treated by the Psychiatrist

- Work with individuals as well as family members regarding the specific symptoms related to their psychiatric disorder and how it affects their sleep
- Provide interventions for each issue one at a time
- Encourage use of sleep logs to track problems and ensure sleep hygiene maintenance; address an associated insomnia condition if present
- Consult with a specialist in functional medicine to work through undiagnosed physiological issues that may be further complicating factors

Address Behavioral Component of Circadian Rhythm Sleep Disorders (i.e., Chronotherapy and Sleep Schedule Alteration)

- Use bright light either in the morning or early evening to either wake up or delay sleep for more consistent sleep patterns
- Consult with a specialist in functional medicine to work through undiagnosed physiological issues that may be further complicating factors

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Gerald Mark Rosen

Department of Pediatrics, University of Minnesota School of Medicine, and Pediatric Sleep Laboratory, Children's Hospitals and Clinics, St. Paul, Minnesota, U.S.A.

Pearl Lee Yu

Department of Pediatrics, University of Virginia School of Medicine, and Pediatric Sleep Disorders Program, University of Virginia Children's Hospital, Charlottesville, Virginia, U.S.A.

For a child, keeping the bed dry at night is an important developmental milestone. In some children, this can happen as early as age three years, soon after getting out of diapers during the day. For others, it has still not happened by the age of 15 years. Somewhat arbitrarily, pediatricians consider six years to be the age after which, if children are still wetting the bed more than two nights a week, the problem is considered worthy of a diagnosis. It is called "enuresis" in the professional literature and "bedwetting" by parents. Some generalizations about bedwetting are (1):

- At all ages, it is more common in boys than girls.
- As children get older, it occurs less often, without any treatment at all—occurring in 10% of 6 year old, 5% of 10 year old, 3% of 12 year old, and 1% of 18 year old.
- Bedwetting runs in families: it occurs in 77% of children if both parents were bedwetters and 44% of the children if one parent wet the bed.

Most children with bedwetting have never been consistently dry at night; this is called primary enuresis. Secondary enuresis (ref 1) is the term used when the child has been consistently dry for six months and then begins wetting the bed more than three nights per week. Primary enuresis is usually caused by a delay in the maturation of the complex system that regulates the control of urination during sleep. Rarely, primary enuresis can be caused by a deficiency in the hormone (anti-diuretic hormone) that causes urine to become concentrated during sleep. Secondary enuresis is more frequently caused by an underlying problem such as obstructive sleep apnea syndrome, severe constipation, urinary tract infections, diabetes, or rarely psychological stressors.

The usual evaluation for bedwetting involves a medical history with a physical examination and urine testing. No other testing is routinely performed unless there is some suggestion of a specific problem. Treatment for enuresis always includes education of the child and parent as well as reassurance that these are common problems that frequently get better without any treatment at all.

If the child, parent, and doctor believe that treatment is important, there are several options:

- Non-drug treatments: a wet alarm and relaxation mental imagery are the most commonly used non-drug treatments for bedwetting.
- Drug treatments: Desmopressin is a hormone that increases the concentration of the urine which decreases the volume of urine produced. This is a prescription medication that is also used to treat enuresis.

Punishment, shaming, and blaming have no role in the treatment of enuresis and will often make the problem worse. Education of a child and parent about enuresis is a very important part of the treatment program. This helps the child and parent understand the symptom, thus demystifying it, and also can help in the treatment.

The following dialogue is an example of an explanation that most five-year-old children would find easy to understand and is taken from a textbook on behavioral sleep medicine:

- Do you know why the bed gets wet at night? (No).
- I did not think so. Most kids and parents who come to see me for this kind of problem do not know, so let me explain. This is a picture of your body (Fig. 1), and I would like to explain how a part of it works.
- Here are the kidneys. Their job is to be the washing machine for the blood. They clean the blood, and what is left over after the blood is cleaned is the water your body does not need, or urine (pee). Your kidneys are working all the time, day and night, cleaning your blood, and making the pee.
- Once the pee is made, it comes down these pipes or tubes to the bladder.
- The bladder is a big muscle that is like a storage tank that holds the pee.
- At the bottom of the bladder is another pipe or tube that lets the pee out (to the vagina/to the penis).

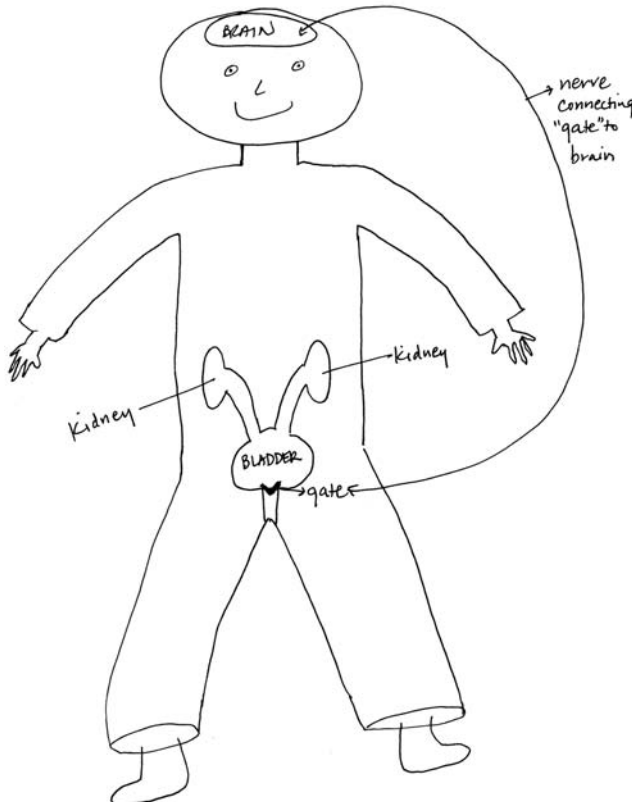


FIGURE 1

- Now here is a really important part. It is called the gate or door. The gate has a very important job. When the gate is closed, the pee stays in the bladder; and when the gate opens, the pee can come out.
- When you were little, your gate would open whenever your bladder was full. But now that you are growing up, you are learning to control your gate most of the time.
- This is how you do it. Your gate is connected to your brain by a nerve that is like a telephone wire.
- Your brain is your body's super computer; it controls everything your body does. It controls your arms and legs, your walking and talking, and everything, even how you are listening so well and smiling right now. It also controls your gate.
- During the day, your brain and your gate are already friends and they talk to each other, and that is why you stay dry all day.
- Your brain keeps your gate closed, and that keeps the pee in. As your bladder fills up with pee and gets full, the gate sends a message up to your brain.
- If we could listen in on their conversation it might sound something like this:
 - “Brain, this is the gate calling. I'm full, so you need to find me a bathroom so I can let this pee out.”
 - Then your brain might say: “Gate, I hear you. You stay closed, and I will find a bathroom.”
 - Then your brain gets your body to the bathroom and when you are in the bathroom, the brain sends a message back down to your gate: “Gate, this is the brain. We are at the bathroom now. You can let that pee out in the toilet where it belongs.”
- Then you open the gate, and the pee goes out into the toilet where it belongs.
- Your brain and your gate are able to talk like this with each other automatically and you do not even know it is happening until you need to go pee.
- But at night, sometimes the brain and bladder get into an accidental bad habit of not talking and listening to each other. Now your brain does not sleep at night. It keeps you breathing, it keeps your heart beating, and it keeps you from falling out of bed; but before it was not always listening too well to the messages from your gate.
- Now during the night, your gate starts off closed, and your bladder slowly fills up with pee. When the bladder gets really full, the gate sends a message up to your brain to let the brain know. If your brain is not listening, the gate sends another message up. If your brain still does not listen, the gate sometimes just opens up and lets the pee out. That is when the bed gets wet.
- So, what we need to do is to help your brain remember to listen to your gate all night, just like it listens to your gate during the day. Because, when your brain is listening to your gate all night long, you will stay dry all night long (2).

If the child will be using the bedwetting alarm, the following dialogue would be added to the explanation. Some children become “dry” from learning the above information and telling their brain and bladder gate what to do. Some children require the reminder alarm. If using the alarm, this can be communicated to the child in the following manner:

- One way we can help your brain remember to listen to your gate is to use the reminder alarm. This is how it works (take out the alarm and show it to the child). When a tiny drop of pee gets on this (touch a wet finger onto the sensing device), it buzzes. That buzz is an extra reminder to your brain to quickly close your gate.
- Now this is what you should do every night before you go to bed. Look at your picture (Fig. 1) and remind your gate to talk to your brain all night long, just like

it does during the day. If while you are sleeping, a tiny little drop of pee leaks out of your bladder, the reminder alarm will go off. That will be a reminder to your brain that your bladder is full and your gate is starting to open.

- When you hear the buzzer, it is a signal to your brain to quickly close your gate and to get up and go to the bathroom and let the pee out into the toilet where it belongs. Some kids like to get their mom and dad to help with this part. Once you let the pee out in the toilet, then put on some dry underwear and/or pajamas and get back in bed and remind your gate to stay shut until you wake up in the morning.

When treating children for enuresis, it is often helpful for them to monitor their progress using a chart. A simple one is enclosed below.

The chart is explained to the child as follows:

This is a dry-wet ruler:

0	3	5	7	10
Dry	Almost dry	50-50	Pretty wet	Soaking wet

It is a ruler that measures how dry your bed is in the morning. It will be your job to use it. Every morning, please mark in this chart how dry the bed is "0" if the bed is completely dry, "3" if it is almost dry, and up to "10" if it is soaking wet.

Some children with enuresis use night-time diapers as a strategy to deal with the enuresis. Though effective, this is often embarrassing for the child and generally needs to be stopped if either of the behavioral training options presented above are used as treatment for enuresis if treatment is going to be effective.

It is important that parents and doctors are empathetic with the disappointment and embarrassment a child with enuresis often has. Parents and physicians should be reassuring that the problem is a temporary one which will improve over time. The strategy for dealing with the symptom should involve both parent and child, primarily focusing upon minimizing the impact of the symptom on the child's life. The best strategy may involve intermittent use of Desmopressin for special events such as sleep-overs or camp.

Bedwetting is a common disorder in school-aged children that can lead to familial stress, social stigma, and negatively affect the child's self-esteem. The most common cause is simply a delay in the acquisition of a developmental skill. Most of the research to date has shown that the bedtime alarm is the most effective treatment for this disorder (3-5). Punitive practices and coercive attitudes have no place in the treatment for enuresis.

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Options Following the Diagnosis of Sleep-Related Breathing Disorders

Barbara C. Fisher

Brain Evaluation/United Psychological Services, Washington Township, Michigan, U.S.A.

There are several options available when children appear to have a sleep related breathing problem. An examination of the structure of the child's face, size of their tonsils, and a cursory examination of the airway is routinely suggested. Depending on the outcome of this initial exam, referral to a sleep neurologist or sleep specialist would be in order. Sleep specialists examine the airway in more depth, and determine the need for a sleep study. A sleep interview is completed to rule out extraneous factors, such as insufficient sleep or the identification of a sleep disorder that is best treated by a specialist in behavioral sleep medicine. The requirement of a sleep neurologist would arise if a sleep study was needed and/or the intervention of medication. If the problem is psychological or emotionally related, then the treatment will ultimately involve use of the behavioral therapies, requiring the services of a specialist in behavioral sleep medicine.

If a sleep problem is obviously linked to enlarged tonsils and/or adenoids, the next step may be a discussion with the primary care physician (PCP) regarding a referral to an ear, nose, and throat (ENT) doctor. At this point, referral to a sleep neurologist or sleep specialist trained in sleep medicine may be appropriate given the need of a sleep study to document suspected symptoms of a sleep disorder breathing problem (upper airway resistance syndrome). An overnight sleep study provides sufficient information to determine whether surgery is the best option by analyzing variables of:

- Number of micro arousals (the index or number of times there was an arousal which tends to shift the person into a lighter stage of sleep usually non-restorative)
- The apnea/hypopnea index (an hourly rate of documented breathing events)
- The apnea/hypopnea index (for rapid eye movement (REM) and non-REM sleep)
- Number and length of desaturations during a respiratory event
- The amount of time spent in each stage of sleep, specifically to answer the question of whether the child is getting adequate restorative sleep for the body and for the brain.

If surgery is decided based upon either the result of a sleep study or grossly seen problematic tonsils, the suggested course is for the child or adult to have a sleep study after three to six months post-surgery. From my perspective as a neuropsychologist, having already evaluated the child or adult (and documented the suspected presence of a memory problem and/or cognitive deficits related to impaired frontal processes) the goal is to ascertain from the data collected by the overnight polysomnogram (PSG) if the problems measured on assessment reflects equivalent severity documented on the sleep study.

If test results reflect severe impairment (implicating the memory and frontal processes) and the sleep study does not reveal commensurate severity then the likelihood of an additional complicating disorder increases. If a sleep study was not completed and instead the child has surgery. As long as the child feels significantly better, confirmed by improved outward functioning as opposed to testing, then the prudent course would be to wait and monitor the child's functioning on a regular scheduled basis. However, if six months later the parents contact me to report school or home problems, then more active interventions are implemented. The first intervention would be a discussion with the PCP regarding the need for a sleep study. Severe sleep study findings matching the test findings would suggest that the causal factor has been found. Variables of sleep apnea versus sleep deprivation suggest a different clinical picture when related to neuropsychological test findings. If the sleep study when clinically analyzed does not appear equivalent to the neuropsychological test findings then referral for a 24-hour or longer electroencephalogram (EEG) is discussed with the PCP.

