

Looking for a Quick Fix?

Controversial Therapies in the Treatment of Language and Learning Disorders



August, 2017

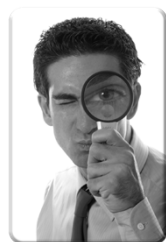
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**LOOKING FOR A QUICK FIX?
CONTROVERSIAL THERAPIES
IN THE TREATMENT OF
LANGUAGE AND
LEARNING DISORDERS**

Jeffrey L. Black, M.D.

I have no relevant financial relationships with the manufacturer(s) of any commercial product(s)
and/or provider of commercial services discussed in this CME activity.

I do intend to discuss an unapproved/investigative use of a commercial product/device in my
presentation.

***At the end of this activity,
participants will be able to...***

- recognize general characteristics of controversial therapies,
- describe common unproven therapies, and
- understand how to advise families.

A Brief History of Medicine

"I have an earache."

2000 B.C. "Here, eat this root."

1000 A.D. "That root is heathen, say a prayer."

1850 A.D. "That prayer is superstition, drink this potion."

1940 A.D. "That potion is snake oil, swallow this pill."

1985 A.D. "That pill is ineffective, take this antibiotic."

2000 A.D. "That antibiotic is artificial, here, take this root."

-- Anonymous

Legal, Medical and Ethical Issues of Unproven Therapy Use for Language and Learning Disorders in Children

Legal requirements for evidence-based educational practice (No Child Left Behind 2002; IDEA Reauthorization 2005).

Ineffective treatments may cause harm directly (toxicity, nutrition, interrupt/delay) or indirectly (time, financial burden, guilt, inaccurate attributions).

Obligation to provide information about the risks and benefits of treatments.

Higher ethical standard than for adult patients because children do not decide on what treatments they receive.

DEFINITIONS OF TERMS



- Alternative medicine:** Interventions not typically taught in U.S. medical schools, not available in hospitals, not reimbursed by insurance, or lacking scientific evidence to support its use.
- Complementary medicine:** Therapies used in conjunction with but not replacing scientific medicine.
- Folk medicine:** Approaches traditionally used by families or certain groups as part of their cultural or religious heritage.

DEFINITIONS OF TERMS

- Holistic medicine:** Care of the patient as a whole, taking into account his/her values, beliefs, culture, and worldview.
- Integrative medicine:** Inclusion of CAM into the fold of scientific medicine.
- Scientific medicine:** Medicine typically taught in U.S. medical schools, available in hospitals, reimbursed by third-party payers, and backed by scientific evidence (sometimes referred to as allopathic, Western, traditional, conventional, or mainstream).



TYPES OF CAM

- | | |
|--|--------------------------------|
| 1. Mind-Body Medicine | Hypnosis, Biofeedback |
| 2. Alternative Medical Systems | Acupuncture, Homeopathy |
| 3. Lifestyle and Disease Prevention | Diet, Stress Management |
| 4. Biologically Based Therapies | Herbs, Orthomolecular Medicine |
| 5. Manipulative and Body-Based Systems | Chiropractic Medicine, Massage |
| 6. Biofield | Therapeutic Touch |
| 7. Bioelectromagnetics | Magnets |

www.nccam.nih.gov

Complementary and Alternative Medicine (CAM) Use in Children

- CAM refers to medical theories and practices associated with treatments that are outside the medical mainstream (complementary = in addition to, alternative = instead of – conventional treatment).
- More than 50% of children with chronic medical conditions use CAM and CAM use is increasing.
- Parents and patients often do not tell their clinicians about CAM use.
- CAM is not covered widely or systematically in pediatric residency education.
- 50% of pediatricians would consider recommending CAM for their patients.

Kemper et al *Pediatrics* 2008; 122, 1374 - 1386

Why Do Families Choose CAM?

- mistrust and misunderstanding of conventional medicine/intervention
- desire to do all that is possible
- conventional treatment is ineffective
- preference for more “natural” intervention
- attempt to gain sense of control



**Unproven Therapies for
Developmental Language Disorder (DLD)
and ADHD: A Partial List**

- Colored overlays/Tinted lenses
- Optometric visual training
- Fast Forward
- Computer-based cognitive training (Cogmed, BrainBuilder)
- Dietary supplements (megavitamins, minerals, amino acids, omega-3 fatty acids, herbs)
- Dietary restriction (sugar, food allergens, additives)
- Neurotherapy (EEG biofeedback)
- Sensory integration therapy
- Auditory integration therapy (The Listening Program)
- Auditory Trainer (CAPD)
- Dore-DDAT (Dyslexia, dyspraxia and attention treatment)
- Cerebellar-vestibular treatment (anti-motion sickness medication)
- Patterning (Doman-Delacato)
- Interactive metronome therapy
- Chiropractic cure for dyslexia
- Davis dyslexia correction method

**CONVENTIONAL TREATMENTS ARE
PERFORMANCE-BASED**

Direct Instruction or Intervention –
targeting deficient “high level” cognitive ability

(e.g. component reading skills for dyslexia and
language skills for specific language
impairment, etc.)

