

The logo features the name 'Beljan' in a large, white, sans-serif font, with 'Psychological Services' in a smaller, white, sans-serif font below it. The text is set against a solid blue rectangular background. On either side of the text, there are white L-shaped brackets that appear to be part of a larger frame or graphic element.

Beljan
Psychological Services

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When Disorders are NOT Disorders:

- Short Term Memory
- Processing Speed
- Auditory Processing
- Sensory Integration
- Working Memory

Base Rates

- Step 1 in making a differential diagnosis or ruling out a previously made diagnosis
- Physicians use base rates as a statistical model of clustering symptoms and factoring them against the age, gender, weight, etc., of their patient to quickly reduce many possible diagnoses down to a few likely diagnoses.

Short Term Memory

- First, consider how significantly impaired a child would be if he had a short term memory deficit.
- Their learning would be completely impaired.
- If said child never had a severe blow to the head, became asphyxiated, or had any other disease process involving the brain, then what would be the likelihood of them having a short term memory deficit?
 - The answer is nearly zero.
 - If a child can tell me what they had for breakfast, I can pretty much rule out the disorder.
 - When this is determined, then I begin to look what causes a child to seem like they have a short term memory deficit when in fact they do not.

Short Term Memory

- One must pay attention to information meant for encoding in order for that information to be encoded into short term memory
- If children perform well on only one encoding task, they do not have a short term memory deficit. Therefore, how could a child do well on any task of encoding if they have a short term memory deficit? They could not.
- As my mentor, Dr. Leonard Koziol, used to say, “You cannot fake a skill if you do not have it.”
- Gifted children are often bored in class, or taken with their own entertaining thoughts.
- If information is not encoded then the result is a child who seems to have a short term memory problem, when in actuality the child was not listening or was distracted.

Problem solved.

Processing Speed

David Letterman “Top 10 List” from years ago:
“How do you know you have a dumb dog?
There is a long delay
between *Bow* and
Wow.”



Processing Speed

- Three tests on the Wechsler Intelligence Scale for Children- fourth edition (WISC IV) can rule out a speed deficit.
- **SS** task, the child is instructed to make cancellations quickly and accurately within a prescribed paradigm. The task is simple and does not load working memory because each cancellation stimulus is novel. No errors should occur as the answers are in front of the child.
- **Cd** subtest measures cognitive speed and learning automaticity (incidental learning), and is further complicated by having the child quickly and accurately make novel number and symbol blends on paper. Many gifted children tend to be perfectionists who recheck their work.
- **BD** provides red and white blocks for the child to quickly put together to match a design displayed in a stimulus book. The test starts by allowing 30 seconds to complete a task and moves to 120 seconds to complete the more difficult items. The child can earn bonus points for speed.

Processing Speed

- Compare the WISC IV **SS** and **Cd** tests to the **BD** test.
- Double checking work on **SS** and **Cd** causes the child to earn correct responses, but less of them, ultimately rendering a lower score.
 - The lower score is often incorrectly misinterpreted as slow processing speed, because the tests are under the PRI (for gosh sakes).
 - The problem is the child **chose** to work slowly, and it should not be interpreted as a speed deficit. Frequent attention errors and dislike for paper and pencil tasks also can cause lower scores not attributable to speed.
- Gifted children frequently yield fast **BD** times (under 10 seconds) on the 45 second items and earn bonus points for fast completion on the more difficult 120 second items.
- Low scores on **SS** or **Cd** and high scores on **BD** rules out a cognitive speed deficit, and vice-versa.
 - **recent TBI dx based on misinterpretation of **SS** and **CD** in forensic case

Auditory Processing

- APD is commonly questioned by parents of gifted children.
 - APD has numerous definitions.
- Most consistently it means the physical elements of the outer and inner ear function, but the child has difficulty processing and making sense of how language sounds in their head.
 - This seems more like a receptive language disorder than an audition issue.
- When I meet a child with a receptive language disorder it is painfully obvious. The disorder does not come and go; it is static. As previously noted, think about how impaired one would be across all of life with this problem and how low the odds are that this would occur when disease and brain injury, etc. are ruled out. Yet, a very high number of parents report it in their child based on an audiology evaluation indicating the child has difficulty identifying a given sound while competing sound is presented. In my experience, children with attention deficit have the same problem, but no one claims it is an APD. Attention deficit is a disorder of sustaining and prioritizing attention.