If you are looking for an ongoing process in the brain, in my experience there are only a few roads to search for primary causal factors, one being sleep and the other, brain injury, best documented by EEG evaluation. The key place where treatment goes awry—evidenced by a worsening condition—can easily be related to undiagnosed respiratory or seizure events. *Any brain injury is at risk for the ongoing process of seizure which is well documented in the research.* Now let us say that a child comes back with sleep apnea. The first choice is always to remove the tonsils and adenoids and to open the airway. Sleep neurologists are strong proponents of taking out the tonsils in a specific manner to open the airway, a process which remains unknown to most of the ENTs that I talk to. I truly think that a class on sleep needs to be included in every medical professional's training, including those of nurses and nurse practitioners. Psychologists should be aware of the effects of sleep as well. We are literally misdiagnosing so many people due to a lack of information regarding sleep and its effects. Obviously, the first diagnostic bin is attention deficit disorders (ADD) but the second is now autism. It used to be depression, bipolar disorder, and anxiety. Who knows what it will be in the future?

Now, what if the sleep study comes back positive? As I indicated above, generally the first intervention would typically be to get a tonsil and adenoidectomy (T & A) completed with the primary goal of opening the airway (which may involve trimming the uvula, if it is too long). Following the surgery, I would complete a neuropsychological re-evaluation (repeating test measures that revealed problems prior to the surgery), within three to six months post-surgery to see if things have changed. A sleep study would be scheduled to track the changes as well, especially if test results continue to show brain impairment. At this point the sleep neurologist or sleep medicine specialist would request a continuous positive airway pressure (CPAP) intervention if the apneas are significant or affect REM sleep, especially with young children to protect their brains against the loss of oxygen.

At the same time a dentist consult is now in order. There are dentists who evaluate the airway and make their appliances to match the patterns noted and provide the best case scenario.

Case in point: I referred a 12-year-old child to a dentist. Here is his history: I saw him at nine years, originally referred for attention deficit hyperactivity disorder (ADHD) due to acting up in class; he was unable to sit still and had

behavioral problems. Testing revealed an ADD/ADHD pattern although not severe enough to explain his behavior and there were indications of memory problems in addition to attention issues. Further evaluation revealed memory problems and a clear delineation of cognitive deficits related to impaired frontal processing; specifically an output problem in written and oral form. This young boy had a terrible time communicating his thoughts, focusing on details, and was unable to describe or discuss the whole picture. This was further complicated by word retrieval issues and the loss of words resulting in difficulty remembering what he wanted to say. He was referred for a sleep evaluation and diagnosed with sleep apnea. He had a T & A and the ear, nose, throat (ENT) specialist reported that his airway was extremely blocked. Long-term mouth breathing had created structural changes in his mouth. A follow up sleep study revealed the presence of apneas. A 24-hour EEG came back positive and the neurologist diagnosed seizure disorder based upon my clinical findings and the electroencephalogram (EEG) results. Problems continued with his behavior in the classroom and in his learning. He changed schools and was certified to receive special education services. I referred him to a dentist specializing in sleep. He completed his analysis and found that the problem was that this young boy had been a mouth breather for so long that the roof area or palette of his mouth was so high it was literally blocking his nose. He prepared a regimen including day and night time appliances. This took a year to complete. His last sleep study came back without any problems. His behavior has improved tremendously and he is making friends. He is doing well in school and happy in his life. The last EEG came back negative although he was still on medication at the time and he remains on small doses of anti-seizure medication (per his physician) as a preventative approach.

Now, another young boy was not so lucky. He was originally evaluated at the age of five years. A bright young man referred for ADD testing; the evaluation revealed attention symptoms, but once again the primary problem was that of memory and cognitive deficits related to the frontal lobe. His tonsils and adenoids had already been removed. He was referred to a neurologist who diagnosed seizures based upon a positive 24-hour EEG and test results documenting clinical evidence. He was placed on anti-seizure medication. He continued having behavior problems in school and difficulties learning. He could not read or write a sentence, and was at this point in the second grade. Evaluation completed within the school setting documented a significant memory problem. He was then referred to a sleep neurologist. The sleep neurologist ordered a sleep study, which came back positive and the child was placed on CPAP therapy due to significant apneas present during REM sleep. Although initially he thought the machine was cool, he became disenchanted due to some discomforts with it and gradually more and more noncompliant with use. Referral to another dentist indicated a structural problem with his mouth and bite. He was started on a different regimen from the child I mentioned earlier. Meanwhile, turbinates were removed from his nose in an attempt to clear the airway. The question of how his tonsils were removed has not been addressed. A recent sleep study indicated the continued presence of significant apneas. This boy, now nine years old still struggles in school particularly with reading and language. Due to his behavioral problems and tendency to start fights and hit people, a social group was formed for him at school to help work through these issues. Despite intellectual assessment at the age of five documenting the presence of superior intelligence, he currently receives special education services for almost three quarters of his learning. His most recent EEG also came back positive despite being on anti-seizure

medication (consisting of several medications). Thus, the problems continue, dentists have been changed, and we continue to work toward resolution of the unresolved apnea problem.

IN SUMMATION

Children diagnosed with sleep apnea face far more issues than adults, given the risk for impact to brain processes and that if placed on CPAP they are looking at a lifetime on a breathing machine. It becomes important to search for the best alternative to address the sleep apnea identified by the sleep study based upon the level of severity. It is critical given the importance of the sleep study that the quality of the study is of the level necessary to obtain an accurate picture of the child's breathing disorder. The severity of the breathing disorder is determined by the sleep study, neuropsychological evaluation, and school performance. Armed with sufficient information, specific options are discussed with the parent.

The issue for children suffering from sleep apnea is twofold as they face the results of sleep deprivation—that can have considerable impact upon their emotional and behavioral status as well as retention of new learning—and the effects of desaturation upon their memory and frontal processes.

Finally, interfacing with the school and family is absolutely crucial to enlist their understanding and to help them cope with a child who is often behaviorally impulsive and out of control, mean, careless with their things and items belonging to others, continually active, displaying hyperactive tendencies and an inability to sit still, distracted, and always talking even if it makes no sense. As intrusive as these children are upon their environment and things in their environment, they are just as sensitive and easily hurt if you try to discipline them. They will appear with the cognitive and emotional deficits associated with the frontal processes that is detailed in another chapter, as well as the cognitive and emotional deficits associated with sleep deprivation. Thus the child suffering from sleep apnea presents symptoms emerging from two issues that carry significant symptoms individually resulting in teachers and parents becoming similarly overwhelmed. Meetings held at the school and with the parents on a regular basis add more team players to work through the many crises that often occur until these issues are somehow resolved.

Part XI: Obtaining Help Through the School

Sharon Witberg

Sterling Heights, Michigan, U.S.A.

INTRODUCTION

Since the early 1970s, as individual states began offering rights to education, for students with learning or other challenges, the belief has been maintained—one who knows the child better than the parent. In the mid-1970s, when the Federal laws were passed to ensure rights to education for the same student population, the same belief was reinforced. Thus, we need to be that involved and informed as parents and educators.

BE INFORMED

To be an involved and informed parent, we begin at home. First, is to accept the child with the challenge. This may begin with contacting a parent-to-parent group that provides one-on-one, confidential support to the parent; support from a nationally known organization for a particular need, *La*, Learning Disability Association of America, Muscular Dystrophy Association, Easter Seals, etc., or one-on-one professional support.

Second, you really need to document, document, and document. Keep notes of the child's progress and abilities, a list of doctors you have taken the child to see, and note the interventions that have worked and those that have not worked. Keep copies of doctors' reports about the child, copies of reports from evaluations or testing of the child, and copies of reports from organizations that have served the child. All information is best kept in a binder or file box in chronological order.

Third, learn the law. By Federal law, children with challenges are entitled to educational services from birth to 21 years of age. Also, individual states' laws ensure education from birth to an age that may be different from the federal law, plus both state and federal laws provide funding to help with the cost of educating these children.

There are a variety of ways to get copies of the pertinent laws. Please know the laws are referred to as rules and regulations. Parents and professionals can access state and Federal rules and regulations online, whether from home or at a public library, by going to your state board of education website. Another website which may be a bit more challenging to navigate would be the United States Department of Education website. Beyond the computer, every state has in place, by law, a protection and advocacy service and, by grant, Parent Training and Information centers to help the public get the rules and regulations and to gain understanding of the rules and regulations. The best advice is to get a hard copy of at least the following:

- Individuals with Disabilities Education Act of 2004 (I.D.E.A).
- Your own State's public act for children with disabilities.
- Section 504 of the Rehabilitation Act of 1973.

The I.D.E.A. is a lot of reading; most people use the sections of this law pertaining to the needs of their children. More importantly, knowing your way around the I.D.E.A. when you are in the process of getting the child's educational needs met is helpful, because I.D.E.A. can fill in where the state rules and regulations may be insufficient, or vice versa. Lastly, on this topic, make notes about what you are reading and write down questions you may have. Then, find an independent advocate to guide you through the process.

The independent advocate can be helpful in sorting out which rules and regulations directly apply to your situation and supply additional information from having experience in the educational maze. Note: an independent advocate is just that, independent. Also, be aware, part of an advocate's job description is to teach you how to advocate for your child so you can take the lead in the advocating process.

THE PARTNERS

There are three partners in the successful educational plan for a child with challenges. First is the child. The child needs to follow the rules at home. Next, the child needs to be in school; the child needs to learn the rules at school set for the child and follow the rules, and the child needs to learn how to let the school personnel know when the child does not understand what is being taught or expected of that child.

The second partner is the parent(s), who are the teachers in the home. Thus, a parent's role includes clearly explaining the rules of the home and reinforcing those expectations. Also, the parent's role includes managing the child's history and new information that becomes available about the child. And a parent needs to become involved in the child's education and is, by law, an equal partner at meetings choosing what is right in the educational plan for their child.

Lastly, but certainly not the least, is the school personnel. It is the educational agency's responsibility to "leave no stone unturned" in finding out about all the needs of the child to be able to fully educate the child; to provide all necessary services required by law; to clearly explain to and teach the child to ensure an outcome of the child becoming a productive member of the community, and to keep the parent(s) well informed and equal partners as provided for by law.

THE ACTS

The I.D.E.A. is the federal law to ensure education for children with challenges. Section 504 of the Rehabilitation Act of 1973 came before I.D.E.A. and now assists I.D.E.A.

Both of the acts require full and complete evaluation of the child before deciding which act will provide the protections and services the child is entitled to. Schools have the "first right of jurisdiction" to do full and complete evaluation of the child. Also, anyone can refer the child for evaluation—parents, doctors, teachers, clergy, grandparents, school principals, etc.

The absolutely best way to make the referral is by letter—to the person at the head of Special Needs, or some similarly named department of the local school district. If the request is not acted upon or if the evaluation does not seem full and complete or if the evaluation does not seem to fit the description of the

child, the parent is entitled to an Independent Educational Evaluation at public expense.

After full and complete evaluation has been completed, a meeting is held to discuss the findings. If the child meets the criteria for educational help as prescribed by I.D.E.A., the plan is written based on the services needed. If the child does not meet the standard of the I.D.E.A. yet, is known to have challenges and needs support, a Section 504 Plan is to be offered and written. Note: Either plan needs to clearly state what will be done to help the child, how and at what intervals the parent(s) will be kept informed as to how the plan is working or not working, and name of the person(s) responsible to help the child with the proposed plan. Additionally, each plan must be revisited, at the very least, within 12 months; though either the school or the parent(s) can call a meeting to revisit the plan if it is not working.

ADD/ADHD

The law is now as supportive of this diagnosis as for any other diagnosis. Each child needs to be fully evaluated because the impact of attention deficit disorder/attention deficit hyperactivity disorder (ADD)/ADHD on the child can vary in how it is manifested. Also, so often there are additional challenges, i.e., anxiety, sleep disorders, allergies, brain injury, etc. So, all diagnoses will have a part in the decisions of how to best serve the child and services needed. The plan should address what the child needs right now and go up from there. Any plan can be revised as needed in the future.

Everyone involved with the child with ADD/ADHD needs to meet and be clear in how they know the child to be. This clarity is the only foundation to successfully moving the child forward. There will be similarities in how the child performs at home and away from home and there will assuredly be differences. From there, the partners will decide the starting point in helping the child.

Everyone needs to be clear as to what the child understands and how to reach the child. It will be very important to have the language (choice of words) used to help the child be the same in school and at home. The methods used to make sure the child is attending should mirror, as closely as possible, in school and at home, to get the best results. This close workmanship will create an environment the child can trust and flourish in.

Finally, everyone involved with the child needs to listen, listen, listen intently to one another; and not through your own "filter" or agenda. Apply empathy, but not sympathy, when appropriate. This workmanship will create an environment where true problem solving can evolve and progress among the adults gathered to help the child.