Pennington (2009) Diagnosing Learning Disabilities, 2nd Ed.

**CAM OR CONTROVERSIAL
TREATMENTS ARE PROCESS-FOCUSED**

Indirect Approach –
targeting lower level perceptual (e.g. auditory,
tactile, visual) or motor ability

Correcting underlying cause improves higher
aspect of cognition (e.g. reading, language,
attention, etc.)

Pennington (2009)

EMPIRICAL CRITERIA FOR CAM (PROCESS-FOCUSED) TREATMENTS

Lower level deficit is present in children with the disorder

Treatment improves the lower level deficit

Reducing the lower level deficit remediates the disorder (**transfer**)

Pennington (2009)

CAM Research Issues

Many CAM therapies have not been evaluated and there are relatively few random control trials (RCTs) in peer-reviewed journals.

Limited interest and expertise in CAM at conventional institutions are potential barriers to experimental studies.

Publication bias in CAM research may be opposite of conventional medicine (i.e. negative results published).

Kemper et al (2008)

IS THE THERAPY PROVEN?

- consistent with pathophysiologic processes
- randomized and comparison-group controlled trials
- accumulated evidence
- peer-reviewed publication

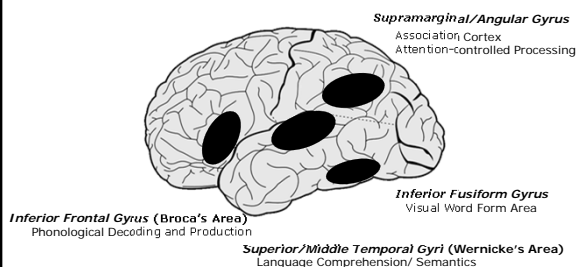


DEVELOPMENTAL LANGUAGE DISORDERS (DLD)

ETIOLOGY	prenatal neuronal migration and axon path finding
BRAIN	structure and function of left perisylvian cortex
NEUROPSYCHOLOGY	phonological processing shared deficit dyslexia: inaccurate/inefficient, word reading SLI: atypical form, content, use
TREATMENT	systematic, direct intervention dyslexia: PAT, phon. coding, fluency SLI: semantics, syntax, pragmatics

Pennington (2009)

Neurological Model of Reading



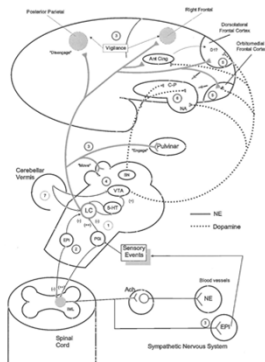
Sandak et al. (2004). *Scientific Studies of Reading*, 8, 273-292.

ATTENTION-DEFICIT / HYPERACTIVITY DISORDER (AD/HD)

ETIOLOGY	neurotransmitter (monoamine) production, release-reuptake and binding
BRAIN	frontostriatal structure and function
NEUROPSYCHOLOGY	abnormal arousal, executive function, mental energy
TREATMENT	psychostimulants and behavioral therapy

Pennington (2009)

Attention-Deficit/Hyperactivity Disorder



Pliszka (2003)

Parents of a five year old with attention-deficit/hyperactivity disorder claim their son's behavior is highly influenced by what he eats. They have observed that he "gets hyper" when he consumes foods high in sugar, artificial additives, and peanuts. They are hesitant to use stimulant medication after reading about growth problems and sudden death. In magazines and on the internet they have read about the safety and effectiveness of restrictive diets and nutritional supplements. They are reluctant to use any form of treatment until they weigh the pros and cons.

GENERAL POINTS REGARDING CONTROVERSIAL THERAPIES

Controversial therapies first appear in non-peer-reviewed literature.

Natural substances or exercises are relied upon and are said to cause no adverse effects.

Powerful placebo or Hawthorne effects convince proponents that the treatment is effective and worthwhile.

LOW SUGAR DIET

THEORY: Rebound hypoglycemia leading to learning and behavior problems.

TREATMENT: Low carbohydrate – high protein diet with frequent feedings or other unknown mechanism (allergy, neurotransmitter).

PROBLEMS: True hypoglycemia not found.

Crook, WG, Jackson, TN: Can Your Child Read? Is he Hyperactive? Professional Books, 1975.

MEGAVITAMIN THERAPY

THEORY: Genetic abnormality causing need for increased vitamin intake and predisposition for deficiencies causing disease (schizophrenia to learning disorders).

TREATMENT: Large daily vitamin doses.

PROBLEMS: Vitamins are co-factors required in small amounts. Risk of toxicity.

Lancet 1:287-289, 1950. RJ Williams, et al

ORTHOMOLECULAR MINERAL THERAPY

THEORY: Deficiency in mineral due to excessive need causes development and learning problems.

TREATMENT: Mineral supplement often based on hair analysis.

PROBLEMS: Hair analysis inaccurate indication of body mineral content. No evidence that children with developmental problems have mineral deficiency.

