

Dyslexia: Unlocking the Code!

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Agenda

•Dyslexia: What it is

- Dyslexia “partners”
- Dyslexic Brain
- Components of Dyslexia
- Signs & Testing
- Brain Library
- Strategies

Dyslexia...Disability??

“ If you notice my ability, you will see NO Disability”

Alison L. Mead

True or False

- Dyslexia mainly affects boys ?
- Dyslexia runs in families?
- It is not possible to tell if a child has Dyslexia before 4 years old?
- The main sign is a child who reverses b's and d's ?
- A person with Dyslexia has average or above average IQ?
- People with Dyslexia usually do NOT become automatic readers
- Dyslexia is a visual problem?
- Dyslexia affects up 1 in 5 people
- People with dyslexia have brain differences

Dyslexia also called reading disability

Dyslexia is a reading disorder in which an individual has difficulty in learning to read or interpret words, letters, and other symbols, but that do not affect general intelligence. It affects areas of the brain that process language

Specific Learning Disorder DSM-5

- Umbrella term for mathematics, reading, and written expression disorders in the updated DSM-5. (*academic skills*)
 - Affect the brain's ability to perceive or process verbal or nonverbal information efficiently and accurately.
 - Not a consequence of lack of 'opportunity of learning' **OR** 'inadequate instruction' **OR** 'cognition'
 - Biological origin: likely an interaction of genetic & environmental
 - Disrupts the normal pattern of learning *academic skills*
 - Reading of single words accurately and fluently
 - Reading comprehension
 - Written expression and spelling
 - Arithmetic calculation & mathematical reasoning (solving math problems)

Specific Learning Disorder

- Individual's performance in a particular area is well below average for age
 - At least 1.5 standard deviations below the age norm
 - Learning difficulties are often readily apparent in the early school years
 - Academic skills (e.g., reading, spelling, writing, mathematics) have to be taught and learned explicitly.
 - Contrast with talking or walking (which are acquired developmental milestones that emerge with brain maturation)
- Key feature: learning difficulties are not better accounted for by
 - Intellectual disabilities
 - Uncorrected visual or auditory acuity
 - Other mental or neurological disorders
 - Psychosocial adversity
 - Lack of proficiency in the language of academic instruction
 - Inadequate educational instruction

DSM-5 diagnostic subtypes of Specific Learning Disorder

1. **Impairment in reading includes possible deficits in:**
 - Word reading accuracy
 - Reading rate or fluency
 - Reading comprehension
 - *DSM-5 diagnostic code 315.00.*
 - **Note:** *Dyslexia* is an alternative term used to refer to a pattern of learning difficulties characterized by problems with accurate or fluent word recognition, poor decoding, and poor spelling abilities.
2. **Impairment in written expression includes possible deficits in:**
 - Spelling accuracy
 - Grammar and punctuation accuracy
 - Clarity or organization of written expression
 - *DSM-5 diagnostic code 315.2.*
3. **Impairment in mathematics includes possible deficits in:**
 - Number sense
 - Memorization of arithmetic facts
 - Accurate or fluent calculation
 - Accurate math reasoning
 - *DSM-5 diagnostic code 315.1.*

Dyslexia and IDEA

Specific learning disability is defined, in part, as "a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or to do mathematical calculations, including conditions such as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia."

Children who do not, or minimally, respond to interventions must be referred for an evaluation to determine if they are eligible for special education and related services (34 CFR §300.309(c)(1))

Types of Dyslexia

1. Dyseidetic
2. Dysphonetic
3. Dysphoneidetic

Dyseidetic Dyslexia – (Angular Gyrus)

- Poor sight-word recognition leading to slow & laborious reading
- Irregular words are sounded out & spelled phonetically
- Usually more advanced in reading than in spelling

- Sometimes referred to as Visual or Surface Dyslexia

Dysphonetic Dyslexia (Wernicke’s Area)

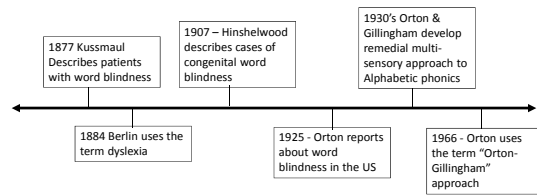
- The student has great difficulty processing phonological information and struggles learning to read as a result. They tend to over rely on the visual features of words thus not paying attention to the phonics (i.e., letter to sound conversion) *Auditory Dyslexia*
- Relies on word recognition (so a word is either known or not-known)

Target Word:	Read As:
House	Horse
Weird	Word

Dysphonetic Dyslexia (AG & WA)