Often times, in an effort to meet the provisions of law, the educators will invite the child into the meeting. Please note: This need only be done when the adult talk is completed, when the adult decisions are made and agreed upon, and when the adults are ready to explain to the child the plan to be followed. Children have not lived long enough to have experienced anywhere near all the interventions that could possibly be used to serve them, so how could they possibly make the right choices. These children, generally, need even the smallest of social interactions explained to them as to how these interactions work, they need to be taught the how-to-dos of so many things other children pick up easily in the

course of living, so it is only reasonable to expect to have to walk them through new ideas and choices and explain how these new ideas should be of help to them. And, there will be those times when inviting the child to attend could be harmful to the working relationship and it is in the best interest of the child to have the parent explain the plan.

This brings this writer to an important feature of the plan process. Parents have the absolute right to record the meetings they attend to secure help for their child. This serves as a very good tool to help the parent remember the many things discussed. Also, by listening to the tape, parent(s) learn the patterns these meetings take, and how to speak more effectively on behalf of the child. Then, should the child have questions about the plan, the parent can listen to the tape and go back to the child with the appropriate answer to the question.

THE ADD/ADHD CHILD AT SCHOOL

These children come in varieties. It is not just ADD/ADHD, but rather, one of many forms of either diagnosis. These children are generally well-equipped intellectually; they just learn differently and may require a bit more caring support. Once you gain the trust of this child, you can really make progress in following their educational plan.

Due to the learning differences of these children, the child will learn part of something and will “defend to the death” that which they have actually learned. When challenged for the rest of the information, they will not know and will not acknowledge that any further information is part of the subject. If the child trusts the person helping them, the child can be gently brought to the rest of the information. To argue the point with the child is futile and will only set up distrust in the working relationship. (This point applies at home and in all settings.)

These children can be very creative. These children need to be taught in unusual ways—attention-grabbing ways. Other students in the class will enjoy these more attention-grabbing presentations, too. Small case in point, an ADHD child, in a classroom, had a problem with transitioning from one subject to another. A strategy employed by the teacher was to give a five-minute warning statement that the end of the subject was coming (actually it was not always a full five minutes and the child couldn’t tell time), so bring what you are working on to an end and be prepared to move on. The statement was followed by a two-and-one minute announcement. The next school year, students who had had that teacher the previous year went to the room to see the teacher. The students said they missed the teacher because they always knew what to expect and when it was coming and it was so helpful, and the current teacher was not doing the same thing. We can only begin to imagine the power of attention-grabbing ideas.

These children need so many reminders, but the best reminders come with opportunities to rehearse and kudos given when the child reports success in having used the desired action. Any rewards program used to guide behavior must start with short goals that are easily attained and, then, be stretched to new levels of control over the highlighted behavior. Never start with, “if you do this for a week, this many times a day, you will get a reward”—it is too long a span of time, in the beginning, for these children. And, again, these children need to be able to trust us.

SPEAKING OF TRUST

Children with ADD/ADHD, or any other challenge for that matter, are prime targets for the covert actions of bullies or being teased. Every adult has a duty, a responsibility, and an obligation to turn schools, homes, and other group activities for children into Zero-Tolerance Zones against bullying and teasing. This is not an unreasonable goal, but does require taking a stand and being proactive. Children should be able to be at home, in school, and in other arenas and feel safe and respected. Parents, educators, and anyone else working with children need to take charge of the situation. After all, there is not a child on earth that has lived long enough and is wise enough and judicious enough to always do the right thing. Children who bully or tease are the absolute proof of this fact. We are the adults—they are not, and the children need us to be the adults.

An ADD/ADHD child is a wonderful child and can be a source of great joy and delight. Help an ADD/ADHD child and find out how true this can be.

Part XII: Maintaining One's Mental Health in a Challenging World

Barbara C. Fisher

Brain Evaluation/United Psychological Services, Washington Township, Michigan, U.S.A.

K. Wrobel

Cognitive Precision Therapy, Washington Township, Michigan, U.S.A.

What is happening in the world today? We are moving too fast. There are too many things on our schedules. Our children are too busy. It is Monday before we know it. Friday has arrived and we did not get all of the things accomplished that we wanted to do. What is happening? Work has become all-important, there is never enough money, and the fun has evaporated into worry. We have plenty to worry about. Taking a trip may be a good thing and then again, your plane could be hijacked. Your luggage may not make it. Do we ever feel safe anymore? Crime is up; safety is down. There is too much anger. Everyone overreacts so quickly.

What do we need to do here? Reflect, reflect, and more reflecting. Take a minute and establish your goals. What do you really care about? What are your priorities? Make a list. Put it somewhere that you will not lose it. Then make sure that you use that list to plan your life out. If you do not plan, the time is eaten up. Ever notice how on a day that you have free, you end up losing the time and you have no idea where it went? If there is no schedule, it is easy to say okay to something that will take your time and later you feel that it was wasted. Schedule your fun times, schedule your vacations, and schedule the hobby you have wanted to do.

SET DAILY GOALS BASED UPON THE FOLLOWING:

- Feel your feelings
- Face your fears
- Stay on schedule
- Remain focused
- Concentrate on today
- Make sure that the events of the day do not negate or take away your own happiness, joy, or peaceful thoughts
- Commit to not over thinking things with the realization that this only serves to complicate life and makes things worse
- Keep changing even if afraid, eventually the fear will go away
- The understanding that one unresolved fear unleashes more fears

MENTAL HEALTH IN A CHANGING WORLD IS DIRECTLY TIED TO THE FOLLOWING:

- Knowledge of yourself, who you are, and what you are here for
- The ability to identify your daily needs
- Making sure that your needs are met

- Managing your feelings so they do not “run” or control you
- The ability to say “no” to someone who is asking for something or for you to do something that is truly not in your best interest
- Having the courage to discuss the reasons why you do not want to do something without becoming fearful of your decision being altered by opinions that are not your own
- Not succumbing to anger or depression that is either yours or belongs to someone close to you
- Affirming that you are in charge of your own life by knowing what makes you happy, what you need every moment of the day, and that you can attain any goal you set for yourself
- Schedule in the tasks that you need to accomplish your goals such as exercise, meals and quiet time

To have mental health in this fast-paced world, you have to have a sense of who you are, what you stand for, what makes you tick, what makes you feel, otherwise you will be subject to everyone else’s opinion—there are plenty of opinions, but they will not be yours.

Building a “Me”:

- Are you over focused on everyone else excluding yourself?
- Discover and focus on your goals
- Are you out of balance? Taking care of everyone but you?
- Do you help to build those around you instead of you?
- Look within yourself for what you need; it is always there

Rules for a New Mind-Set:

- If fearful: accomplish the task and do it quickly.
- Place yourself with people who are passionate and believe in life.
- See yourself as an active participant, rather than as an observer.
- See obstacles as challenges, never as a means to keep you from your goal.

The Key:

- Finding a way to remain centered, whether that is meditation or exercise or spiritual, anything that provides that feeling.
- When we lose our center, it is easy to make bad decisions, it is easy to work too hard to please others, and it is easy to become lost.
- It is easy to forget who we are.

Self-Esteem:

- Be careful not to become performance based whereby you are only as good as your last success.
- Feel successful all of the time, even if you are not.
- Tell yourself you did a good job even if you did not, figure out how to change it and change it the next time.
- Do not spend time second guessing or beating yourself up for something you wish you had not done.
- Let things go if in the big picture they are small and inconsequential.
- If you do not begin to appreciate your own value then it is hard to ask others to appreciate you. Treat yourself the way you want others to treat you.

- If you do not know who you are, you are at risk to become dependent upon others to tell you your value and determine your goals.
- You end up with stray parts, pieces of yourself—the idea is to connect the parts and develop your own sense of self.
- Feelings are good sources of information.
- You need to be aware of your feelings in order to have the information about yourself and what you are thinking.
- Remember that feelings are not reality.
- Feelings are not meant to be kept inside; they are meant to be released, perhaps shared, and then move on.
- If kept inside, feelings can become huge and larger than they need to be.
- It is important to limit your time on feelings to make sure that little things do not become big things.

Getting Stuck in Feelings or Thoughts:

- When we are stuck in our feelings, reality can become distorted.
- When we distort things we are at risk to question, to doubt, and to become highly critical of ourselves.
- People are rarely able to emerge intact from continual judgmental and critical thinking
- This can lead to distorted thoughts, prediction of the negative and depression.
- Becoming stuck in one's thoughts is probably the worst thing that we can do.
- If we become stuck in those critical, highly derogatory thoughts and cannot get out, it is the beginning of a downward spiral.
- When this happens change sets, shift, go for a walk, and play music anything to emerge from the engulfing darkness.
- Sadness and depression lead to anger, it is the same energy. If you are angry about something you are usually sad about it

Anger is a very powerful feeling, and generally not accepted by those around us, because it is uncomfortable. Children naturally withdraw from people who are angry, so do dogs. The problem is that people become sad about things, and instead of feeling sad they become angry. Because anger is so uncomfortable for those around them, they stifle that anger. Instead of dissipating or becoming less, the anger increases; it grows, and grows. Anger kept inside never becomes less, it only becomes bigger—the more it is in our thoughts the larger it becomes. So, what is the object here? Well, you will find that if you can talk about the anger at the time it comes out in a calm voice, even though you are angry, and a generally less angry voice than if allowed remaining internally trapped and festering then the situation is resolved and the anger is used positively. Because when you talk about it, you become driven to change it and fix it. In this manner, the energy used from the anger makes things different in your life.

Take a typical attention deficit disorder (ADD) scenario. You are angry because you do not complete the paperwork to clean up your piles. You look at them grow day after day until you explode and, in a totally frustrated heap, declare the piles as overwhelming. With that, you use the fuel provided by the anger to begin to deal with the piles, maybe a little each day, because you can no longer stand them. Unfortunately, the avoidance and procrastination of ADD results in putting off many things until the next day. It is the frustration and the anger that eventually forces things to change. It is the anger and frustration that

turns the high school student around to ask for help. It is the frustration and anger that turns the ADD spouse to ask for assistance in getting organized. It is the frustration and anger behind the changes made in the work setting. Although ADD individuals work off of fear and get things done in fear of being fired, in fear of losing the trip promised by the parent, or some toy or whatever; the anger is a far more powerful force. Think about the times when you were driven to make things different in your life, when you finally went on a diet, started working out, began to get organized, and you kept that promise—it did not end when the problem was averted. Those times were fueled by anger, not fear. Every day I set goals for myself for what I am going to accomplish. Every day I re-set the goals not accomplished for the next day. I never give up. Why? Because I am absolutely determined to remain mentally healthy in today's changing world and one of the ways to do that is to accomplish the goals I set for myself.

When Is Expression of Anger a Problem?

- When it is unconnected to anything and just part of being agitated which serves no one and is unacceptable
- When there is no goal, no outcome, and no use for this emotion
- When things are said that are hurtful and should not be said
- When people become physically or emotionally scarred
- When used as a defense to protect ourselves from getting hurt
- When used to get even with those who hurt us or others who are innocent
- When used as a method to control others due to our internal fears
- Anger is an emotional response, it is not rational, it is not grounded in reality, it is how we feel, the object is always to get at the reason why and never to remain in this emotion
- There is no excuse for remaining angry
- You cannot apologize enough or undo the harm caused by continual anger upon those you love

What Happens if We Become Stuck with Anger?

We become:

- Bitter,
- An irritable malcontent,
- A blight to the gathering of friends,
- A stone in someone's shoe, and
- Someone to be avoided

What Do We Need to Do?

- Be peaceful
- Honor our feelings
- Be assertive, speak as we feel
- Accomplish the goals we have so we do not get angry at ourselves
- Fix the problem
- Do not talk about it—do it

If Someone Remains Continually Angry What Are Our Options?

Understand the discomfort, we do not like the sound; it brings us back to being small, insignificant, and helpless. The key at that point is to detach. Disengage,

stand back, and try to diffuse it, especially if you are the targeted person. Realize that the anger of another person is theirs, not yours. Usually they are angry with themselves. This is one of the problems with the ADD household; you have ADD parents angry with themselves and their children as a result—especially when they see similar behavior. Research has isolated parental issues and the home environment as a deterrent in these cases to the management of ADD. When we are doing our cognitive training program, especially when trying to finish the program, we encounter an angry parent. In trying to finish the program, “the heat is on,” so to speak, to perform. The child has to perform the long form and that is their exit. The parent is tired of bringing the child two times per week and wants to have this over. They send messages of “finish this up.” If this does not occur, the messages become more angry. The child is stymied in anxiety and cannot complete the program. What is the intervention? We do not approach the parent. We talk to the child. We build the child up. The idea is to resist anger not succumb to it. Now, we cannot talk to the child directly about this, we cannot discuss their parent being angry and how it affects them. But what we can do is work with the child to make them believe in themselves, do what they know and have been trained to do, give them the confidence they need, the support they need, and power to finish the program. The best thing we can do—the hardest thing to do—is to teach the child to remain impervious to anger, to detach, and remain unaffected.

The most powerful people know this and practice it.

Again, What happens to the person who is continually angry? They become bitter. They are tired; anger demands a lot of energy. They predict doom and gloom, anger demands depression. Things cannot be good. Anger begets stress. Anger drives up blood pressure, remember those red faces? Anger stops rational thinking. Anger drives people away; anger makes bad decisions. Whenever I find myself becoming angry, either I try to avoid it or I stop what I am doing that leads to anger. I put in place stopgaps to avoid that feeling (such as allowing others to distract me and not exercising during the time I have planned to work out or letting someone talk me out of something I want to do or need to do). I try to think about a situation and what I need to do if I think I will become upset. It all comes down to micromanagement; does it not?