Schizophrenia 3:95-107, 1971. A Cott

AMINO ACID SUPPLEMENTATION

- THEORY:** Intake of neurotransmitter precursors correct deficiencies in the CNS that cause neurologic-psychiatric disorders (especially ADHD).
- TREATMENT:** Tryptophan and tyrosine as nutritional supplements.
- PROBLEMS:** Consistent with current theory but unproven.

Mindell E. : Earl Mindell's Vitamin Bible for Your Kids, Rawson and Wade, New York, 1981.

HERBS AND ANTIOXIDANTS

- THEORY:** Pharmacological properties of plant extracts can reduce restlessness, improve concentration and enhance memory.
- TREATMENT:** Over-the-counter herbal preparations are taken as daily dietary supplements.
- PROBLEMS:** Safety and efficacy information is lacking. Active compounds vary widely in strength from one brand and batch to another. Products often contain multiple active substances. Interaction between active substances and prescription drugs is unknown.

Chan, E. et al: *Contemporary Pediatrics*, 17:116-130, 2000.

HIGH DOSE FISH OIL

- THEORY:** Long-chain polyunsaturated fatty acids (LC-PUFAs), especially omega-3, are a significant component of cortical tissue and nerve cell walls. They influence neurotransmitter release, gene transcription and inflammation recovery. Childhood neurodevelopmental disorders are caused by a genetic abnormality in phospholipid metabolism or insufficient dietary intake.



Continued....

.....HIGH DOSE FISH OIL

TREATMENT: LC-PUFAs (omega-3) supplementation (8-16 mgs/day) taken to treat disorders like ADHD by normalizing nerve cell membrane structure, improve cell signaling and synaptogenesis. Vayarin, a prescribed medical food, contains omega-3.

PROBLEMS: Despite the finding that some ADHD patients have lower LC-PUFA content of their RBC membranes, improvements in behavior have been inconsistent and negligible.



Sorgi, PJ et al: *Nutrition Journal* 6:16, 2007.

Your own child brings home a sign-up sheet from school for vision screening. This new program has been endorsed by the PTA. Your spouse has attended a seminar at school that introduced Comprehensive Learning Related Vision Screening and was impressed with what was presented. This screening battery is said to identify 75% of the children with learning related vision problems as compared with the usual school or physician screening that identifies only 25%. The screening test is offered at school for \$5. Children failing the screening test are referred to treatment specialists in the community. The parent group (Parents Allied for Vision Education) representative said that nearly all children receiving the treatment benefit.

PAVE supports comprehensive Learning Related Vision Screenings (LRVS) which evaluate eye health, near and far visual acuity, eye movement control, focusing from near to far, sustaining clear focusing, eye teaming ability, depth perception and visual motor integration. These are the visual abilities crucial for academic and athletic success.

OPTOMETRIC TRAINING

THEORY: Learning disabilities are due to abnormal visual perception and abnormalities in the coordination of eye movements and binocular fixation.

TREATMENT: Exercises to improve abnormal eye function and visual perception.

College of optometrists in vision development
www.covd.org



PROBLEMS WITH OPTOMETRIC TRAINING

Reading disabilities do not involve eye movement – most children with oculomotor problems read normally; incidence of convergence/fixation problems similar in “normal” population.

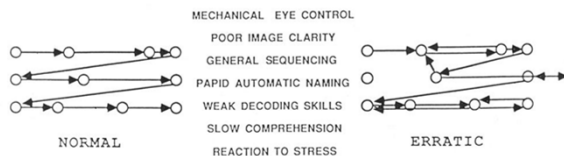
Visual processing problems are cortical – children with strabismus do not usually reverse letters, numbers.

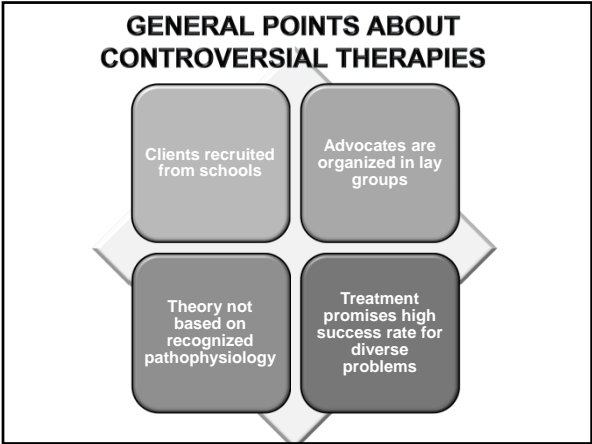
Reading problems have a significant language – auditory component (Wernicke's – Angular Gyrus – left parietal – temporal region).

Data do not support efficacy – major problems with controls for observer bias, associated interventions, natural history.

SOME POSSIBLE CAUSES OF POOR EYE TRACKING

"TRACKING" (SACCADIC)





Irlen Colored Overlays/Lenses

In 1983, during a presentation at the annual meeting of the American Psychological Association, Helen Irlen proposed a treatment of dyslexia using tinted (colored) overlays or lenses. The lenses treat a condition called scotopic sensitivity syndrome (SSS) that is said to be a visual defect related to difficulties with light source, glare, luminance, wave length and black/white contrast. Without publishing research on the condition or efficacy of the treatment, she claimed in the newsletter of her institute (2001) that tinted lenses have also successfully treated individuals suffering from light sensitivity and distortions caused by head injuries, migraine headaches, cataracts, fibromyalgia, depression and perceptual problems.

irlen.com/newsletter-archive

Irlen Colored Overlays/Lenses, cont.

