Building Models: The VSL/ADHD

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A brief personal history: at age nine, I was focused on building plastic models of planes and ships; at nineteen, my focus, powered by hormones, shifted to live models; and by 29, I focused on building psychological models of learning processes. Science emerges over the decades in steps. Each new psychological concept about learning evolves to an empirically testable hypothesis and to a model. We advance our understanding and what we do with that understanding because we develop better models of how the varieties of human brains work.

One frontier of advancing scientific knowledge is where visual-spatial learners (VSLs) and Attention Deficit Hyperactivity Disorder Learners (ADHDs) (Dorry, 1996) meet. As a boy I built a plastic model of the X-15 supersonic plane, celebrating advances in air speed and the emergence of human beings into new realms beyond our atmosphere. We are now building a model of human learning called the VSL/ADHD, exploring new realms of understanding about ourselves. The VSLs and ADHDs are two types of learners who do not flourish in the listen-only, auditory-sequential teaching environment of the typical classroom. This article will explore the model of similarities and differences in how VSLs and ADHDs learn and perform.

The majority of the VSL/ADHD model is straightforward: a combination of the known facts about VSLs and ADHDs to produce a statement of how these conditions would operate together. No part of it is counter-intuitive once you are familiar with ADHDs and VSLs. This is consistent with the KISS Rule or Keep It Simple for Success. That is quite intentional, since the best models for psychological processes account for the maximum amount of verifiable facts/data with the minimum number of presumptions, or according to the following formula:

$$\text{Best model} = \frac{\text{maximum amount of verifiable facts/data}}{\text{minimum number of presumptions}}$$

Are there really visual-spatial learners? (And how did they get in MY backyard?)

While the empirical base of information about ADHDs is well established, if often misunderstood, the studies that validate the definition of VSLs are just emerging. The *Visual-Spatial Identifier* questionnaires are available online at www.visualspatial.org or www.gifteddevelopment.com in a 15-item *Observer Report* version and a *Self-Report* version, in both English and Spanish. These questionnaires have been used to document the validity of VSLs as an independently identifiable learning style, and establish the frequency of VSLs in the student population.

The surprising finding is that 37.6% of the student population studied was strongly VSL compared with 23% strongly auditory-sequential (ASL). The classic educational assumption that auditory-sequential learners were universally predominant is a fallacy! The studies that validate the *Visual-Spatial Identifier* for White and Hispanic males and females, ages 9-13, with 750 students in urban and rural geographic areas, are described in full in *Upside-Down Brilliance: The Visual-Spatial Learner* (Silverman, 2002). We're now able to report an individual student's VSL score and profile compared to students of the same age, gender, and ethnicity. We can define a student as predominantly a VSL or an ASL, and the degree of confidence we have in that judgment. (See, "Classroom Identification of Visual-Spatial Learners," by Steven Haas, in this issue for more information about the *Identifier*.)

Why must a Venn diagram be made from circles?

Table 1 frames out a rectangular Venn diagram of the overlap between VSLs and ADHDs. The developing VSL/ADHD Model is succinctly defined in the central column. The left hand VSL column-cells set the issue for the row, (see Figure 1 on page xx), and the center and right columns show the way in which the VSL/ADHD and ADHD-only individuals operate.

One concept that is essential to the understanding of the ADHD column, and therefore the overlapping VSL/ADHD column, is the reality that the condition should be called "Attention **Self-Control** Disorder," not Attention **Deficit Hyperactivity** Disorder (ADHD). ADHD individuals have the same full range of ability to focus and pay attention as anyone. It is the difficulty in keeping self-control of an appropriate level of attentional focus, somewhere between daydreaming and hyper-focus, on the important issue that is the bane of AD/HDs.

ADHDs spend more time towards either extreme of the continuum from unfocused daydreaming to hyper-focus. The ADHD individual's curve of the amount of time spent at what degree of focus is a normal bell-shaped curve turned upside down to a center low position. The "average" individual spends more time at a moderately focused level that is best represented by a normal bell-shaped curve in the usual center high position. [ASLs reading this can ask a visual-spatial friend to explain that to them or look at Diagram 1.] The effect for the ADHDs is that when they are well focused or hyper-focused, their learning and functioning is quite extraordinary, but when they are unfocused or daydreaming, both learning and performance are quite poor (A.K.A.: consistent inconsistency).