Ask Yourself These Questions if You Are Angry:

- Do you try to do too much and then end up with failure?
- Are you allowed to make mistakes?
- Do you always have to be right?
- Do you live on the edge?
- Are people allowed to love you?
- Are you a bad person?
- Are you afraid of being hurt?
- Do you want to hurt others as they hurt you?
- Do you want to get even for past injustices?
- Do you believe you can make the world right by vindicating wrong?
- Were you angry as a child?
- When you became angry, did they ignore you?
- Were you told to repress your anger?
- Were you told that your anger was not justified?
- Was love and affection withheld if you were angry?
- Do you remain angry because you could not as a child?

What Is Your Reaction to Anger?

- Do you placate and smooth things over?
- Say one thing and do something else?
- Avoid talking about your anger?
- Repress your anger, later making a nasty comment or saying “no” to a request?
- Use humor to disguise your anger?
- Do you become quiet and not talk?

When You Are Angry, Do You Do the Following?:

- Overeat, snack, and eat sweets?
- Go to sleep?
- Excessively gamble?
- Abuse/misuse drugs/medications?
- Watch television?
- Get lost in a book or movie?
- Cry?
- Withdraw from people?
- Feel guilty?
- Compulsively exercise?
- Apologize for your feelings?
- Do something nice for someone?
- Be mean to your animals?
- Withhold love or affection from others?
- Become an irritable malcontent.

Talking About Your Anger Is not About:

- Fighting
- Personally attacking
- Rejecting or humiliating
- About making the person feel bad about themselves
- Screaming
- Abandonment
- Ridiculing or teasing
- Abusive behavior
- Hurling words without discussion
- The time to reveal long kept secrets or deceptions

Anger—Do’s and Don’ts:

- Be clear about your anger
- Do not attack the other person in any way
- Do not use others in conversation: “He agrees”
- Do not blame
- Do not use terms of: “you did this and that”
- Use “I” in speech: “I feel. . . .”
- Do not generalize—be specific
- No kitchen sink routine
- Do not bring up the past
- Do not throw nasty comments or darts—no insults

- Honor borders/boundaries
- Stick to the point—address the issue
- Do not repeat yourself
- Do not apologize for being angry
- Do not sermonize
- Never leave the argument—finish it
- Do not walk out in the middle

Four-Step Method

1. Discharge the anger energy. Disengage
2. Look underneath the anger. Identify your feelings
3. Consciously decide what to do with the anger. Examine alternatives
4. Reframe the situation to reengage

Discharging Anger: Disengage

- Dialogue with yourself: why are you angry?
- Anger diary
- Just talk. Do not try to make sense of it
- Activities to let go of anger: walk, exercise, music, watch movie, read book, talk to someone, write it out, letter or journal, shower or bath, dancing, pound a pillow, take a swim, and so on

Look Underneath the Anger: Identify Feelings

- Ask questions.
- What is it about?
- Why is it here?
- What does it mean?
- Why am I so upset?
- What are the additional issues?
- Visualize the result of the anger
- Is it truly anger or something else? Causal conditions
- What would you like to be different?

Examine Alternatives: Decide What to do

- You have options
- Consciously decide what to do
- Think about the end result
- Best solution in the grand scheme
- Purpose of communicating the anger?
- Think about how you will communicate the anger
- Role play or rehearse what you will say
- Imagine the response of the person

Reframe the Situation to Reengage

- Different perspective: recognize position of other person
- Seek to understand
- Look at the big picture

DAILY AFFIRMATIONS

- Praise yourself
- Applaud yourself for all those little things you are successful at.
- Continually say, "Yes, I did it; yeah for me; I am so pleased with what I did." This is not arrogance nor is it self-indulgence
- See this process as the means to continually build an internal sense of self-esteem, to shift dependence upon others for approval to yourself

CONGRATULATING THE SELF

- Recognize the wonderful things that you do
- Say to yourself, "nice job." Do not wait for someone else to do it
- Applaud the things you do and do not be afraid to be proud of yourself
- When we do not think highly of ourselves, we miss out on a wealth of experiences, events and good, good feelings

BEING HUMAN

- Everyone makes mistakes and screws up
- When we feel that we have to be perfect when we judge ourselves and we also judge others
- Softness comes when we are human
- When we make mistakes and we can laugh at ourselves
- You may not want to place yourself in a position whereby you always have to know everything and whereby you have to be right
- Loving people love themselves first

WHEN BAD THINGS HAPPEN . . .

- The persona or psychological makeup of the person determines the way they cope with and react to traumatic situations
- If the person is "depressive, hysterical, dramatic, and negative," then they will react with more darkness and bad things only, and offer excuses to remain in their darkness and in their negative outlook upon life.

When Bad Things Happen: Extrinsic Versus Intrinsic Locus of Control and Who Has the Control?

- If the person is more upbeat and views life as being determined by them then they are intrinsically based.
- This means that they see the bad things that happen to them as "moments to learn from"
- Something that life has to teach them and they take bad things and use them as learning experiences—thereby benefiting from life events
- If someone is extrinsically based, seeing the locus of control as outside of them, then they use bad things which happen as an example of how they "cannot" control life and they use it as one more negative affirmation of the negative things that life brings to them

- The question becomes who has the control. Does life? Alternatively, do you?
- The more dependent the personality the more that they see life from an extrinsic perspective; the external environment has more of an affect upon them than the internal self does.
- Anxious people tend to be more dependent, they look at the bad things that happen to them as the environment having control—not them.
- Their anxiety is increased by the idea that they have no control over what happens to them.
- Individuals who see the control as being outside of themselves (extrinsic locus of control) do not see themselves as being able to fix the bad things that happen and they predict that bad things can happen to them at any time and any place—thus making life more and more fearful.

ONE OF THE KEYS TO MAINTAINING GOOD MENTAL HEALTH IS FEELING ACCEPTED:

- Feeling accepted by someone is not feeling judged
- It is feeling that everything that you do is okay, that it is all-right and you are not a bad person if you make a mistake
- Too often we think that we are bad people and we do not love ourselves.
- Everyone is grateful when we are gentle and loving with them—first we have to be this way with ourselves.

Take 31 days to have a new life, a new outlook, a new belief system, a new you. Each day do one thing different from what you would normally do that is positive. Use any of the suggestions in this chapter but more importantly add your own. Some examples:

- Day one: Count how many things are beautiful around you including yourself
- Day two: Laugh at least fifteen times; you may have to create your own jokes or things to laugh at
- Day three: Tell each of the people close to you something nice that you like about them
- Day four: Give thanks for what you have; spend the day censoring any negative thoughts about what you do not have, appreciate all the things around you
- Day five: Smile at everyone you see
- Day six: Think five good thoughts about yourself
- Day seven: Think five good thoughts about someone close to you and tell them
- Day eight: Call two people and ask how they are doing; remain positive even if they say things are not good
- Day nine: Avoid all arguments, even when people try to make you angry
- Day ten: See anyone who is angry as being sad; when they get angry ask them what they are sad about rather than responding to their anger
- Day eleven: Think only joyous thoughts even if it is raining outside; remember that everything has its place
- Day twelve: Tell yourself five times that everything will work out all right; that everything happens for a reason, each time a problem occurs and believe it
- Day thirteen: Sing three songs even if you cannot carry a tune or sing along with the radio

- Day fourteen: Take care of your health issues don't wait until things become worse; the tooth ache, the back ache and so on
- Day fifteen: Follow through on all of the goals that you set for yourself
- Day sixteen: Give something to someone close to you for no reason just to show that you care
- Day seventeen: Tell five more people something positive that you like about them and don't lie
- Day eighteen: Don't exercise to lose weight or for competition; work out until you simply feel great and stop
- Day nineteen: Tell yourself five things you like about who you are and what you stand for
- Day twenty to day twenty-five: Identify your feelings, your goals, your wants and your needs in life
- Day twenty-six: Take the first steps towards achieving those goals, don't worry about it not working out; take a calculated risk
- Day twenty-seven: Break down the steps necessary to attain your goals; make a chart and a time line to make this happen
- Day twenty-eight: Give five people warm hugs and let happiness in and out
- Day twenty-nine: Tell someone you are upset with what it is that is bothering you in a pleasant, positive, clearly communicated manner
- Day thirty: Acknowledge that you are in control of your life
- Day thirty one: Acknowledge that you can attain most of the things you want and go for it!

Part XIII: Maintaining Physical Health with Weight/Strength Training

Ara H. Yardumian

Bally Total Fitness—Ann Arbor, Ann Arbor, Michigan, U.S.A.

INTRODUCTION

Attention deficit disorder (ADD) and stress are partners and interchangeable: the more stress the worse the ADD symptoms, the worse the ADD symptoms the more stress. One of the primary effects of stress is poor diet, weight gain, and less than optimal body flexibility, strength, and endurance.

Keeping the above in mind, reducing stress and maintaining your best physical health are the best ways to reduce symptoms of ADD and stop this cycle.

SOME SUGGESTIONS FOR STRESS REDUCTION

Cardiovascular Training

This conditions the heart and vessels to prevent injury, burns fat, and improves delivery of blood, oxygen, and nutrients to the body.

Flexibility

Ability to move your joints through their proper range of motion without compensation caused by tightened or weak musculature.

Nutrition

Smart eating habits to maximize your body's use of nutrients, good health, and energy.

Body Composition

The physical make-up of your body mass comprised of adipose tissue (fat mass) and nonadipose tissue (lean mass). The shifting of body composition toward a leaner, less fatty physique is accomplished by improvements in cardiovascular, muscular, and flexibility training paired with proper nutrition.

Muscular Strength/Endurance

This trains your body to perform activities of daily living with safety and ease, either singularly or repetitiously.

- The goal: correct body composition, increased flexibility, muscle strength, and endurance.
- The means to the goal: nutrition and cardiovascular training.
- The process: see the following rules.
- Adapting to a new diet and exercise routine is a process, not an event. Address your changes step by step. Here are a few rules to adopt.

Cardiovascular Exercises

Walking, jogging, swimming, cycling, elliptical training, and rowing machines are all effective means to burn fat and keep your heart healthy. At least 20 minutes of daily cardiovascular exercise will help you achieve your health and fitness goals. If your schedule does not allow large blocks of time, try splitting your cardiovascular exercise into a few smaller bouts of exercise.

Flexibility

Flexibility is aided through resistance training with appropriate methods, supplemental classes such as Pilates and Yoga, and an appropriate stretching routine. Consult a fitness professional to get a personalized plan.

Avoid the Scale

Body composition measurements can tell you the relative amount of fat in your body. This method of measuring fitness progress is superior to weighing.

GENERAL NUTRITION**Calories in Versus Calories Out**

This is the most important factor for fat-loss. The primary requirement is that your calories consumed are less than calories burned. To accurately determine your daily caloric needs, consult a total fitness facility to test your resting metabolic rate.

Eat Several Small Meals Throughout the Day

This is the rule most commonly neglected or abused. Your daily caloric needs should be split into three meals and two to three snacks of appropriate calorie size. Skipping breakfast or other meals can send your body into a starvation mode where your body protects your fat stores. Eating frequent meals of appropriate portion size will maximize your metabolism and facilitate fat-loss thus preventing you from having dangerous food cravings or over eating.

Choose Your Fats Wisely

Choose lean grades of beef such as loin, round, tenderloin, and top loin. Trim any visible fat and remove any skin before cooking and grill rather than fry. Low-fat dairy products are an excellent way to reduce calories and provide satiety.

Minimize consumption of saturated fats such as butter, cream, lard, and some cheeses. These fats, which are often solid at room temperature, are a primary factor in the development of cardiovascular disease. Monounsaturated and polyunsaturated fats, like those found in nuts, seeds, and olive and canola oils are harder to store as fat and are known to promote better health.

Avoid Refined Sugars

These are found in soda, candy bars, and chocolate. Sugars and processed carbohydrates break down rapidly into your bloodstream and cause an insulin response—storing calories as fat and leaving you feeling tired and hungry. Limit your consumption of sugars to naturally occurring sugars like those found in fruits and vegetables.

Choose 100% Whole Grain and Nonprocessed Carbohydrates

Examples are wheat pasta and wheat bread. Whole-grain foods high in soluble and insoluble fiber reduce the amount of blood cholesterol and keep you regular. These foods also aid in satiety especially when consumed with water.

Use of a Multivitamin/Mineral

This is encouraged by the American Medical Association. Obtaining all of the essential nutrients in a standard diet is a daunting task. Taking a couple of pills per day is not!

Drink Lots of Water

The old standard of drinking eight 8 oz. glasses of water is not enough! This does not account for water lost during activity. Drinking 128 oz. of water or more will aid in your fat-loss. Your body requires water to perform at its optimum for physical performance, mental energy, and fat-loss.

Muscular Strength and Endurance

This is achieved through a weight-training program. Begin exercises with the weight appropriate to complete one to two sets of 8 to 12 repetitions in good form. As you develop, progressively increase your resistance and increase to two to three sets.

Listed below are some exercises to help you burn off excess stress and energy and shape your body. All exercises can be completed with a resistance ball and a set of dumbbells.

For a simple, yet effective, resistance training routine, start with one to two exercises from each major muscle group (legs, chest, back) and pair them up with two to three conditioning exercises.