The assessment for SSS involves questions about eye fatigue, blurred vision, words “running off the page” and visual tasks with overlays of 7 different colors. During the tasks, individuals answer questions about visual discomfort and clarity while interpreting geometric figures and reading text. Fifty percent of individuals with dyslexia are said to have SSS and derive immediate improvement in word reading accuracy and efficiency when their specific tint is used. The Irlen Institute was the original fabricator of tinted glasses. Schools may now support the use of overlays by screening and supplying the needed tint. Colored overlays are an allowable accommodation for the Texas state assessment (STAAR).

IRLEN COLORED OVERLAYS/LENSES DO NOT ALLEVIATE READING DIFFICULTIES (RD)

Sixty-one school children (aged 7 – 12) with R D

Irlen diagnosticians diagnosed SSS in .77

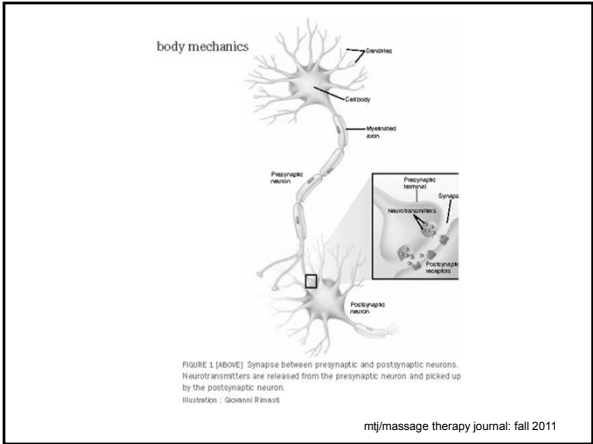
No difference in reading (WRRT, GORT) among those with and without SSS using prescribed color, non prescribed color and clear overlay

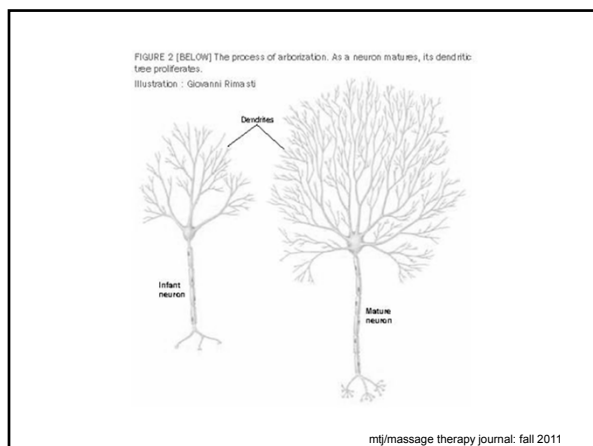
Two of three children who knew their SSS diagnosis and tint had higher Wilkins Rate of Reading Test (WRRT) scores with the prescribed overlay

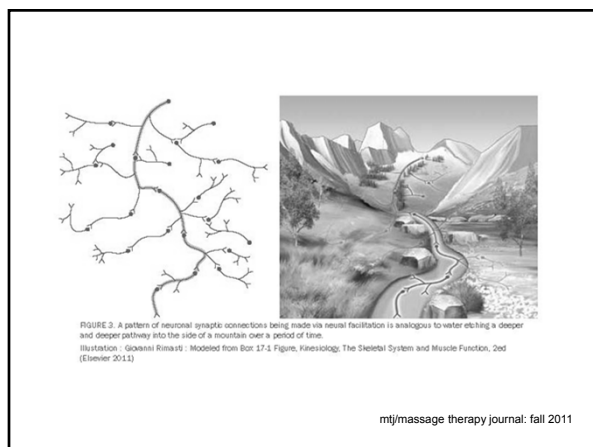
Pediatrics, Vol. 128, No. 4, 2011

Neuroplasticity

The brain’s ability to form new circuits in response to training or recovery from injury.







Peril and Promise of Plasticity

"Neurons that fire together wire together."

Advocates of unproven treatments often use the promise of neural plasticity.

"Molding and shaping of neural connections are severely restricted after critical periods in childhood and adolescence."

Research on critical periods suggest that plasticity can be enhanced, even in adults.