- Person will have weak visual-motor skills
- Most difficult to treat

History of Dyslexia



History of Dyslexia

- 1878 – Kussmaul (German neurologist)**
- Some patients could not read properly and regularly used words in the wrong order
 - Introduced the term "word blindness" to describe their difficulties
- 1887 - Berlin (German ophthalmologist)**
- First to use the word 'dyslexia' in place of word blindness
 - Condition was described as 'dyslexia', from the Greek meaning 'difficulty with words'.
- 1896 - Pringle-Morgan**
- First case of developmental dyslexia was reported by in the British Medical Journal on 7 November 1896
- Turn of 20th Century**
- Pringle-Morgan (general practitioner) and Hinshelwood, (ophthalmologist) speculated that such difficulties with reading and writing were due to "congenital word blindness."
 - Dominant view (for years) was that dyslexia was caused by visual processing deficiencies

History of Dyslexia

1925 – Orton (American neurologpathologist)

- Orton proposed the first theory of how specific reading difficulty arose
- Placed a great emphasis on the dominance of one side of the brain.

1935 – Orton-Gillingham (educator/psychologist)

- Developed an educational intervention that pioneered the use of simultaneous multisensory instruction
- Teaching strategies he developed during his research are still in use today

How to describe it in reports

- 1) Specific learning disorder with impairment in DSM code otherwise known as dyslexia, dyscalculia or dysgraphia
- 2) Unexpected difficulty with reading or writing when compared with cognitive abilities
- 3) Difference between measured ability and measured performance due to reading fluency
- 4) No longer requires special education services however due to the diagnosis of Dyslexia will require support and accommodations

The LAW

- In 2016, Gov. Jerry Brown signed into law Assembly Bill 1369
- The new law requires schools to assess struggling readers specifically for dyslexia
- This is a far reaching implications:
 - As many as 80 percent of California students with learning disabilities in special education

The Law

- In addition, the law requires the California Department of Education, by the start of the 2017-18 school year, to post information on its website to help teachers find a proven, evidence-based approach for teaching reading to students with dyslexia. Such approaches, which include [Orton-Gillingham](#) and [Wilson Language Training](#), involve direct instruction in breaking the “code” of letters and sounds. The law does not include two requirements initially sought by the grassroots organization that sponsored the legislation, [Decoding Dyslexia California](#): that districts be required to use the tools posted on the California Department of Education website and that students in K-3 be screened for dyslexia.

The Law

It’s time to start using the “D” Word!!

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Dyslexia Partners

- **Dyscalculia** (sometimes referred to as “Math Dyscalculia”)
 - Difficulty understanding and using number-related concepts or symbols or functions commonly used in mathematics
- **Dysgraphia**: A learning disability that affects writing abilities. Difficulties with spelling, poor handwriting, and trouble putting thoughts on paper

Dyscalculia Signs

- **Early Signs:**
 - Unsure of size differences: which one is bigger, taller, shorter, smaller ?
 - Difficulty recognizing patterns: smallest to largest or tallest to shortest
 - Doesn't understand “math words” greater than, less than and signs such as =, +, -
 - Still using fingers passed 1st grade
 - Trouble with visual-spatial representations of numbers, such as lines,
 - Does not want to play games that involve “mental math”, UNO, WAR, Monopoly

Dyslexia Partners: Dysgraphia

- **2 TYPES:**
 - 1) **Language based:** difficulty writing the sounds of the language in the correct order, writing letters out of order. Letters out of order , composing grammatically based sentences, pronouns, word endings, “ed”
 - 2) **Non-language based:** Difficulty producing handwriting, forming letters, spacing issues, capitalization, basically the mechanics

Dysgraphia: Symptoms fall in 6 categories:

- 1) Visual Spatial
- 2) Fine motor
- 3) Language processing
- 4) Spelling/handwriting
- 5) Grammar
- 6) Organization of language

- Difficulty with orthographic coding: which is the ability to store unfamiliar written words in the working memory

Dyslexia Partners: Dysgraphia: Symptoms

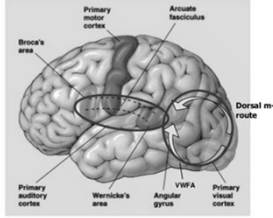
- Tight awkward pencil grip and body position
- Illegible handwriting
- Tiring quickly while writing
- Unfinished or omitted words in sentences
- Difficulty with syntax
- Large gap between written ideas and understanding demonstrated through speech