[insert Diagram 1. "ADHD and Non-ADHD Focus Of Attention"
from attached PowerPoint slide]

Table 1. The VSL/ADHD MODEL

VISUAL – SPATIAL LEARNERS: [See page xx in this issue] **VSLs**	**QUALITIES AND FUNCTIONS WHEN BOTH CONDITIONS PRESENT: VSL-ADHDs**	**ATTENTION DEFICIT HYPERACTIVITY DISORDER LEARNERS: ADHDs**
Thinks primarily in images	Visual images likely to prevail due to difficulty in sequential processing	Sequences of letters and words harder for ADHDs whose strength is in non-linear processing
Has visual strengths	Ability to use visual-spatial strengths well greatly enhances learning	Visual scanning of world occurs as natural part of ADHDs' stimulus-seeking process
Relates well to space	Spatial awareness very likely a strength, IFF* level of focus functionally strong enough	Physical activity and kinesthesia enhances awareness and functionality in 3-D space
Is a whole-to-part learner	Whole-to-part learning predominates among VSL/ADHDs	Holding focus for entire sequence of part-to-whole learning difficult due to distractibility
Learns concepts all at once	If concept presented in parts without overview of whole, VSL/ADHDs lose track of parts and sequence	Non-linear thinking helps concept learning IFF* concept is not solely linear sequential
Learns complex concepts easily; struggles with easy skills	When VSL/ADHDs able to stay hyper-focused, complex concepts are easier	Fast scanning "overview" of details leads to learning of overall picture or concept
Is a good synthesizer	When VSL/ADHDs able to stay hyper-focused, both analysis and synthesis better	Non-linear thinking aids both analysis and synthesis, IFF* hyper-focused
Sees the big picture, may miss details	VSL/ADHDs frequently miss details, yet can get big picture	ADHDs sometimes miss the big picture altogether due to missed details
Reads maps well	Seeing spatial relations is strength, IFF* focused	ADHDs can get lost on map detail and lose track
Is better at math reasoning than computation	Visualizes math concepts as whole, misses details	Math concepts understood, computation poor, e.g., due to impulsivity
Learns whole words easily	Whole word learning more likely than phonetic methods	Non-sequential learning style makes phonics difficult

Must visualize words to spell them	Can often visualize better, but not the only successful method	Phonetic-sequential process of spelling often difficult for ADHDs
Much better at keyboarding than handwriting	Quick visual-motor control facilitates keyboarding over handwritten work	As fine motor demands are lessened, speed of output and consistent quality of output are better with keyboard
Creates unique methods of organization	IFF organization is accomplished, often unique	Must hyper-focus to become organized, then can do well
Arrives at correct solutions intuitively	Can reach solution, IFF able to stay focused on problem	Non-linear thinking can bypass sequential problem solving mode
Learns best by seeing relationships	Overview or higher order relationships noticed, even if details may not be	Both learning (input) and performance (output) more difficult due to distractibility
Has good long-term visual memory	Once image gets into long-term memory, it stays !!	Long-term memory of visual image dependent on whether focused enough at time of presentation
Learns concepts permanently; does not learn well by drill or repetition	Once concept in long-term memory, it stays. Retrieval suffers from internal distractibility.	Repetition may be necessary to get item into long-term memory, since first presentation may be missed due to distraction
Develops own methods of problem solving	VSL/ADHDs' problem solving likely idiosyncratic, with novel solution sets	Non-standard, non-linear problem solving patterns; Yet can be less self-controlled to achieve productivity
Is sensitive to teachers' attitudes	VSL/ADHDs are sensitive, IFF attentive to the qualities of the teacher	May miss social cues and body language of teacher or peers
Generates unusual solutions to problems	Non-linear thinking can greatly exceed linear problem solution	Excellent at generating ideas when hyper-focused; Poor at following through
Develops quite asynchronously (unevenly)	Asynchronous development the norm for VSL/ADHDs	Consistent inconsistency across areas of development is typical
May have very uneven grades	VSL/ADHDs likely to be underachievers with marked grade variability	Consistent inconsistency; Grade depends upon whether focused or not
Enjoys geometry and physics	Non-linear & 3-D aspects of these subjects have more interest than auditory-sequential subjects	ADHDs will enjoy those subjects in active, hands-on laboratory format, rather than sit-and-listen classroom
Masters other languages through immersion	Immersion is the best method since novelty and visual experience draws attention	Language learning is easier if not able to revert to well-known first language
Is creative, technologically, mechanically,	Technological, mechanical and other creative abilities much more frequent than in	Definitely able to be creative, generative and productive; May be difficult to follow through

emotionally, or spiritually gifted	general population	
Is a late bloomer	Undoubtedly, VSL/ADHDs bloom later than peers !	Social-emotional development most likely delayed
		* IFF = If and only IF.

Scarlet semaphore signals

The first red flags for strong visual-spatial learners appear with a history of ear infections (otitis media). Interference with incoming auditory information during the developmental period can result in less than adequate central auditory processing. With difficulties in processing through the auditory channel, individuals, particularly those with a predisposition towards a default mode of visual-spatial learning style, can develop a stronger visual-spatial learning pattern.