Scientific American, Feb 2016

Prevalence of neuromyths amongst practicing teachers in five different international contexts

Percentage of teachers who "agree" (rather than "disagree" or "don't know")					
MYTH	United Kingdom (n=137)	The Netherlands (n=105)	Turkey (n=278)	Greece (n=174)	China (n=238)
Individuals learn better when they receive information in their preferred learning style (for example, visual, auditory or kinesthetic)	93	96	97	96	97
Differences in hemispheric dominance (left brain or right brain) can help to explain individual differences amongst learners	91	86	79	74	71

Nature Reviews/Neuroscience 2014

Neuromyths: One Reason Educators use Unproven Approaches to Teaching

- Unscientific ideas about the brain
- Misconception generated by a misunderstanding, a misreading or misquoting of brain research findings

Learning Styles

Neuromyth: Students learn best when they are taught to their preferred learning style (visual, auditory, kinesthetic, tactile)

Neuroscience: Brain's interconnectivity makes the theory unsound; not supported by controlled studies

Hemispheric Dominance

Neuromyth: Teaching should consider if students are right-brained (intuitive) of left-brained (step-wise) learners

Neuroscience: Complex cognitive tasks engage both hemispheres

Why Teaching Approaches Linked to Neuromyths Flourish

- Low cost, easy to implement, fun
- Brain basis adds appeal and credibility
- Protected from scrutiny – critical analysis requires knowledge of neuroscience and access to technical journals
- Absence of neuroscience in education and teacher training

Different Perspectives on Training in Neuroscience for Educators

Create a new transdisciplinary field – neuroeducation
International Mind, Brain and Education Society
www.imbes.org

Require neuroscience coursework for doctoral training in education research

Educational Researcher, 2005

Do not make teachers learn neuroscience but rely on institutions (schools of education, district central offices, professional organizations) to inform them about unproven “brain-based” approaches

Daniel Willingham
www.danielwillingham.com

Patterning (Doman-Delacato)

THEORY: Abnormal neurologic organization causes mental retardation, specific learning disabilities and motor deficits.

TREATMENT: Motor pattern exercises that simulate early development.

Visual, auditory, tactile stimulation.

Rebreathing to improve CNS blood flow.

Fluid restriction to reduce CSF volume.

For SLD forced restriction of nondominant hand, active training of dominant hand, eye patching, restrict non-verbal music that stimulates nondominant hemisphere.

PROBLEM: Perceptual motor exercises do not reorganize cortical connectivity to improve higher cognitive or motor function. Mixed/poor dominance is effect not cause.

JAMA 174:257,1960, RJ Doman et al

Brain Gym

- Neurological repatterning
- Perceptual-motor training (educational kinesiology)
- Crawling, drawing, tracing in the air, yawning

braingym.org

Brain Balance

- Integrated approach for brain-body imbalance
- Sensory motor (strength, balance, rhythm, sensory detection)
- Neuro-academic (cognitive processing, academic skills)
- Nutrition (remove gluten, sugar, dairy, processed food)

brainbalancecenters.com

Learning Rx

- ThinkRx based on Cattell-Horn-Carroll
- Targeted, repetitive, game-like mental tasks
- Clinician/trainer gives instant feedback one-on-one
- ReadRX auditory/visual processing and coding

learningrx.com

A clumsy first grader with sloppy paper-pencil skills has just finished a year of occupational therapy at school. He was said to make good progress with treatment and his printing, to your estimate, now appears age appropriate. The school O.T. recommends continuing weekly individual therapy to help with his inattention and slow development of reading proficiency. She states that he has tactile defensiveness, shortened duration of post-rotatory nystagmus, and gravitational insecurity. The child's mother is concerned about the effect of pulling her child out of the classroom two hours weekly for therapy. She was forewarned of physician bias against it.

SENSORY INTEGRATION

- THEORY:** Vestibular system plays a critical role in L.D. and A.D.D. and is a unifying system of the brain. When it does not function properly, incoming sensory information is interpreted inconsistently and inaccurately. Patients with SI deficits can show abnormal sensory responsiveness, decreased post-rotatory nystagmus and preservation of primitive reflexes.
- TREATMENT:** Controlled tactile and vestibular stimulation facilitate integration of primitive reflexes which improves midbrain organization leading not only to improved balance, muscle tone and visual-fine motor skills, but better inter-hemispheric connections and higher cortical processes such as reading.
- PROBLEMS:** Decreased PRN is not associated with vestibular dysfunction. SIT does not normalize PRN or have effect on VFM, ADHD, ASD or academic skills.

Ayres, A.J.: *Sensory Integration and the child*. Western Psychological Press, 1981.

GENERAL POINTS ABOUT CONTROVERSIAL THERAPIES

Studies that do not support the controversial treatment are discounted as biased, controlled by uninformed physicians.

Unproven therapies often have the endorsement of school officials and are incorporated into school programs.

EEG BIOFEEDBACK

- THEORY:** Impulsive children (ADHD) can be trained to increase the type of brain wave activity associated with sustained attention and therefore improve concentration and reduce hyperactivity. Those with reading problems improve because of electrical activity synchrony.
- TREATMENT:** Biofeedback (EEG transformed to light/tone) for altering brain wave activity during 40-80, forty minute sessions held 2-3 times per week. Usually augmented by academic tutoring.
- PROBLEMS:** Published reports use small numbers of subjects, ambiguous diagnoses, contain concurrent treatments, use questionable outcome measures and lack double-blind, placebo-controlled procedures. Treatment costs excessive (up to \$3-5 thousand).