1. Legs
 - a. Body weight squats
 - i. Keep weight in heels.
 - ii. Hold abdominals tight to prevent back from arching and hips from tilting.
 - iii. Keep torso upright to prevent from bowing downward.
 - iv. Bend at hips and knees, lowering rear backwards and downwards.
 - v. Consciously squeeze your gluteus to push you back up (just before locking out your knees).
 - b. Lunges
 - i. Keep weight on heel of forward foot. Back foot should rest on toes.
 - ii. Hold abdominals tight to prevent back from arching and hips from tilting.
 - iii. With one foot forward, lower back knee until it is just off of the ground.
 - iv. Consciously squeeze your forward leg glutea to push you back upwards (just before locking out your knees).
 - c. Hamstring curl with resistance ball
 - i. Lie on back with arms spread at 45° to the side of torso.
 - ii. Set heels at hip distance apart atop a resistance ball with legs fully extended.
 - iii. Keeping your hips straight, flex knees, pulling heels back toward you.
 - iv. Hips should rise and fall as your knees flex and extend.

2. Chest
 - a. Push-ups
 - i. Set hands just wider than shoulder distance apart with knees or toes on the ground.
 - ii. Squeeze (set) shoulder blades downward and together keeping them fixed.
 - iii. Bend elbows to lower body over arms.
 - iv. Drive elbows towards full extension (do not lock) using chest muscles.
 - v. Keep abdominals tight to prevent back from arching.
 - b. Dumbbell chest fly
 - i. Lie with shoulder blades resting on ball and head just barely supported by the ball.
 - ii. With dumbbells parallel to each other, lower and raise in an arch-like motion using chest to move elbows.
3. Back
 - a. Pull-ups
 - i. Keep abdominals tight to prevent back from arching.
 - ii. Squeeze (set) shoulder blades downward and together keeping them fixed.
 - iii. Pull elbows downward toward your ribcage.
 - iv. Do not swing or rock yourself upward.
 - b. Back row
 - i. Keep abdominals tight to prevent back from arching.
 - ii. Squeeze (set) shoulder blades downward and together keeping them fixed.
 - iii. Lower weight until shoulder is about to round and shoulder blades come out of position.
 - iv. Pull elbows backward/perpendicular to your ribcage.
 - v. Keep your torso level and flat.
4. Conditioning exercises
 - a. Jumping Jacks
 - b. Mountain climbing
 - c. Walking/jogging in place
 - d. Chair press-ups
 - e. Lateral/side-to-side hops
 - f. Front-to-back hops

Part XIV: Cognitive Training Programs

Barbara C. Fisher

*Brain Evaluation/United Psychological Services, Washington Township,
Michigan, U.S.A.*

Patricia Jason

Cognitive Precision Therapy, Washington Township, Michigan, U.S.A.

Two cognitive training programs are offered at our facility: Interactive Metronome (IM) training and our Brain Training program, which we have found make a substantial difference in an individual's functioning. These programs have been found to be successful in addressing the deficit areas to make it a worthwhile endeavor over time as measured by self-report as well as pre and post evaluation.

INTERACTIVE METRONOME

Interactive Metronome (IM) is a brain-based, cognitive training program using neurosensory and neuromotor exercises to enhance brain performance and neural recovery. This cognitive therapy has been extremely successful with the attention deficit disorder/attention deficit hyperactivity disorder (ADD/ADHD) population, providing alternatives to or in supplement of prescribed medication. Testing has consistently documented improved performance in areas of reading and writing skills, attention, word attack/decoding skills, and a host of others, including thinking speed and memory as well as sustained attention. Renewed successes in these areas encourage increased motivation and improved self-esteem. Overall, this has been a very powerful program, making significant changes in the lives of children, adolescents, adults, and the aged.

The groundbreaking significance of the IM program is its ability to reach the child who has become unmotivated and who is already "turned off" to any type of intervention. It becomes very hard attempting to reach children who have learned to hate school and who sees school as the source of their incompetence. Therefore, school is to be avoided at all costs. When children have struggled with an attention disorder from elementary school onward, they have learned to expect failure from the school setting. School is not fun, nor is it positive for them. Instead, school is something to endure, punctuated by Christmas and Easter breaks to allow the children to get through until the break in the summer. In working with ADD/ADHD children for over twenty years, despite all of my creativity, I have evidenced little success in trying to talk a child into studying. Study plans coupled with earning an allowance work for a short period of time until the parent or the child becomes tired of maintaining the necessary energy to keep any behavioral plan in motion. For children who are frustrated with reading ability, encountering the necessity to read on a daily basis is going to limit their ability to change unless the reading issue is addressed in some manner. All of the tutorial programs focus upon content, but no program is addressing changes necessary within the brain to make it easier for the child to learn to read. When that child's brain actually changed

and it is easier to read, then they naturally pick up a book and show interest in reading. Why? Because our society is based upon reading to be literate, to read the newspaper, to belong, and thus it is naturally self-rewarding.

The IM program consists of 13 different physical activities using hands and feet alone, as well as a combination of hands and feet. Initially training sessions involve the completion of short tasks, which increases in duration as the program evolves. By the time of the fourth session, task length increases to 1000 repetitions of one particular exercise, taking 20 minutes to complete. By the eighth session the person does 1500 repetitions for the first time, and session 9 is 2000 repetitions of one activity. The next major change occurs on session 11, the task of four hands and four feet (four movements of hands and four movements of feet). This task requires the person to think ahead, to anticipate their next action as they shift back and forth between hands and feet. The goal is to be as precise for hands as you are for feet, obtaining bursts in both areas.

The beauty of the IM program is that it fosters internal competition and guaranteed success. Every person is successful in IM, attaining the goal that we have set which is substantially below what is typically required by the program. The reason is the difference found on post-evaluation, the presence of sustained success which remains over years, and the changes that automatically occur in the person's day-to-day functioning.

A long form is done in the beginning (to provide a baseline), at the midpoint of the program (to measure their progress), and at the end of the program (to confirm that they have reached their goals). The long form consists of 54 reps on hands and 12 additional exercises consisting of 30 reps without guide sounds. The last exercise is 54 reps with guide sounds. The use of the guide sounds varies with the timing of the long form. On the initial long form, the use of the guide sound is to see how sensitive the person is to sound. Typically, the guide sounds throw people off when they are not used, but with someone sensitive to sound, the degree of discrepancy increases. At the mid-term the purpose is to gauge their progress, and the discrepancy with the use of the guide sounds reveals how they are learning the program as now the guide sounds score shows a substantial decrease rather than increase. The final long form is the same, and with some individuals their score drops incredibly low when the guide sound is introduced.

The person starts competing against themselves to perform better. The bursts become a target and almost addictive in their draw. As the program lengthens in the amount of reps on one task, the opportunity for bursts increases. A burst is four or more consecutive reps that are considered "right on," (15 milliseconds or less within the bell sound). IM becomes a science in attaining a greater length of burst while maintaining closer milliseconds to the bell. In working both variables, the closeness, in terms of milliseconds, that the movement is to the bell sound and the length of the burst, the more the brain is trained. The length of the burst depends upon the person's precision and their ability to control their emotions and their movement simultaneously to attain continued bursts. Bursts consist of four "right on" beats, which equals one burst. The maintenance of bursts requires the person to simultaneously address their emotions as well as their physical movement. It takes an enormous amount of concentration and energy to maintain these bursts, demonstrating the power of the brain. I find that initially everyone is so excited about hearing this wonderful ping sound that their excitement immediately stops their concentration, obviously curtailing their burst record. Gradually they learn that their excitement is going to be detrimental, as they learn to repress or contain their emotion in the effort to elongate the burst.

It is the necessity of having to control or repress one's emotions that makes the IM program so powerful in addressing symptoms of depression, anxiety, and trauma post traumatic stress disorder (PTSD). If a person is anxious, then they will not be able to maintain bursts or even maintain low scores. This is the reason why I will tell people that you cannot be anxious and complete the IM program. The same is true of depression. If you are depressed, there is a psychomotor repression, which is well documented in the research. That psychomotor repression, similar to anxiety, will deter one's progress and prevent completion of the program. It is not to say that it does not become difficult to complete the program when these variables are present, and individual variability determines exactly how these variables actually interfere.

These variables do not reveal themselves as problematic until later in the program. Up until the 11th session, people make huge progress, in leaps and bounds. It is after the 11th session that the range changes. The change is directly related to variables involving the individual. For example, typically for children under 10 years of age, following the 11th session their progress slows way down to an extremely slow pace, while other individuals, although slowing down, continue to make steady progress. Completing the long form is another area of demarcation whereby individual differences directly correlate with their ability to complete the final long form by the last (or 15th) session. As trainers, we have to contend with anxiety in general, fear of failure, even the emotional repercussion or losses related to completion of the program (less time with the parent who has been driving them to our facility, relationships the individual has formed with the trainer, to cite a couple of examples).

The program is generally completed within 15 to 20 sessions with the person who is above age 10 years and without any additional issues (neurological or emotional or cognitive). However, when there are other variables involving the brain, stemming from a neurological disorder or emotional problem, then completing the program takes time. If the child is young, it takes the brain time to have all of the training come together to be able to carry through the program on their own. If it is a brain problem, similarly, it takes time for the brain to absorb this new learning sufficiently to carry through without the guide sounds. In other words, to complete the long form the brain has to complete the program on its own; the training has to have become internally learned to accomplish this task.

Initially at our facility we began by focusing on the visuospatial, visuoconstructive, and visuo-perceptual skills to measure changes prior to and following completion of the program. The difficulty of seeing any clear-cut changes resulted in altering the protocol we used for testing to a re-assessment of the core measures of the attention assessment (the evaluation used to initially assess for ADD/ADHD), which consisted of measures of distractibility, processing speed, and information processing. Surprisingly, we began to see definitive changes in evaluation prior to and following the program, which has proven consistent through the five years that we have been running the program. Even more exciting was the finding that changes persisted through time and repeated evaluation completed a year or two later. Reports from either the individual or from parents echoed these positive findings.

Memory testing showed some differences to varying degrees; however, it has been the attention measures that have revealed the most consistent changes. Children taking medication performed similarly when not on medication. Children who never used medication revealed substantial gain in their performance. The bright children performed as expected within one to two standard deviations

above the mean or more, and the below average children performed within average or high average limits following completion of the program.

Through time it became clear why we were seeing these consistent changes. Distractibility, for example, improved in all likelihood as a result of decreased anxiety and the necessary component of focusing and attending to complete the program. We found that when the child or adult became anxious it clearly affected their performance in this program and, similarly, when they learned to control their anxiety, the reverse would occur.

Processing speed or cognitive (thinking) speed on timed evaluation improved as the likely result of the demand of timing that is inherent in this program. Information processing may be the result of improved memory but more likely the ability to think more effectively given the overall pervasive effect of this program that succeeds in "waking up" a person's cognitive functioning. This latter finding is consistently reported by those who have completed the program, declaring that they have more energy and feel more alert.

College students and adults who were re-evaluated revealed similar patterns to that of the children and significant improvement in the following symptoms:

- Sustained attention
- Scanning
- Thinking or cognitive speed
- Decreased distractibility
- Improved ability to maintain divided attention
- Improved information processing and listening comprehension

Adults reported the following changes in their day-to-day lives:

- Spontaneous increase in reading
- Increased verbal fluency
- Improved time management and overall organization skills that were previously affected by spatial deficits
- Overall improved sense of well being
- Improved functioning noted on depression, anxiety, and quality of life inventories
- Decreased symptoms of depression
- Decreased overall symptoms of anxiety
- Increased feeling of overall arousal and alertness described as "more energy"
- Increased drive and motivation to complete tasks
- Feeling more focused
- Improved short-term memory for day-to-day tasks
- Positive decline in trauma symptoms associated with diagnosis of PTSD, specifically increased emotionality and verbal expression
- Improved ability to remain focused in a lecture setting
- Improved ability to take notes in a lecture setting
- Increased ability to understand oral communication
- Improved ability to follow step-by-step directions

For children, improvement on test measures ranged from one to three standard deviations difference from average to very superior limits on the measures used to assess ADD. Improvement was noted in the following:

- Sustained attention
- Scanning

- Thinking or cognitive speed
- Visuospatial analysis
- Visuospatial problem solving
- Visuoconstructive skills
- Decreased distractibility
- Improved ability to maintain divided attention
- Improved information processing and listening comprehension
- Decoding, word attack skills: sound blending, phonological awareness and processing
- Improved verbal spatial relations

Parents reported improved attention symptoms in school:

- Positive reports from the teacher
- Improved ability to take notes in class
- Increased ability to understand oral communication
- Increased ability to understand instructions
- Improved ability to follow step-by-step directions

Parents also reported positive emotional changes:

- Decreased symptoms of depression
- Increased sense of well-being
- Increased overall arousal and focus
- Increased drive and motivation to complete tasks
- Increased ability to try tasks afraid of prior to training
- Decreased anxiety
- Improvement, to varying degrees, in trauma symptoms and symptoms of PTSD

The “spatial” impact of the program, which is what we originally thought it would accomplish, is the improvement in the ability to decode phonetically, which naturally increases and improves children’s reading ability provided they apply themselves and read more. The initial research found by the creators of this program was the improved word attack score on a cognitive achievement test. This finding has held up through time, noted on a rather consistent basis following completion of the IM program.