Auditory Processing

- Think about how impaired one would be across all of life with APD.
- Think about how low the odds are that this would occur when family history disease and brain injury, etc. are ruled out.
- An audiology evaluation has the child try and identify a given sound while a competing sound is presented.
 - In my experience, children with attention deficit have the same problem, but no one claims it is an APD.
 - Attention deficit is a disorder of sustaining and prioritizing attention.

Auditory Processing

- A disorder called 'misophonia', also known as phonophobia, exists.
- Misophonia disorder has been described as an extreme negative reaction to background noise, and not simply annoyance or distraction.
- The mechanisms behind the disorder are not known (Green 2002), and this is not what most people consider APD.
- One can determine this problem by standing behind a child and stating a line from a poem or nursery rhyme while the child plugs one ear. If the child processes the line better in one ear versus the other, then simply using one earplug can significantly help the issue.

Sensory Integration

- I have discussed Sensory Integration Disorder (SID) with several prominent neuropsychologists who concur:
 - SID basically means the child's sensory system is working well, but their frontal lobe (i.e., neostriatal, basal-ganglia, and cerebellar circuitry) mediation of the sensory stimulus has not developed to the extent that it can be put in the background of experience.
 - In other words, the child cannot yet inhibit/modulate sensory experience; it does not mean the sensory system is impaired (Koziol 2010 & 2011).
 - In my experience, nearly every child who has been seen in my practice who carried the diagnoses of APD or SID, in actuality had ADHD-inattentive type. When that disorder was treated, the symptoms of APD and SID were significantly reduced.

Working Memory

- Working memory has unfortunately entered the public lexicon causing its meaning to become variably and incorrectly explained, and its complexity overlooked.
- Working memory is relatively easy to measure using various neuropsychological tests. I
- In my experience, children who are gifted often have profound capacity for working memory and it seems to be a major feature in intelligence.
- A gifted child who does not have ADHD generally can reliably express working memory capacity. Much like encoding, discussed above, inattention, distractibility and impulsivity will undermine the child's expression of working memory.

Working Memory

- Children with ADHD, who are gifted or not, cannot reliably and consistently express working memory for as long as they want and whenever they want, and their variable expression causes a ‘Swiss cheese’ effect in academic and behavioral performance.
- Sometimes the child performs quite well, while at other times they cannot execute a previously expressed skill with the same efficiency.
- These children often are identified as willful or oppositional because when they are experiencing an ‘ADHD moment’ and their working memory is undermined, they cannot execute a previously expressed skill and that looks willful.

When Disorders are NOT Disorders:

- My solution is that a pediatric neuropsychologist who is versed in giftedness should be consulted when parents have questions of short term memory, speed, auditory processing, sensory integration issues, or working memory.
- A pediatric neuropsychologist looks at all elements of functioning as opposed to individuals who specialize in one area and tend to only look for and find issues within their wheelhouse of knowledge. It takes a whole brain to function, so the whole brain should be evaluated to rule out erroneous diagnoses.

BONUS THOUGHT

- ****You can't have a fine motor deficit and be a violin or piano prodigy.**

When Disorders are NOT Disorders:

Katz, J., et al. Handbook of Clinical Audiology Sixth Ed. Lippincott Williams & Wilkins, 2009.

Green P., Josey, F. The Use of an Earplug to Increase Speech Comprehension In a Subgroup of Children with Learning Disabilities: An Experimental Treatment. Applied Neuropsychology. 2002, Vol. 9, No. 1, 13–22.

Koziol LF, Budding DE, Chidekel D. Sensory Integration, Sensory Processing, and Sensory Modulation Disorders: Putative Functional Neuroanatomic Underpinnings. The Cerebellum 2011 Dec; 10(4):770-92.

When Disorders are NOT Disorders:

Koziol LF, Budding DE, Chidekel D. Adaptation, Expertise, and Giftedness: Towards an Understanding of Cortical, Subcortical, and Cerebellar Network Contributions. *The Cerebellum* 2010 Dec; 9(4):499-529.

Goldberg, E. *The Executive Brain: Frontal Lobes and the Civilized Mind*. Oxford Press, 2001.