Lubar, J.F.: *Biofeedback and Self-regulation* 16:201-225, 1991.

ACOUSTICALLY MODIFIED SPEECH TRAINING

- THEORY:** A deficit in auditory temporal order processing underlies language-learning disabilities.
- TREATMENT:** Acoustically modified speech training with computer-based multimedia Fast ForWord (FFW) games provided for 1.5-2 hours/day for 3-6 weeks leads to improvements in spoken language (comprehension and expression) and reading skills. Phonological awareness, phonics and word reading added in 2000.
- PROBLEMS:** Temporal order processing defects have not been found consistently in SLI or DD. Initial claims of FFW efficacy were based on two preliminary studies and non-experimental field trials. Reading outcomes not measured in published reports until 2003; dyslexia control group lacking. Independent investigations have shown gains in some aspects of oral language, phonemic awareness and reading. Oral language and reading gains not correlated with growth in auditory temporal order processing. Reading gains inconsistent and minimal.

Temple, E., et al: *PNAS* 100(5),2860-2865, 2003.

**COMPUTERIZED TRAINING IN WORKING
MEMORY - COGMED**

THEORY: Working memory (WM), the capacity for brief storage and manipulation of information, is utilized during many complex cognitive tasks. This type of memory is largely a frontal lobe function and is integral to executive attention. Individuals with frontal lobe impairment, including ADHD, suffer from problems in executive function associated with deficits in working memory. WM training can improve executive function problems and reduce symptoms of disorders such as ADHD, stroke and dementia in all age groups – preschoolers through older adults.

continued

**COMPUTERIZED TRAINING IN WORKING
MEMORY – COGMED, *continued***

TREATMENT: Software-based working memory training is supervised by professionals at COGMED sites who provide ongoing feedback and motivation. Training consists of twenty to twenty-five 30 to 45 minute sessions over 5 weeks and typically is done at home. Each session presents 90 WM tasks that require the user to remember a sequence of numbers, letters or patterns. The difficulty level (number of elements) is automatically adjusted on each trial to match the user's WM ability. A non WM task, choice reaction time, was added (2005) to reward attention and response inhibition.



continued

**COMPUTERIZED TRAINING IN WORKING
MEMORY – COGMED, *continued***

PROBLEMS: Mostly small scale studies have been published. Results have included children with ADHD, academic deficits and those who were very low birth weight. There has been evidence of possible transfer to untrained working memory tests and academic skills. Failure to demonstrate benefits in teacher behavior ratings, to blind observers and use adequate control groups limit possible conclusions about efficacy.



Klingberg T, et al: *JAACAP* 44(2), 177-186, 2005.

AUDITORY TRAINER
(FM Assistive Listening Device)

THEORY: Abnormality in the central auditory system causes (CAPD) problems with sound localization, auditory discrimination, and detecting an auditory signal embedded in competing acoustic signals resulting in listening, language and academic difficulties.

TREATMENT : Multi-faceted management included FM systems that amplify the teacher while reducing background noise and reverberation.

PROBLEMS: Listening problems are multi-factorial. Clinical criteria for CAPD are nonspecific. Tests for CAPD do not exclude ADHD and language disorders. Meaningful evaluations of intervention are not possible when the precise nature of CAPD is unknown.

Bamiou D.E., et al: Arch. Dis. Child 85:361-365, 2001.

Counsel Families About Controversial Therapies

Cover clinical course of the condition

Observe response to unproven therapy

Underscore their role in management

Notice and control your reaction

Send them resources and support groups

Educate them to recognize unproven treatments

Listen to their concerns

AAP – CCWD (2001) and Kemper et al. (2008)

Characteristics of Unproven Therapies

Promise success rate much greater than validated treatments

Effective for multiple unrelated disorders

Based on novel theory inconsistent with established concepts

Supported only by anecdotes, testimonials; no RCT or control comparison trial

Providers make substantial profit

Visit web-based Resources for Evaluating Controversial, Complementary and Alternative Therapies



Cochrane Collaboration
www.cochrane.org

National Council Against Health Fraud:
www.quackwatch.org

National Center for Complementary and Alternative Medicine – National
Institute of Health:
www.nccam.nih.gov



AAP Section on Integrative Medicine
www.aap.org

Understood.org
www.understood.org

A Commonsense Guide to Complementary and Alternative Medicine Treatment Recommendations

		Is the therapy effective?	
		Yes	No
Is the therapy safe?	Yes	Recommend	Tolerate
	No	Monitor closely or discourage	Discourage

From Kemper K, Cohen M. *Contemp. Pediatr.* 2004; 21:65

CLOSING THOUGHTS ON CONTROVERSIAL THERAPIES

- Become familiar with and use objective sources of information about complementary and alternative treatments.
- Look carefully for characteristics of quackery/pseudoscience.
- Determine if scientific research has shown that the therapy is evidence-based (quality of evidence, strength of treatment).



WARREN CRAIN

"...HOLD STILL, LARRY, IT'S TAKING ANOTHER PICTURE..."