Together with the changes seen on the attention measures noted above, the IM program provides the singular intervention necessary for a child or adult diagnosed with ADD (the genetic disorder of inattention). When additional sleep or neurological issues are not present as confounding variables, this program has been found to persist through time as the best possible intervention for the genetic, uncomplicated attention disorder.

Of course the child or adult needs to apply what they have learned; they need to read more and they need to develop the necessary coping mechanisms into a routine to add structure in their lives. For the most part, however, in our experience this program offers a choice of whether to use medication, rather than medication being a necessity. Medication may be used to help focus during a specific type of class, or take a test or examination or participate in an important business meeting, but IM graduates routinely report that medication is not necessary to perform everyday functions.

BRAIN TRAINING PROGRAM

The brain training program is used for those individuals who have issues beyond that of ADD (a genetic biochemical disorder). Although the IM program will help from a generalized perspective—it has been found to increase attention and concentration and decrease distractibility, improving information processing and overall alertness—it does not address the frontal processes or the memory processes to a substantial degree. In fact, there are times that we have found individuals to actually look worse in their functioning due to the frontal issues becoming more apparent, no longer clouded by other attention deficits. The brain training program consists of a treatment session one to two times per week which is augmented by games and activities to address specific deficit areas in between the treatment sessions. Each program is highly specific and designed to address those deficits isolated on neuropsychological evaluation. In this manner the treatment regimen is specifically tailored to the individual's carefully diagnosed problem.

The brain training program is comprised of both a computer program and hands-on activities designed to build frontal processes and specifically address the following issues:

- Selective attention
- Perseveration
- Problem solving
- Abstract reasoning
- Sequential analysis
- Integration
- Cognitive rigidity
- Decision making
- Word retrieval

The following memory processes are also addressed and improved by this program:

- Registration
- Storage
- Retrieval
- Recognition

Visuospatial processes and visual motor skills are developed while completing training to address the above issues.

What we have found in our research, pre- and post-testing, following completion of a segment of the brain training program is that this program actually develops strategies to improve memory functioning.


Case in point: We did a three-month intense braining program with a 24-year-old girl who had untreated sleep apnea. She also had a history of neurological impairment from childhood. At the end of the program, despite receiving no other treatment, her performance still improved on measures of oral comprehension, as well as on various memory measures. She revealed improvement in the decreased impact of frontal deficits upon memory functioning. Scores improved significantly on those tasks where she could use strategies such as grouping words together; however, on those tasks demanding pure memory functioning (such as short-term

recall of numbers) she still had difficulty, which in all likelihood was the result of the untreated sleep apnea and/or the historical neurological impairment. The point is that despite the lack of treatment of these disorders, she still made significant gains in the brain training program.

We have countless stories of improved functioning of young children, adolescents, and adults who continue to reveal improvement through time. One woman who had two major brain injuries, the last occurring when she was in her fifties, has made significant progress and continues in the program to date. Serial testing reveals the gains made in her memory and use of the frontal processes, especially in the development of strategies to address common symptoms of word retrieval and the day-to-day confusion that exists when these brain areas are damaged.

The brain training program has been particularly effective with the aged population. My parents are currently using the program on a daily basis and reporting positive results. One man who started the program at the age of 75 has managed to withstand the emotional issues related to changing residence and the loss of his wife, as well as severe sleep apnea and ongoing cardiovascular disease.

To date, the brain training program provides the only known program that specifically addresses the frontal processes. This program has revealed success over time to build strategies to cope with these cognitive deficits associated with impaired frontal processes, while simultaneously decreasing the effect of the specific deficit.



**Appendix A:
Symptoms of
ADHD Inattentive Type
or ADD Without Hyperactivity
in Children**

<i>Symptoms</i>	<i>Normal—not attention deficit disorder (ADD) due to something else probably emotional</i>	<i>Consider ADD and reassess in 3 mo if school is getting worse: not symptomatic</i>
Information not being processed: missing part of the directions—missing instructions or directions for homework, in class work or tests, missing key word endings, page numbers, specific instructions for papers or tests	This does not happen	This is occurring in the classroom but not hindering completion of work—at home your child is responsive to directions even two and three step directions
Distractions: missing parts of conversation, saying the wrong thing at the wrong time, missing parts of classroom lectures, discussion, request or directions from parents in home	This does not happen often only when highly stressed	This happens only with certain subjects and not all of the time; at home your child appears to understand things that you explain and can reauditorize (explain how they will carry out the directed request) or repeat back what you said, sometimes not part of conversation in home setting, manage to pick up most of the conversation or fake it until you make it
Distractions: Feeling overwhelmed and out of control	This does not happen often only when highly stressed; too much going on at one time	Child maintains planner and schedule; gets work done on time

<i>More likely ADD: symptomatic in school: failing classes due to work not completed or not turned in</i>	<i>Likely ADD: symptomatic: crisis mode either by overwhelming anxiety, depression, or school failure—total apathy and refusal to complete work</i>	<i>Suggestion for coping</i>
<p>Occurring more in the classroom and hindering completion of work, child say it does not know what to do or was not told what to do or given any instruction—at home it is now noticeable and child is not completing requests from parent or only doing one of the three steps</p>	<p>In school studying the wrong chapter, doing the wrong problems, completing the assignment wrong in class or as homework due to missing directions; at home child is fighting more with parents about being right, about not being told something, more miscommunication, in college failing tests or not completing papers due to missed information – problem escalates to not wanting to do any work, increased anger and sadness or anxiety symptoms or apathy toward school</p>	<p>Repeat back the time and date, we are agreeing to meet at this time yes? Or at this place yes? Re-check test and homework assignment directions and instructions</p>
<p>This happened in school a lot and now is affecting more classes than specific subjects seen prior, worse since transition to junior high and more work output demanded, or worse in high school or in college due to increased complexity and school demands, missing social conversation and conversation at home, looks like daydreaming and not part of conversations</p>	<p>The teacher is now totally confusing, if now in junior or high school or college, all subjects are confusing regardless of the subject or the specific teacher, school is more frustrating and no longer rewarding, your child begins to feel inadequate; symptoms of anxiety and depression appear more prominent, not knowing what to do is becoming a common excuse for incomplete assignments, missing conversation socially which is having noticeable effect upon peer relationships</p>	<p>Give the directions back and make sure you have it correct—explain what you have heard to know if you got it right—keep getting feedback until you are no longer confused, go to the teacher and ask for help before the problem has escalated beyond repair, try to stay with conversations and keep feedback going to offset becoming distracted or not knowing what is going on in the conversation, keep your interest up and this will help with sustained attention. Check in on the conversation to make sure that you are still with it—you mean you are saying this and why? Summarize to make sure you know what people are saying they love it and feel heard</p>
<p>Child feeling more overwhelmed with work due to changes from junior or high school or college and feeling like they cannot keep up so they create a system to complete work and maintain control</p>	<p>Child feels overwhelmed and out of control with the work in school that is piling up, creating more anxiety and more hopelessness; child appears more apathetic in school, (but really more emotional and more at risk) cyclical reaction from teachers, creates more anxiety and even less hope of things getting better in the future, increased anxiety and symptoms of depression</p>	<p>If overwhelmed list all of the things you need to do and do it both as a list and then plot it out visually on a time chart of days or hours to see how to get things done</p>

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<i>Symptoms</i>	<i>Normal—not attention deficit disorder (ADD) due to something else probably emotional</i>	<i>Consider ADD and reassess in 3 mo if school is getting worse: not symptomatic</i>
Distracted: Not remembering to do things, losing things and cannot find things, disorganized	This does not happen often only when highly stressed, too much going on at one time	Your child is forgetting to do some things but not all things, happens intermittently at school and only rarely at home, teacher reports child looking for some missing objects that need to be replaced and at home there are some mornings when things cannot be found
Distracted: switching from one uncompleted task to another, Poor or no eye contact, loss of focus, poor sustained attention, daydreaming, or chatty and too busy in class	This does not happen often, only when highly stressed; too much going on at one time	Tasks not being completed in school but still okay in home setting, sustained attention difficult on subjects child not interested in, notice that child does not maintain eye contact all the time, teacher reports poor sustained attention in class
Increased anxiety in school, school is not positive and instead is a reminder of what child cannot do, fidgeting with something, appears restless but this increases with task anxiety, does not approach learning with confidence; homework assignments not completed or not turned in, hates school, does not feel confident, declining self-esteem	This does not happen often only when you are worried or nervous	Teacher reports that child is playing with things in the desk or bringing something from home and playing with it in class, begins to complain about school, questioning if smart, at home more restless cannot sit still, seems more worried may have difficulty falling asleep

<p><i>More likely ADD: symptomatic in school: failing classes due to work not completed or not turned in</i></p>	<p><i>Likely ADD: symptomatic: crisis mode either by overwhelming anxiety, depression, or school failure—total apathy and refusal to complete work</i></p>	<p><i>Suggestion for coping</i></p>
<p>This is happening more frequently at school and at home, child is losing more things at school, desk becoming more disorganized, room messier and disorganized, cannot get out the door on most mornings due to missing socks, shoes, books, papers and so on</p> <p>More tasks not completed in school and some tasks at home, issue of eye contact becoming more apparent, teacher reports clearly not concentrating in class and in class assignments are taking longer due to not sustaining attention, teacher reminding child to focus more, child appears more restless</p>	<p>Forgetting to do things; usually homework is now lowering the grade, forgetting about tests until the night before, suddenly remembering a paper that is due, and the disorganization is clearly present at both home and school, late on all school mornings, lost items are now appearing in all types of places, mostly under the bed</p> <p>Child declares school to be boring and not interested, not completing work in class, talking more and chatty in school or daydreaming and looking out the window, refusal to complete work at home, eye contact not there and child does not seem to care, child reports brain busy inside, listening to everyone's conversation or dwelling on certain issues, disliking school more and feeling more inadequate</p>	<p>Make a list of what you have to do—use the planner, sticky notes, put reminders in the same place to see them each day, structure and routine, routine for cleaning, routine for the morning and routine for the evening and homework time after school—set limits on task completion to speed homework along, everything should have a place</p> <p>Always complete the task before going on to the next or do things in groups but do not diversify too much—force yourself to keep going to complete things because it takes longer to remember where you were especially on certain tasks and do not allow interruptions, use music to remain focused upon the task, keep reminding yourself of eye contact when talking to people, force yourself to look in people's eyes</p>
<p>Teacher reports increased playing with things during the day, object from home replaced with pencils stuck up their nose, playing with paper clips until they go flying across the room, more complaints about school, talks about the next weekend on Monday, worries about school performance increase and school is definitely less positive</p>	<p>Fidgeting is hitting an all time high in both school and now at home, cannot sit still, anxiety is screaming, feeling more hopeless about school and about academic future, feeling stupid, more bored in school, hating school more, sick before going to school, sick in school, psychosomatic complaints, cannot sleep at night, too anxious and worried although appearing seemingly more relaxed on the outside (increasing apathy)</p>	<p>If ADD is diagnosed get set of books for home and begin homework program. Need to address escalating school problem, cognitive rehabilitation program, address anxiety: medication vs. benefit from supplements, calcium, a hot bath, breathing—learning to meditate, hypnosis</p>

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<i>Symptoms</i>	<i>Normal—not attention deficit disorder (ADD) due to something else probably emotional</i>	<i>Consider ADD and reassess in 3 mo if school is getting worse: not symptomatic</i>
Memory problems: studying for the test but then forgetting it when taking the test, learning new information difficult to retain, learning names of peers in class	This does not happen often, only when you are worried or nervous	There should not be a memory problem seen
Spatial: Dislike of reading, slow reading speed, reading comprehension problems due to missing parts of words or word ending or not having read the material, word substitution, content reader, omits small words, anxious about reading, learning a foreign language	This is not a problem	Struggle in kindergarten with fine motor to copy designs, spacing and forming of letters, first grade struggle with phonetics, chaining sounds to sound out words tends to break into syllables, reading slow and laborious, but reading problems not standing out child just has to spend more time at home doing work, work in class is slow when writing, child memorizing words to like to read, some comprehension difficulties
Spatial and slow speed: Problem with timed testing, poor test taker, specifically multiple choice questions, approaches tests with anxiety; test taking anxiety takes on life of its own	This is not a problem	First sign is on the MEAPS or any testing that involves a scantron and multiple choice questions, either loses place on scantron or cannot decipher questions, obvious problem due to number of wrong items is absurd