LEARNING DISABILITIES

- Why discrepancy model is wrong
- Reading/Spelling (Dyslexia)
- Math (Dyscalculia)
- Hand Writing (Dysgraphia)

The Discrepancy Model (DM)

- IQ is 22 points (1.5 standard deviations) above achievement scores
- The child functions two grade levels below placement
 - Led to most children in USA not receiving specialized reading remediation until 3rd grade because you cannot get two grade levels below 1st or 2nd grade.
- Bush II era replaced PL 94-142 with IDEA, which rang in teaching to the AIMS test

Problems with DM

- No agreement on what the discrepancy should be
 - FSIQ, VCI, PRI, or Quan.
 - Word reading, spelling, comprehension, or math
- Schools obfuscate DM data to their advantage
 - If you beat discrepancy=no service
 - If you fail IQ/Ach discrepancy, but are within two grade levels of placement=no service.
- DM precludes early identification
 - It is a wait to fail model

Problems with DM

- IQ is a predictor of school success, but not reading acumen::high IQ children are overlooked
 - **Gifted ascot example
- Low IQ (borderline) but not MI/MR have difficulty showing a discrepancy
 - 78 IQ needs a 56 ach score to meet DM, which suggests nearly no ability
 - A young child needs very few raw score points on Ach testing to earn an average score

Problems with DM

- DM is an outcome score decision model and not a clinical decision – there is no thinking involved as it does not differentiate types of reading, math, or writing disabilities
 - There is a mountain of research that proves DM is a line in the sand to choose who receives help, but is not clinically sound::unethical for a school psy with a state clinical psy license to use DM.
- DM is not sensitive to the different stages of reading development at different ages (no sensitivity for specificity)