"I heard what you said." "I see what you mean." These are key words to listen for, because they infer a strong ASL or VSL. If someone says, "I heard what you said," or "I hear you," even when the presentation is visual, you have a hint as big as a beanbag chair that he or she thinks in the auditory mode. Someone who says, "I see what you mean," even when all that has happened is auditory, is telling you something about his or her way of processing incoming information from the world.

Several factors in the model about VSL/ADHDs abilities described in Table 1 infer the following hypotheses about responses on the *Weschler Intelligence Scale for Children (WISC-III):*

1. If Block Design (matching an abstract pattern on a printed sample) is highest or among the highest on the Performance Scales, a VSL learning style is more likely.

2. If Block Design is significantly higher than Object Assembly (puzzles that do not have a printed sample to start from), then the individual is more likely to be a whole-to-part learner, since seeing the whole pattern in the sample facilitated the score.

3. If the Freedom from Distractibility Index (a measure of attention and concentration) is significantly lower than the Verbal Comprehension Index (which measures left-hemispheric, auditory-sequential abilities), then the individual is more likely to have a diagnosable Attention Deficit Hyperactivity Disorder (AD/HD).

4. If items 1, 2, and 3 above are true, then the individual is more likely to be a VSL/ADHD.

Paragraphs for the pragmatist

On the side of practical application, the best answer to the "What do I do now?" question that immediately follows the diagnosis of ADHD and identification of a student as a VSL (therefore a VSL/AD/HD) is the Multi-Modal Treatment Model:

1. **information**
2. **support**
3. **settings (home, school and work)**
4. **therapy**
5. **medication**

1. For **information,** go to these sites about ADHD and related conditions:

- www.nih.gov National Institutes of Health: **THE BEST** informational website about Attention Deficit Hyperactivity Disorder (AD/HD) and Mood Disorders !!!
- http://www.surgeongeneral.gov/library/mentalhealth/home.html Surgeon General's Report on Mental Health, with several chapters on Mood Disorders (e.g., anxiety), Bipolar Disorder, AD/HD, and child, adolescent, and adult mental health issues.
- www.schwablearning.org Schwab Learning Center with information for parents and teachers about AD/HD and other Learning Disorders.
- www.oneaddplace.org Assorted information on AD/HD
- www.educationplanet.com Teacher resources on AD/HD and other issues.
- www.gifteddevelopment.com for information about VSLs and gifted issues.

2. For the National **Support** Groups, go to these sites:

- www.chadd.org Children and Adults with Attention Disorders (CHADD) 8181 Professional Place, Suite #201, Landover, MD, 20785
- www.add.org National Attention Deficit Disorder Association, 9930 Johnnycake Ridge Rd., Suite 33, Mentor, OH 44060

3. For books, videos, and other materials on how to address the issues in their respective **settings**, go to these catalogs, et cetera:

- www.guilford.com Guilford Publications catalog , Dept. ABI, 72 Spring St., New York, NY 10012 Phone: 212-431-9800 OR 800-365-7006. Get on their mailing list!! Best books by Russell Barkley, top theorist about Attention Deficit Hyperactivity Disorder (AD/HD).

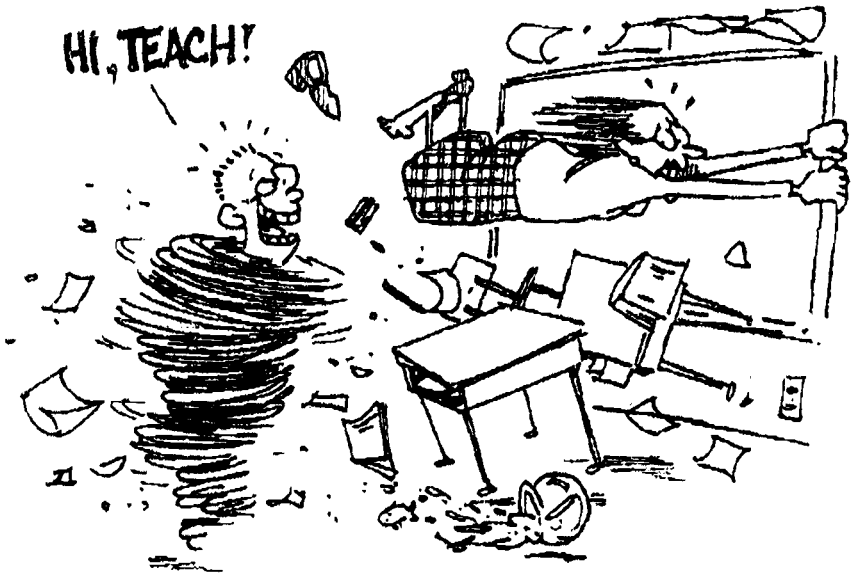
- www.addwarehouse.com A.D.D. Warehouse catalog, 300 Northwest 70th Ave., Suite #102, Plantation, FL., 33317 Phone: 954-792-8944 or 800-233-9273.
- www.woodbinehouse.com Woodbine House catalog, 6510 Bells Mill Road, Bethesda, MD 20817 Phone: 800-843-7323 Get on the mailing list.