<i>More likely ADD: symptomatic in school: failing classes due to work not completed or not turned in</i>	<i>Likely ADD: symptomatic: crisis mode either by overwhelming anxiety, depression, or school failure—total apathy and refusal to complete work</i>	<i>Suggestion for coping</i>
Memory should not be a problem and if it is becoming more noticeable this does not signify ADD, your child is more at risk for a breathing related sleep disorder and/or to be suffering from some type of a brain injury	When memory is affecting learning, especially the acquisition of language and language related tasks as well as pure memory tasks of math fluency and memorizing math facts	If you are truly forgetting and it is not due to distractibility then consult your physician, memory is one of the primary first signs of some type of illness—may need neuropsychological testing
Reading gets harder and if child is not compensating by reading more, reading problems are more noticeable, reading is slow and increases homework time; eventually resulting in child not reading chapter to answer questions, anxious about reading aloud in class, comprehension problems due to word substitution in reading, missing word endings, or omitting small words	Reading problem is now pervasive, child avoiding reading at all costs, doing the hunt and peck routine for homework which takes longer and pervades the whole evening creating stress on parental relationships, reading comprehension problems issues affecting all subjects, math story problems, handwriting worse, does not like to write, spelling worse, words not recalled when spelling test is over, poor vocabulary development makes reading worse	Read more and it will come easier to you, learn more words—one new word each day; the only surefire method has been a cognitive training program which addresses the problem making reading easier and not as tedious for you
Child develops increased anxiety toward taking tests, anxiety results in poor performance; primarily a problem with standardized, national testing	Test taking problems take on a life of their own, holding child back from certain colleges due to ACT and SAT performance, large classes in college and examinations become overwhelming, confidence destroyed with repeated test failure affecting certification examinations and having enormous consequences	Extra time on national testing requires ADD evaluation and thorough report. Cognitive training helps with this as well—there are classes to teach how to take these kinds of tests—diagram out the question—read it by circling the not phrases or excluding or all of the above and so on to make sure you first understand the question—then go through each answer by attaching it to the question and rule out the ones that would not work, one is always obvious, then a second based upon knowledge and you are always down to two possible answers—pick the best response to the question not what you think or believe

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<i>Symptoms</i>	<i>Normal—not attention deficit disorder (ADD) due to something else probably emotional</i>	<i>Consider ADD and reassess in 3 mo if school is getting worse: not symptomatic</i>
Avoidance and procrastination of all papers especially research papers, says homework is done when it is not, starting tasks at the last minute, mentioning projects due on Monday on Sunday night	This is usually not a problem	Child talks less about school, not as excited about learning, homework is a little more difficult to get done due to avoidance (going to the bathroom, getting something to eat) and less attention to task, child putting off some tasks until the last minute but gets it done in time and turns it in, no problems indicated by teacher
Liking school versus feeling neutral about school, development of good study habits vs. resists studying, hard worker does not feel smart, school place of mastery or place of failure, language acquisition and math fluency, work completed fast and careless or takes too long and remains uncompleted, development of depression or anxiety or both	This is usually not a problem unless you do not want to do something	Work is difficult due to fine motor issues and your child notices a difference between peers and his/her performance in kindergarten or first grade, this is the beginning of not feeling smart, not liking school and fear of performance being problematic
Fear of failure, fear of success; does the minimum and never pushes the envelope to achieve success, highly anxious, remembers all of their mistakes, need to be perfect, always thinking, cannot get to sleep due to thinking too much, lacks confidence	This is not usually a problem and if present it is related to specific circumstances	Child becoming more preoccupied with having things perfect at home and in school but not so noticeable that you think you have a problem and the teacher does not mention anything


<i>More likely ADD: symptomatic in school: failing classes due to work not completed or not turned in</i>	<i>Likely ADD: symptomatic: crisis mode either by overwhelming anxiety, depression, or school failure—total apathy and refusal to complete work</i>	<i>Suggestion for coping</i>
<p>Completion of homework more difficult endeavor, taking longer due to avoidance on part of child and lack of familiarity with text (not read) tells parent no homework when asked and goes out to play, teacher indicates more assignments missing and lowering grades, more and more tasks being started at the last minute, still working all night to get it done and not giving up, but homework and school work taking up much of child's life</p>	<p>The problem has escalated to work not getting turned in and not being completed, avoidance of tasks to the degree that very little work is being turned in resulting in failure grades that cannot be turned around by extra credit or good performance on tests, the problem has now become severe, threatening to result in grade retention, avoidance and procrastination affects everything, even social, child on periphery of group, more isolated and introverted, no motivation, easily lies to avoid anger of parent, more private with thoughts and deeds, harder to reach, keeping anger inside to avoid confrontation</p>	<p>Homework program consisting of rewriting parts of the chapter—words in bold and summaries on notecards, drawing pictures, graphs, or diagrams on larger postcards, looking for the “pearls” or main concept in math to re-write, and then completing homework, set times to get work done, each subject organized and limited to time slot on schedule, shut off the phone and allow no interruptions during this time, can use music and snacks, write term papers in portions, start large projects doing an hour's worth of work to get into the project and avoid more procrastination on the assigned day of working on project, cognitive training program works through avoidance issue</p>
<p>Child finds themselves working harder than their peers whom they think brighter than them and these comparisons negate their self-esteem, increasing as school progresses through elementary to junior high and high school, as more failure occurs, child predicts the worst to avoid becoming disappointed, while feeling less bright and self-esteem declining either good study habits develop or child has an “I do not care attitude” and does not complete work</p>	<p>Increased frustration, decreased tolerance, more negative thinking, irritability and anger, prediction of the worst case scenario, isolation, on the periphery of the group, not engaging socially</p>	<p>If you have a genetic depression then you may have to address it chemically with medication or functionally with supplements to hit the same neurotransmitters in the brain—otherwise learn about crooked thinking, exercise; use whatever works to think more positively; emotions discussed generally have good odds to decrease whether it is anger, sadness or nervousness about something or being overly focused upon a mistake, talk about it with someone to diffuse the emotion and you can do the same for others</p>
<p>Child making more comparisons to sibling (if smarter and older) especially if life seems easier, more jealous of younger sibling who is not encountering any problems in school, child seems to be less eager to complete tasks, sleep complaints emerge with child having difficulty getting to sleep</p>	<p>Child experiencing more failure, cycle of hating school, doing less work, failing, feeling stupid, more at risk to be fearful of both success as well as failure but becoming more comfortable with failure as known entity; sets life patterns for adolescent, requires perfect performance or quits and does not finish, insomnia due to over thinking about things, avoids opportunities for success by seeing risk of failure</p>	<p>No risk no gain—take calculated risk when you think you can do things try it and then let it go if it does not work out just learn from your mistakes—but the only way to grow and gain success is through failure—our best teacher—the more painful the experience the more that we learn and the more that we are able to give up bad habits that have become comfortable</p>

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<i>Symptoms</i>	<i>Normal—not attention deficit disorder (ADD) due to something else probably emotional</i>	<i>Consider ADD and reassess in 3 mo if school is getting worse: not symptomatic</i>
Increased frustration, decreased tolerance, less flexible, more rigid thinking, black/white thinker, cannot generalize learning, difficulty acquiring language, poor pragmatic skills, behavior problems, hyperactive, fighting	This is not usually a problem or temporarily present due to a specific reason and/or a specific event that has occurred	This problem has not been present for you—if anything you tend to try too hard and not give up when you should, you are not rigid and more open to the opinion of others sometimes you need to hang onto your opinion more

<p><i>More likely ADD: symptomatic in school: failing classes due to work not completed or not turned in</i></p>	<p><i>Likely ADD: symptomatic: crisis mode either by overwhelming anxiety, depression, or school failure—total apathy and refusal to complete work</i></p>	<p><i>Suggestion for coping</i></p>
<p>You did not have this problem before in your life but recently you are finding yourself more upset and people are telling you that you are more rigid and need to be right a lot of the time—you are aware of it but it does not bother you and no one is that upset</p>	<p>Frustration is highly diminished due to increased stress; lately your tolerance is even worse snoring more, sleeping less, a injury or fall you took, and now you are easy angered, easily upset with no tolerance for change in plans or how you expect things to be</p>	<p>If you have become more rigid it can be a sign of some type of medical problem that affects sleep and/or your brain, specifically the frontal processes you should consult your physician immediately</p>



**Appendix B:
Symptoms of
ADHD Inattentive Type
or ADD Without Hyperactivity
in Adults**

<i>Symptoms</i>	<i>Normal—temporary stress, anxiety or depression</i>	<i>Consider attention deficit disorder (ADD) and re-assess in 6 mo—problem still present</i>	<i>More probable problem related to ADD: deficits not interfering with day to day functioning: not symptomatic</i>
Information not being processed: missing part of the directions or forgetting parts of conversations they swear never took place	This does not happen often only when highly stressed	This has happened since childhood at different times but it never caused a problem in school for you—you always maintain that you are in the right in these situations	This was worse as a child but now you have things under control; you argue less and assume that you are right and everyone else is wrong
Information not being processed: missing appointments, meetings or dates	This does not happen often only when highly stressed	This may have happened one or two times from childhood onward, but it has not been a big problem and you always recheck your times anyway and write them down	You have done this but generally it was not a big problem as a child and now you have other people to remind you or you always use a planner
Information not being processed: confusion, misunderstanding what was said	This does not happen often only when highly stressed	This has happened since childhood at different times but is not a problem	This happened in school a lot but now it only happens once in a while—you usually have enough information to cover any losses that occur or someone else takes notes
Distracted: missing parts of conversation	This does not happen often only when highly stressed with too much going on at one time	This has happened since childhood at different times but you manage to figure it out	This does happen a lot as an adult and it did happen a lot as a child but you usually manage to pick up most of the conversation or fake it until you make it
Distracted: feeling overwhelmed and out of control	This does not happen often only when highly stressed; too much going on at one time	This has happened since childhood at different times but is not a problem	You felt this way as a child in school but now you work hard not to be in that position or you ask for help or blow up take a break and get renewed energy
Distracted: not remembering to do things	This does not happen often only when highly stressed; too much going on at one time	This has happened since childhood at different times but is not a problem	This happened with homework as a child and you frequently lost assignments but now you write it down or someone reminds you

Most likely ADD: deficits interfering in day to day functioning at job, home or school: symptomatic

Likely ADD: crisis mode: need immediate evaluation and intervention

Suggestion for coping

As a child you fought your parents all of the time, telling them they never told you something—now you fight with your wife and children and sometimes your boss at work or you are the boss and your employees are always wrong

This has happened since childhood—people are angry at you, you are missing things at work, or failing classes, incorrect or missing work due to missed communication

Carry a tape recorder. Repeat back what you think people have said to you

As a child you were the one they took bets on as to whether you would remember the date and show up, often you did not—you do the same thing now, so everyone calls you the night before and then reminds you throughout the day

This has always been a problem for you and now it has gotten so bad that you are missing all kinds of things with consequences at work and at home that can be disastrous

Repeat back the time and date, we are agreeing to meet at this time yes? Or at this place yes? Recheck documents to make sure of time and place especially airplane tickets and invitations with small print

The teacher was always confusing and so was everyone else and now you are still the guy at the meeting who does not get it—it is more of a problem when you cannot find anyone to give you a summary of what took place

You have always had a problem missing the directions in class and becoming confused, the wrong page, the wrong date and so on but now you are missing things at work or in your college class and the stakes are too high—you are failing class or being cited at work or not understanding those close to you

Give the directions back and make sure you have it right—explain what you have heard to know if you got it right—keep getting feedback until you are no longer confused

You missed parts of conversation as a child and still do as an adult sometimes it gets you into trouble and sometimes it does not but it is always an issue

You miss parts of conversation all of the time and cannot figure out what is being said; too often you are being asked to stop daydreaming and to pay attention

Check in on the conversation to make sure that you are still with it—you mean you are saying this and why? Summarize to make sure you know what people are saying; they love it and feel heard

You felt overwhelmed and out of control with the work in school and got mad as a child, screaming at everybody and everyone helped you with your homework—you still get all of that help and fall apart when you do not

You feel totally out of control and so overwhelmed that you are ready to jump out of your skin and yell at anyone who asks you to do anything; the deadlines are killing you and your stress is at an all time high

If overwhelmed list all of the things you need to do and do it both as a list and then plot it out visually on a time chart of days or hours to see how to get things done

You do forget to do a lot of stuff despite all of the reminders; you just get busy—the same thing happened as a child

You have become so stressed and distracted that you are forgetting things on a continual basis at home and at work

Make a list of what you have to do—use a planner, sticky notes, put reminders in the same place to see them each day

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Symptoms	<i>Normal—temporary stress, anxiety or depression</i>	<i>Consider attention deficit disorder (ADD) and re-assess in 6 mo—problem still present</i>	<i>More probable problem related to ADD: deficits not interfering with day to day functioning: not symptomatic</i>
Distracted: losing things and cannot seem to find them	This does not happen often only when highly stressed; too much going on at one time	This has happened since childhood at different times but is not a problem	This does happen now and did happen as a child—a lot—but you try to put stuff in the same place all the time
Distracted: switching from one uncompleted task to another or uncompleted tasks and projects	This does not happen often only when highly stressed; too much going on at one time	This has happened since childhood at different times but you keep it from becoming a problem	You have historically done this but it saves you from being bored and you always manage to get it all done
Distracted: poor or no eye contact, loss of focus	This does not happen often only when you are angry or do not like the person	This has happened since childhood at different times but you keep it from becoming a problem	The teacher was always telling you to focus when in school but now you have learned that socially you need to look at people even if you have to pretend that you are listening
Distracted: always fidgeting with something, restless	This does not happen often only when you are worried or nervous	This has happened since childhood but your parents are the same way and you keep yourself busy	You are always playing with something and this was true as a child and now as an adult but so what—it does not bother anyone—well maybe your spouse
Memory problems: forgetting things more than you used to	This does not happen often only when you are worried or nervous	This is not a problem—you have a really good memory	Your memory has always been pretty good and what you rely upon to get by so this usually is not a problem

Most likely ADD: deficits interfering in day to day functioning at job, home or school: symptomatic

Likely ADD: crisis mode: need immediate evaluation and intervention

Suggestion for coping

This is a continual problem that delays you in the morning to get to where you need to go and this was present as a child and messed things up then too—the reason that you are always late