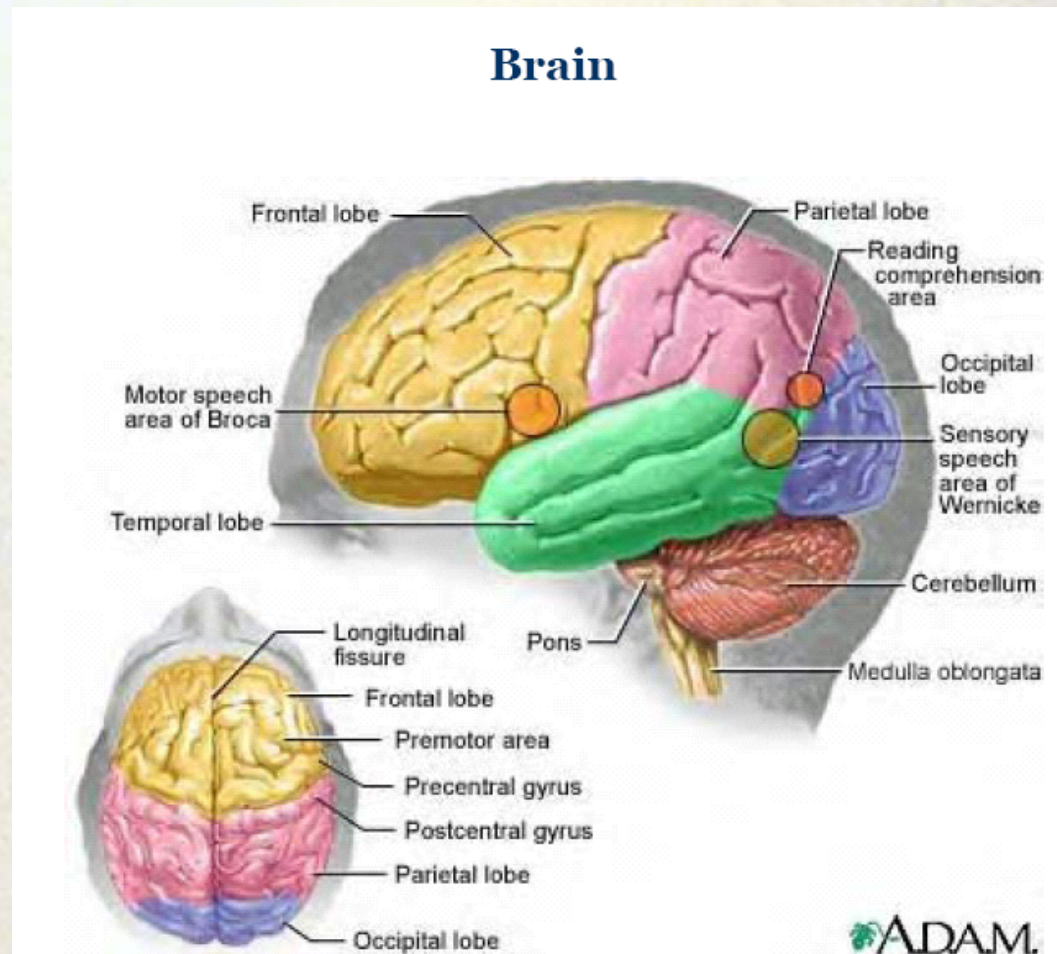
Problems with DM

- DM does not detect or look for neurological variations that can impact learning, such as ADHD, executive functioning deficit, language disorders, visual-spatial deficit, or sensory and motor deficit
- Once DM is met, schools use the term *Specific Learning Disability (SLD)* and do not acknowledge dyslexia or dyscalculia as viable terms::treat SLD with global interventions
 - Tantamount to your MD diagnosing you with a tumor, but does not acknowledge what kind::treats all cancers with the same treatment

Learning Disabilities are Brain Based Disorders

- The neuropsychology of LD is too vast and complex for this discussion; suffice it to say the following:
 - To execute skills and tasks the brain functions in a multimodal manner that is highly interdependent upon the interactions between the micro-systems of neurochemicals and neurons to pathways and the macro-systems of the limbic system, white matter, grey matter (higher cortical processing), and the cerebellum.

Major regions



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Reading Disorder - Dyslexia

- Phonological
- Surface (orthographic)
- Mixed
- Deep

Phonological Dyslexia

- Approximately 2/3 or all reading disabilities.
- A basic deficit in using phonological processing for word decoding and spelling
- The reader subsequently has to over-rely on whole word (sight word) recognition, which slows fluency and limits comprehension.
 - Example: The gifted child with the ascot

Surface (orthographic) Dyslexia

- About 14% of all reading disabilities
- Difficulty visualizing or recognizing whole words for reading or spelling
- Can use phonics to decode each word
- Represents a disorder of habituation and consolidation in which reading is dysfluent
- Numerous approximation errors

Mixed Dyslexia

- The reader has the characteristics of Phonetic and Surface dyslexia.
- There is no usable key to decode for reading or spelling::severely impaired readers
- Equates to multiple interruptions of neural circuitry necessary to develop reading
- Results in unusual errors where one cannot tell what the child is trying to spell

Deep Dyslexia

- The reader is impaired for reading words with abstract meaning, but can read words that are more concrete or easily visualized
- The child tries to use semantic or contextual cues to determine meaning
- Semantic and visual errors
 - apple=fruit
 - Familiar=family

Math Disorder - Dyscalculia

- Children with markedly poor skills at deploying basic computations processes used to solve equations (Haskell, 2000)
 - Poor language and verbal retrieval skills
 - Limitations in working memory
 - Limitations in executive functioning skills (focus execute)
 - Faulty visual and spatial skills
 - Poor consolidation of routines

Myths of Dyscalculia

- Math abilities are only based on IQ and formal education
 - All animals and infants can make basic estimates of 4
 - A rabbit has to estimate the size of their burrow hole so a predator cannot enter
- Math is a completely lateralized task
- Boys do better at math than girls (only true by HS and the difference is small)
- Math is not always related to language; prepositions
 - Once you have language, you cannot think without it

Non-Symbolic Representations of Numbers

- **Subitizing** – determining small sets of numbers without counting-usually limited to four
- **Ordinality** – an understanding of *more or less* + ordinal relationships
 - *Prepositions of math (prepositions go where the cat goes)*

Non-Symbolic Representations of Numbers

- **Counting** – with language acquisition subitizing is enhanced with counting and measure
 - Little kids like to line up toy cars etc. and repeatedly pour water.
- **Arithmetic** – developmental sensitivity to combine and decrease quantities of small sets

Dyscalculia Subtypes

- **Verbal** – difficulty retrieving or recalling stored mathematical facts of over-learned skills; likely have difficulties in reading and spelling as well
- **Procedural** – difficulty only with math, but can read and write; a fundamental breakdown in the procedures of math, ex. the direction of multiple column adding and subtracting
- **Semantic** – inability to decipher magnitude representations among numbers, the child fails to see logical errors, ex. $145 - 15$ cannot equal 25