By Hal Robinson for The Times-Picayune, New Orleans, La. Tribune Media Services

The absence of evidence is not evidence of absence

Carl Sagan

A CHECKLIST FOR IDENTIFYING CHARACTERISTICS OF UNPROVEN TREATMENTS (PSEUDOSCIENCE)

Characteristic	Present		
	Yes	No	Unclear
1. Treatment is based on theories that are not accepted concepts of physiology or disease mechanisms.			
2. High success rates are promised for multiple unrelated conditions.			
3. Basis for support rests on anecdotes, testimonials or reports that are influenced by placebo or Hawthorne effects.			
4. Treatment targets “low level” perceptual, sensory, motor or memory processes to improve “high level” (e.g. attention, language, academic) performance.			
5. Advocates and authors of published information about the treatment have financial conflicts of interest.			
6. Print or digital information was widely disseminated prior to publication in peer-reviewed journals.			
7. Critical evidence and critics are ignored or discounted as uninformed or biased.			

"Yes" answers indicate that the treatment lacks proven efficacy.

Adapted from McKenzie, JF: A Checklist for Evaluating Health Information. *J School Health* 57:31, 1987 and Finn P et al.: Science and Pseudoscience in Communication Disorders: Criteria and Applications. *Am Journal Speech-Language Pathology* 14:172, 2005.

RESOURCES FOR EVALUATING CONTROVERSIAL, COMPLEMENTARY AND ALTERNATIVE THERAPIES

Cochrane Collaboration

www.cochrane.org

This widely recognized and respected international, non-profit organization supports and disseminates systematic reviews and meta-analyses on the efficacy of interventions in the healthcare field. The Cochrane Library contains over 700 reviews on complementary and alternative medicine. Thirty-two cover Development, Psychosocial and Learning Problems. Abstracts can be downloaded at no cost. A “plain language summary” gives a concise statement that can be understood by families.

National Council Against Health Fraud

www.quackwatch.org

Tries to combat health-related frauds, myths, fads, fallacies and misconduct. Information about unproven treatments for developmental and learning disorders are found at the topical index “Questionable Mental Help.” Advice is given about how to spot quacks, spurious interventions and bogus science.

National Center for Complementary and Alternative Medicine (CAM)

– National Institute of Health

www.nccam.nih.gov

Funds research and provides information to the public on CAM. Links are given to documents and journal articles. Dietary supplements, acupuncture and homeopathy are among the treatments covered. This website has limited value for CAM use with DLD/dyslexia.

American Academy of Pediatrics – Section on Integrative Medicine

www.aap.org (click on section website)

This website was designed to help pediatricians advise families who are seeking CAM-related therapy. A brief description of complementary and alternative medicine, anecdotal data and the scientific method is presented for parents who are directed to investigate whether a therapy has been evaluated in an evidence-based scientific study by using websites such as www.ncbi.nih.gov/pubmed. Parent information converts to a pdf format for print distribution. Links are provided to articles on CAM topics, such as Therapies for Learning Disabilities and Fish Oils and Neurodevelopmental Disabilities, that have been published in Pediatrics in Review.

Understood.org: A Resource for Parents of Children with Learning and Attention Issues

www.understood.org

This website was created in 2012 by 15 nonprofit organizations. Alternative/controversial therapies are covered under treatments and approaches. Parent-friendly language is used to provide checklists and questions to use when evaluating a therapy, describe signs of an unproven treatment and explain what makes a treatment controversial. The potential benefits of treatment are sometimes overstated.

SELECTED SYSTEMATIC REVIEWS AND CONSENSUS STATEMENTS

The Cochrane Library

www.cochranelibrary.com

Polyunsaturated Fatty Acids (PUFAs) for Children with Specific Learning Disorders

Polyunsaturated Fatty Acids (PUFAs) for Attention Deficit/Hyperactivity Disorder (ADHD) in Children and Adolescents

Jeffrey L. Black, M.D.

ASHA Evidence-Based Systematic Reviews

www.asha.org/research/EBP/EBSR/

Auditory Processing Disorder and Auditory/Language Interventions: An Evidence-Based Systematic Review

The Effect of Sensory-Based Interventions on Communication Outcomes in Children: A Systematic Review

Stanford Center on Longevity and Max Planck Institute

<http://longevity3.stanford.edu/blog/2014/10/15/the-consensus-on-the-brain-training-industry-from-the-scientific-community/>

A consensus on the Brain Training Industry from the Scientific Community

American Academy of Pediatrics

www.aap.org (search under Advocacy and Policy)

Sensory Integration for Therapies for Children with Developmental and Behavioral Disorder – 2012

Learning Disabilities, Dyslexia and Vision: Policy Statement – 2009, Joint Technical Report – 2011

Treatment of Neurobiologically Impaired Children Using Patterning – 1999

RESOURCES ON THE IMPLICATIONS OF NEUROSCIENCE FOR EDUCATION

Neuroscience and the Classroom: Making Connections

www.learner.org/courses/neuroscience

This online course for K-12 teachers was produced in association with the Mind, Brain and Education Program at the Harvard Graduate School of Education. Forty-two video modules cover how to understand and use neuroscience research in the classroom, neuroimaging tools, the neurobiology of learning and developmental disorders, and case studies of success stories.