You cannot find anything anymore—your glasses are in the refrigerator, the sandwich you forgot to eat is under the bed where you were looking for your glasses yesterday and stopped eating when you noticed all kinds of things under the bed—the piles are huge and things are out of control—you are late because you cannot find what you need to go anywhere

Always have a place for everything—a place for your keys, a place for your money, your checkbook a routine for doing things—clean up every night before bed to put everything back and go through your piles once per week or every few days if you have a lot of them

Things are boring if you cannot move from task to task or what really occurs is that you find yourself thinking about something else and then wanting to take care of that instead of what you are doing—it is hard to keep things straight when your brain is so busy inside

You are so distracted that you cannot finish anything and you now have 10 different uncompleted tasks—you just keep starting things but you cannot finish anything either at work or at home

Always complete a task before going on to the next or do things in groups but do not diversify too much—force yourself to keep going to complete things because it takes longer to remember where you were especially on certain tasks; do not allow interruptions

It was hard to maintain eye contact as a child the same as it is now when you are busy listening to everyone’s conversation or re-analyzing everything over and over in your head—makes it hard to focus on one thing at a time

You cannot look at anyone or anything for too long because you are too distracted and your head is too full of thoughts of what you have to do, and what you have not done, and a million other things

Keep saying in your mind to look at the person and remember their face—force yourself to look in their eyes—practice by looking at your pets

You cannot help it; no matter how hard you try you have something in your hands at all times

Your fidgeting has hit an all time high and you are so restless that you have taken to pacing and cannot sit for long because the attention symptoms have so disrupted your life at home and at work that your anxiety is absolutely huge

Try to keep your hands still and if you are wringing your hands you may be too anxious an may benefit from supplements, calcium, a hot bath, breathing—learning to meditate, hypnosis

You usually do not have a memory problem—if anything it is being distracted that makes you forget things—but if this is worse then so is something else in your life such as the possibility of a sleep disorder or potential head injury

You never have a problem with memory but when you are worried, more nervous, more anxious you forget things or something in your life is different and you are forgetting more due to a sleep problem or recent head injury

If you are truly forgetting and it is not due to distractibility then consult your physician, memory is the first sign of some type of illness—may need neuropsychological testing

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Symptoms	<i>Normal—temporary stress, anxiety or depression</i>	<i>Consider attention deficit disorder (ADD) and re-assess in 6 mo—problem still present</i>	<i>More probable problem related to ADD: deficits not interfering with day to day functioning: not symptomatic</i>
Spatial: dislike of reading, reading comprehension problems	This is not a problem	This has happened since childhood—memorized words to like to read, comprehension improved with diagram or rewrite sentence	You did not like reading as a child in school and you do not like to read now as an adult but you compensate with books on tape or you scan things or have someone else read it and tell you what it is about
Spatial: poor management of time—late for appointments or completing projects—too much stuff and not enough time	This is not a problem	This has happened since childhood—you write out schedules to avoid this problem	This is always a problem and a big struggle, but so what you just describe yourself as type A and you are good at what you do so people wait until you get it done—or you get frustrated—pull an all-nighter and get it done or pay someone else to do it or tear out your hair and buy yourself more time
Spatial: poor test taker, specifically multiple choice questions	This is not a problem	This has happened since childhood—you diagram sentences or write it out to avoid problem	You have struggled with this since testing began in school and never felt smart as a result; now you just avoid taking those tests the best that you can
Avoidance and procrastination: paperwork	This is usually not a problem	This has happened since childhood but you set goals; so not a problem	This is a big problem and always will be but you work it out by getting extensions, working all night or getting help from someone else

Most likely ADD: deficits interfering in day to day functioning at job, home or school: symptomatic

Likely ADD: crisis mode: need immediate evaluation and intervention

Suggestion for coping

Lets just say that reading has never been your strong suit, you did not like to read as a child and you do not like to read now so basically you do not and you avoid any task that involves reading which recently is becoming harder to do in your job

You dislike reading and avoid reading but this is becoming problematic at work and at home—more reading is needed at school or at work and now you have to face your problem—your spelling is a problem as well as lack of vocabulary

Read more and it will come easier to you, learn more words—one new word each day, try a cognitive training program which addresses the problem; making reading easier and not as tedious for you

Everybody predicts you will be late and you are so they are now telling you to be somewhere 30 min earlier than you need to and sometimes this bothers you if you arrive before the party has gotten started—you always have too much stuff to do and not much time for you

You are late all of the time due to not being able to find anything, not able to manage your time, too many things on your plate and increased stress; so much that you cannot think

A cognitive training program also helps with this—otherwise use your planner to map out what you are trying to do hour by hour—estimate times for everything and then decide what you can and cannot do by forming a hierarchy of importance

Test taking held you back in school, affected your ability to go to college where you wanted and plagues you in your difficulty with examinations

Test taking is a problem; you cannot pass any tests whether in school or at work especially the big examinations for certification and the multiple choice and scantron questions are the worst

Cognitive training helps with this as well—there are classes to teach how to take these kinds of tests—diagram out the question—read it by circling the hot phrases or the excluding or all of the above and so on to make sure you first understand the question—then go through each answer by attaching it to the question and rule out the ones that would not work, one is always obvious, then a second based upon knowledge and you are always down to two possible answers—pick the best response to the question not what you think or believe

Paperwork is your nemesis—one big pain in the neck and you avoid it like the plague that it is which sometimes gets you into trouble

Your avoidance of paperwork is so bad that you are months behind at work, have not turned in your mileage voucher to get paid, taxes not done and you are past the extension, big issues and big consequences

Force yourself to get things done by setting aside days or hours to do paperwork; shut off the phone and allow no interruptions during this time

(Continued)

(Continued)

<i>Symptoms</i>	<i>Normal—temporary stress, anxiety or depression</i>	<i>Consider attention deficit disorder (ADD) and re-assess in 6 mo—problem still present</i>	<i>More probable problem related to ADD: deficits not interfering with day to day functioning: not symptomatic</i>
Avoidance and procrastination: starting or finishing tasks that are large or problematic	This is usually not a problem unless you do not want to do it	This has happened since childhood but you set time lines so it is not a problem	You have certainly struggled with this since being a child but now you have a routine to get started or have help in the beginning
Avoidance and procrastination: typically begin tasks at the last minute	This is usually not a problem unless you do not want to do something	This has happened since childhood but you set time lines so it is not a problem	This has been a lifelong issue however you usually manage to pull things off at the eleventh hour and do a good job
Avoidance and procrastination of people who are upset or angry	This is not usually a problem unless you are worried due to a specific situation	You have had this problem due to fear of people—family members have the same problem	You have a history of people being mad at you for one thing or another so you naturally avoid people if they are upset and wait for the smoke to blow over
Fear of failure, fear of success	This not usually a problem and if present it is related to specific circumstances	You have had this problem due to life long anxiety and your family setting high goals—so you are more compulsive and perfectionistic to make these goals	This is a problem at different times of your life and sometimes you manage to work it through and other times not as well—it may result in your avoiding some challenges or potentially positive but risky situations and you tend to take the solid road or the sure thing—so if it looks too risky you probably would not do it but you still do okay—you just do not stand out as a star

Most likely ADD: deficits interfering in day to day functioning at job, home or school: symptomatic

Likely ADD: crisis mode: need immediate evaluation and intervention

Suggestion for coping

You put things off with the best of them but you are the one who does not know when to stop complaining and get the job done—however the more that you avoid the deeper in trouble you get which is happening more at home, school and work

You cannot start any task due to overwhelming anxiety and fear of not being able to finish anything due to the stress, anxiety and realization of attention problems and the impact upon your life; so at this time you are totally blocked

Large projects require time but you need to start them before spending the time to diffuse the anxiety. So start these tasks when you only intend to do a little bit just to get going so you then know what to do—start on the research before sitting down to write the paper—write the middle before trying the beginning

You have always begun tasks at the last minute and used to manage to still pull things together more than you can do at this time—so beginning tasks at the last minute is not allowing you to still accomplish the goal

While you would typically complete tasks at the last minute and get it done, now you are too overwhelmed to do anything and you cannot start any task even when threatened to lose the class or be fired from your job or left by your spouse or significant other

Set aside time to get things done depending upon the task; for example do phone calls in the morning when no one is in the office or the paperwork that requires the most concentration or find your best time for any task and do it then

Given that more people are getting upset with you—there is less tolerance for them and you avoid them at all costs

Everyone is so mad at you that you avoid everyone and do not go to work or class or meet for the date or call friends

Tell yourself, which is true, that the best way to diffuse anyone who is angry is by talking to them and simply listening to what they have to say think of something else at the time to get through it but their anger and upset will decrease if they feel that they have been heard—unless people are critical then tell them to forget it and you do not need to hear what they have to say

Your history is one of failure and difficulty as a child and as an adult in this never ending struggle with attention symptoms—you avoid opportunities to avoid failure and success as well—you are not a risk taker

You are totally immobilized and cannot do anything

No risk no gain—take calculated risk when you think you can do things try it and then let it go if it does not work out just learn from your mistakes—but the only way to grow and gain success is through failure our best teacher—the more painful the experience the more that we learn and the more that we are able to give up bad habits that have become comfortable

(Continued)

Symptoms	<i>Normal—temporary stress, anxiety or depression</i>	<i>Consider attention deficit disorder (ADD) and re-assess in 6 mo—problem still present</i>	<i>More probable problem related to ADD: deficits not interfering with day to day functioning: not symptomatic</i>
Increased frustration, decreased tolerance, more negative thinking, irritability and anger	This is not usually a problem or temporarily present due to a specific reason	You have had this problem due to lifelong depression—family members have the same problem	You do tend to predict the worst and have done so since being a child but this protects you from being disappointed—you do not have a lot of patience for things and get easily frustrated so you do something else
Increased frustration, decreased tolerance, less flexible, more rigid thinking	This is not usually a problem or is temporarily present due to a specific reason	This has not been a problem for you—if anything you tend to try too hard and not give up when you should, you are not rigid and more open to the opinion of others sometimes you need to hang onto your opinion more	You did not have this problem before in your life but recently you are finding yourself more upset and people are telling you that you are more rigid and need to be right a lot of the time—you are aware of it but it does not bother you and no one is that upset

Most likely ADD: deficits interfering in day to day functioning at job, home or school: symptomatic

Likely ADD: crisis mode: need immediate evaluation and intervention

Suggestion for coping

When things do not go as well it is easy to become depressed and more negative about yourself and those around you—so you have less tolerance for you and for everyone else

You have become so negative and irritable that you have no tolerance for anything and predict the worst in everything—you are totally negative and it is spilling over and obvious at work and in personal relationships

If you have a genetic depression then you may have to address it chemically with medication or functionally with supplements to hit the same neurotransmitters in the brain—otherwise learn about crooked thinking, exercise and use whatever works to think more positively

Lately your tolerance is even worse whether it is your blood pressure going up, snoring more, sleeping less, a recent car injury or fall you took, and now you are easy angered, easily upset with no tolerance for changes in plans or how you expect things to be

You have no frustration tolerance due to increased stress but not rigid thinking unless something else is going on like a rise in blood pressure or sleep problem

If you have become more rigid it can be a sign of some type of medical problem that affects sleep and/or your brain, specifically the frontal processes—consult your doctor immediately

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about the first edition . . .

"...[the] review of the literature is sound, their description and causal explanations of symptoms commendable, and their analysis of practical coping methods top-notch....The volume should be required reading for all teachers and will help parents and physicians alike." —*Choice*

about the second edition . . .

Completely revised and updated, this *Second Edition* spans every issue related to ADD care and treatment. New chapters focus on emerging issues, the overlap of sleep disorders, how sleep disorders mimic ADD/ADHD and/or increase the symptoms, ADHD and sleep apnea, ADHD and restless legs or periodic limb movements in sleep, sleep in children, adolescents and adults, the aged population, ADD and women, novel treatment approaches, including a new cognitive training program, methods to diagnosis ADD/ADHD and separate it from other overlapping disorders, and mis-diagnosis.

Discussing the most commonly diagnosed behavioral disorder of childhood, this guide clearly defines the features and clinical appearance of ADD...spans the occurrence and presentation of ADD in patients at all stages of life, from childhood to old age, and focuses on issues specific to each age group...considers issues specific to female patients...analyzes conditions that may mimic ADD/ADHD...identifies coping mechanisms, as well as tools to address symptoms of ADD at home, school, and work...and offers a clinical overview of currently available medications.

about the editor . . .

BARBARA C. FISHER is a fully licensed psychologist who has specialized in neuropsychology for the past 16 years. She is affiliated with Brain Evaluation/United Psychological Services, Washington Township, and on Staff at Mount Clemens General Hospital, Michigan. Dr. Fisher is the co-author of several books and various published articles and has been actively presenting seminars for the lay and professional population for the last ten years on a variety of topics related to brain-behavior issues from a neuropsychological perspective. Dr. Fisher is Board Certified for Behavioral Sleep Medicine and a member of the American Academy of Sleep Medicine, the American Psychological Association, and the American Academy of Neurology, among other organizations. Dr. Fisher received the B.A. and M.A. degrees from Oakland University, Rochester, Michigan, and the Ph.D. degree from Wayne State University, Detroit, Michigan.

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270 Madison Avenue
New York, NY 10016
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