4. Consider the appropriateness of the need for different types of **therapy:** For example, family therapy, social-skills and other groups, couples therapy, individual therapy (e.g., cognitive-behavioral).

5. To learn about **medication** options:

- www.nih.gov National Institutes of Health: **THE BEST** informational website about Attention Deficit Hyperactivity Disorder (AD/HD) and Mood Disorders !!! Try searching MEDLINE on this site.
- http://www.surgeongeneral.gov/library/mentalhealth/home.html Surgeon General's Report on Mental Health, with several chapters on Mood Disorders (e.g., anxiety), Bipolar Disorder, AD/HD, and child, adolescent, and adult mental health issues.

Better living through chemistry



Several new medications have appeared in the past few years, giving us options that are far better than before. For example, Concerta (the stimulant methylphenidate from McNeil Pharmaceuticals, www.concerta.net) has a new design for the pill itself, allowing an appropriate dose of the medication to be dispensed from the pill over a longer time period during the day.

Another new development is the long awaited *non-stimulant* medication for ADHD, atomoxetine or Strattera (brand name from Lilly Pharmaceuticals, www.lilly.com). It has the advantages of only one dosage per day to achieve a 24/7/365 maintenance level, no induction of tics, anxiety or hypo-manic states, no "recreational" drug use, not a scheduled pharmaceutical (therefore the physician can call in the prescription), and approved by the Food and Drug Administration for ages 6 to adult. While not all cases of ADHD require medication, if you are considering medication as part of the treatment plan, these are worthy of consideration. Do remember that *stimulant medications should be absolutely avoided if there is a family history of mood disorder or even moderate indications of frequent mood issues for the individual.*

There are no known direct effects on a visual-spatial learning pattern from medications, except those that are intuitive. A medication that will affect the body in a particular way, e.g., inducing sleep, will affect a VSL in the same way. The specific medications for ADHD will have their effect on ADHD, and similarly on the individual with a VSL/ADHD. Although it has yet to be documented empirically, we can expect that the improvement in ADHD functioning from medication will enable a VSL/ADHD to perform better overall.

A premise to ponder

The concept that there are differences between brain function on the left and right and on the top and bottom, that some brains tend to take in more information and learn in different ways, seems self-evident. In ancient times, it was being self-aware that one operated best in the world in a certain way, and did tasks that way because it worked. On the larger scale, societies sorted out children on the basis of their abilities and apprenticed the hunter-trainees to the hunters and the gatherer-trainees to the gatherers because it worked. Many societies throughout the world still do it that way.

Throughout the U.S., there is a near-universal mandatory education period that requires all children to just sit and listen with their ears from grade one onward. Based on the assumption that all brains are created equal and in the likeness of the left-brained designers of the educational system, we over-generalize the needs of one learning style to all children. Yet all generalizations are false. The temporary celebration of finger paintings and building toys stops when we enter the numbered grades on the apparent assumption that the visual-spatial functions of our brains begin to atrophy at age five. We expect all students to learn best with the same auditory-sequential input. We have forgotten the intuitive wisdom that has guided societies for thousands of years.

A call to arms! (and legs… and eyes and ears)

In the interim between our current knowledge about ADHDs and VSLs, and that point in the future where we have a sufficiently valid and reliable model for

VSL/ADHDs, we should not stand idle awaiting further enlightenment from psychological science. We have sufficient information to challenge the existing assumptions on which educational systems are currently constructed. We have an imperative in our contracts to do the very best we can to achieve "goodness of fit" between children's learning styles and the teaching methods they experience.

Let us renew the celebration! Break out the finger paints, and the building toys and, more importantly, the Computer Assisted Design programs!! Make banners and posters to support the intellectual revolution! Strike up the band! Move through the streets dancing for joy that we have more senses than just hearing and more ways to learn than just step after sequential step. Move our conceptualization of human learning and functioning into the new millennium.

Discard the antiquated concepts that assume Locke's *tabula rasa*/blank slate model of cognitive development and functioning with all children ready to be imprinted with the same auditory-sequential teaching format. Presume that we have the potential to learn from more sensory channels than just sound waves, and more than from the channels on cable TV. Embrace the fact that the human body was not designed to remain indoors in a sitting position for the majority of every day. It was meant to actively participate in the whole of the world that surrounds it!

References

Dorry, G. W. (1996). The perplexed perfectionist. In *ADD and adolescence: Strategies for success from CHADD.* Plantation, FL: CHADD.

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