Dyscalculia

Subtype

- Verbal
- Procedural
- Semantic

Deficit

- Counting-Rapid # identification
- Retrieval of stored facts
- Consolidation of +/- and x facts
- Likely reading and writing disabilities
- Writing #s from dictation
- Lining up equations
- Math computational procedures
- Deficits with division and regrouping procedures in subtractions
- Conceptual understanding of math
- Estimation skills
- Magnitude representations
- Higher level math proofs (good at geometry-bad at algebra (vice versa))

Error Type

- Math Fact: $6+5 = 10$
- Operand: $6-5 = 11$
- Algorithm:
$$\begin{array}{r} 123 \\ -87 \\ \hline 44 \end{array}$$
- Place Value:
$$\begin{array}{r} .70 \\ +.75 \\ \hline .145 \end{array}$$
- Word Problems

Subtype error

Verbal Retrieval

Procedural due to poor attention
or exec func

Procedural due to poor
working memory/habituatation

Procedural due to poor
working memory/habituatation

Verbal dysfunction

Writing Disorders - Dysgraphia

- Dysgraphia is defined as a difficulty in automatically remembering and mastering the sequence of muscle motor movements needed in writing letters or numbers and/or processing deficits related written expression.
- Dysgraphia seldom exists in isolation without other symptoms of learning problems.

Subtypes of dysgraphia

- **Ideomotor apraxia** - refers to a single action, not a sequence of actions such as those necessary to manipulate a pencil when writing a lengthy passage.
 - Poor pencil grip? Use a tiny pencil!

Subtypes of language-based dysgraphia

- **Ideational Apraxia** - refers to the inability to perform a sequential motor act, though each individual act can be performed in isolation and on command.
 - writing is often slow and laborious
 - frequently erasing, correcting, or crossing out while writing.
 - The ability to copy is often preserved, though prone to careless errors (O'Hare and Brown, 1989)
- These students often lack the necessary organization skills to foresee a stepwise progression of events from beginning to middle to end, so they tend to become stuck or entrenched in their efforts to produce written language. Time management problems in the classroom are common, since is no capacity to allocate time in appropriate increments to complete activities requiring multiple steps (Levine, 1999).
 - Think executive functioning

Subtypes of language-based dysgraphia

- **Constructional Dyspraxia** the breakdown of the visual spatial synthesis of written production due to faulty right hemispheric functioning with respect to written language.
- Contrary to popular belief, there really was little evidence that poor handwriting was a transient developmental delay, and that children may eventually outgrow their sloppy written language patterns over time.
- constructional dyspraxia is an inability to produce and/or modulate written language due to deficits with the spatial constraints of letter and word production.
- The inability to center written information on a page, in addition to deficits in sequencing letters and words in a straight line without tailing off.

Subtypes of language-based dysgraphia

- **Grapho-motor dysfunction** - is a fine-motor deficiency where drawing, tracing, using scissors, and writing pose difficulties. These children may have a high aptitude for art or mechanics, despite their writing being slow, laborious, and sometimes illegible.

Three forms of graphomotor dysfunction

- **Graphomotor Production Deficits**

- Poor motor coordination and unstable pencil grip.
- Slower paced writing.
- Writing dominated by larger muscles of wrist and forearm.
- History of speech articulation difficulty often present.
- Inconsistent writing pressure.
- Muscle fatigue.

Three forms of graphomotor dysfunction

- **Motor Feedback Deficits**
 - Eyes close to hand to monitor the pencil visually.
 - Inability to monitor writing instrument as reported by small nerve endings in joints and fingers.

Three forms of graphomotor dysfunction

- **Motor Memory Dysfunctions**
 - Poor motor output and production.
 - Unable to recall sequences of muscle movements needed to produce letters.
 - Difficulty recalling letter shapes.
 - Writing is slow, hesitant, and laborious.
 - Inconsistent letter formations.
 - Frequent reversals, erasers, and reduced legibility.
- Prefer printing to cursive due to fewer motor sequences

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- <http://schoolneuropsychpress.com/products/index.html>
- <http://www.schoolneuropsych.com/>

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