Neuroscience: Implications for Education and Lifelong Learning

www.interacademies.net/file.aspx?id=25096

The Royal Society, an independent scientific academy of the UK, produced this document (Feb. 2011) to summarize how advances in neuroscience research has shed light on mental processes involved in learning and can contribute to education. Policy recommendations are made to address the challenges faced by neuroscientists and educators who seek to strengthen the appropriate use of findings and the science base for education.

FURTHER READING

Pennington BF (Ed): **Controversial Therapies for Dyslexia. Perspectives**, The International Dyslexia Association Vol. 37, No. 1, Winter 2011. (Issue available at www.interdys.org)

This review covers Fast ForWord programs, vision efficiency and movement-based interventions. The editor also describes the basic differences between traditional performance-based therapies and controversial therapies that are typically process-based.

Weber W and Newmark S: **Complementary and Alternative Medical Therapies for Attention-Deficit/Hyperactivity Disorder and Autism.** *Pediatric Clinics of North America*, 2007; 54:983-1006.
(Article available at www.pediatric.theclinics.com)

The standard treatment, pathophysiology, several categories of complementary and alternative therapies for ADHD are concisely described. The rationale and efficacy data of CAM for autism are also discussed.

Kemper KJ, Vohra S, Walls R. American Academy of Pediatrics: **The Use of Complementary and Alternative Medicine in Pediatrics.** *Pediatrics*, 2008; 122: 1374-1386.

(Article available at <http://pediatrics.aappublications.org/cgi/content/full/122/6/1374>)

This report from the American Academy of Pediatrics Task Force on Complementary and Alternative Medicine (CAM) outlines common CAM therapies, epidemiology, medicolegal and ethical implications in the context of holistic care. A common sense guide for making therapeutic decisions and tips for talking to parents concerning CAM use are provided.

American Academy of Pediatrics, Committee on Children with Disabilities. **Counseling Families Who Choose Complementary and Alternative Medicine for Their Child With Chronic Illness or Disability.** *Pediatrics*, 2001; 107:598-601. (Article available at <http://pediatrics.aappublications.org/cgi/content/ful/107/3/598>).

While this position statement was written for pediatricians, it contains useful directions for all disciplines that have a role in advising families who are considering the use of complementary and alternative medicine for their child with a chronic condition. The importance of maintaining a scientific perspective, an unbiased attitude and a trusting relationship are stressed.

Simkin, DR and Popper, CW (Eds): **Complementary and Alternative Therapies for Children with Psychiatric Disorders,** *Child and Adolescent Psychiatry Clinics of North America* – Part I, 2013; 22: 375-538; Part II, 2014; 23: 427-686 (available at www.childpsych.theclinics.com)

These two issues of CAPCNC give an overview of issues related to integrative medicine practice that combines traditional and alternative approaches. Comprehensive reviews of CAM therapies include several that are often used for children with learning and attention disorders, including neurofeedback, vitamins, minerals, amino acids, herbs, omega-3 fatty acids and sugar restriction.

Favaone, SV and Antshel, KM (Eds): **ADHD: Non-Pharmacologic Interventions.** *Child and Adolescent Psychiatry Clinics of North America*, 2014; 23: 687-982 (available at www.childpsych.theclinics.com)

The interventions reviewed include neurofeedback, computer-based cognitive training, nutritional supplements, elimination diets and exercise.

Finn, P., Bothe, A.K. and Bramlett, R.E. (2005): **Science and Pseudoscience in Communication Disorders: Criteria and Applications.** *American Journal of Speech-Language Pathology*, 14, 172-186 (article available at ajslp.pubs.asha.org).

Teachers are increasingly being held responsible for the evidence base that supports their practice. They may also be asked by parents about treatment for learning disorders that is being offered outside the school. This article describes ten criteria for distinguishing between scientific and pseudoscientific treatment claims. Teachers considering these criteria will be assisted in their decisions for using or recommending an educational intervention.

DeBonis, DA: **It Is Time to Rethink Central Auditory Processing Disorder Protocols for School-Aged Children.** *American Journal of Audiology*, 2015; 24: 124-136 (article available at www.asha.org/publications)

The purpose of this article is to review the literature on central auditory processing disorder (CAPD), its definition, diagnostic criteria and testing issues. Reasons why CAPD has not been proven to be a clinical entity distinct from deficits in attention, executive function, memory, language and general intelligence are presented. Recommendations are made for the evaluation and treatment of problems with listening that consider all possible factors.

Jeffrey L. Black, M.D.

Willingham OT (2012): **When Can You Trust the Experts? How to Tell Good Science from Bad in Education.**

Jossey-Bass: San Francisco. (read reviews and order at www.danielwillingham.com).

This book by a University of Virginia professor of psychology describes how teaching methods are typically adopted and the implications of the scientific method for education. An easy-to-use, four-step process for evaluating the scientific soundness of a proposed curriculum, teaching strategy, textbook or anything else purported to help children learn is presented.