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Primer of Neural Anatomy

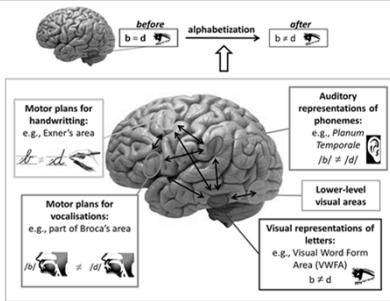
The cortical reading network

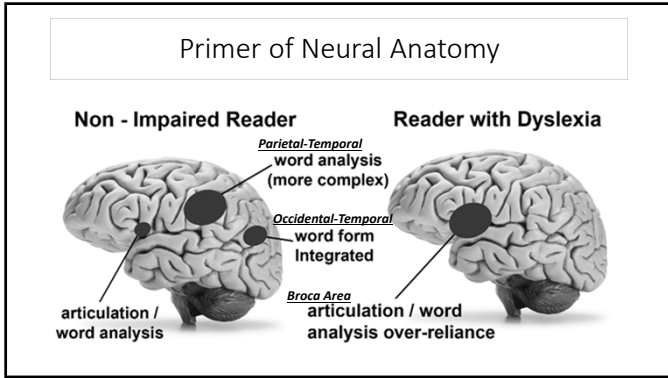


The Reading Brain

- Heschl's Gyrus- Detects and discriminates sounds (phonological awareness)
- Superior Temporal Lobe- Modulates the 44 phonemes in the English language
- Supramarginal Gyrus: Spatial arrangement and manipulation of sounds (ie: phonemic awareness)
- Angular Gyrus: Includes the visual word form area, visual representation of words (i.e., text orthography)
- Broca's Area: Expressive Language (i.e. word retrieval)

Primer of Neural Anatomy





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- Components
- Executive Function
 - Auditory Processing
 - Visual Processing
 - Phonemic awareness
 - Anxiety

Executive Function

- There is no evidence that a therapeutic intervention changes executive function. However, the frontal lobe continues to mature through our 20's
- The best way to "treat" executive function is to "teach" accommodations explicitly (most of us learn EF strategies implicitly but children who struggle need to be taught explicitly)
- Visual supports are the best way!
 - kids should take pictures of homework schedule for planners
 - www.schKidules.com (magnetic display board)

Decoding

- Decoding impacts comprehension due to the slow pace of symbolic recognition it is difficult to retain the knowledge that reading is supposed to impart
- Figurative and social language are very difficult for kids with language based neurodevelopment disorders
- After 5th or 6th grade literature is packed with inferential language (idiom, metaphor, etc)
 - Difficulty and miss out on a lot of the subtle messages in text
- These need to be EXPLICITLY taught for kids with language based disorders.

Phenomic and phonological awareness

- Test of Auditory processing skills...blending, auditory comprehensions,
- Phonological awareness by linguistic systems, discreet skills needed for reading
- Phonic instructions: May be too complicated for kids with dyslexia.
- Word family instruction as proved to be beneficial to these kids. Sets kids up to learn prefixes and suffixes.
 - Make a game using paint strips
 - My Name is Alice (A, B, C.) My name is ---- and I come from ---- and I like . (something eat) C my name is Carol. I come from Colorado and I like carrots. Really works on letter name with letter sound in word. Helps with phenomic awareness. Do this activity I conjunction with hand clapping or ball bouncing once children get the game.
 - Lego word building

Emotional Side Effects

- Results of the wide gap between ability and performance!
 - Anxiety
 - Frustration
 - Self doubt
- The emotional side effects further decrease performance in the classroom and eventually have an impact on social skills

Emotional Side Effects: Anxiety

- Behavior: Can't wait, can't deal with environmental noises, very distracted by environment, melting down or acting out or shutting down (think: sensory overload)
- Verbalizing: "I'm so stupid, I can't, I don't want help"
- Psychosomatic symptoms:
 - Stomach aches
 - Headaches
 - Difficulty sleeping

Emotional Side Effects: Anxiety

- Decrease anxiety with use of visuals and predictable routines
- Testing formats should be the same
- Do away with time constraints

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Early Signs

- May have difficulty pronouncing words
- Difficulty recalling the correct word
- May have difficulty with rhyming
- Always sings alphabet to figure out the letter
- Difficulty following directions
- Difficulty sounding out new words
- Mixes up the order of letters
- Clumsy or difficulty in multi-player sports

School Signs

- Seems confused or bored by books
- Difficulty learning to tell time (read a face clock)
- Takes the a VERY long time to do homework
- Avoids reading out loud in class (decoding-sounding out words)
- Struggles with writing assignments
- Difficulty fitting in
- Difficulty understanding proverbs, puns and idioms
- Difficulty sharing what they know in class

Testing for Dyslexia

- There are differing thoughts on the best time to test for Dyslexia:
 - You can see the early signs so a child can be "at risk" but most professionals say a child under the age of 9 cannot be diagnosed with Dyslexia
- Other professionals say as early 5-6 years old

- **Preschool screening:**
 - Phonological Abilities Test
 - Get Ready to Read

Testing for Dyslexia

- **Kindergarten screeners:**
 - Shaywitz Dyslexia Screener
 - Ready to Learn
 - KTEA 3
 - WIAT 3
 - Test of Early Reading Ability
 - Dynamic Indicators of Basic Early Literacy
 - AIMSWeb

Testing for Dyslexia

- **School Age:**
 - WIAT
 - Gray (Oral & Silent) Reading Test (GORT & GSRT)
 - CELF 5
 - CASL
 - CTOPP 2
 - Woodcock Reading Mastery Test

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Brain Library®

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The Brain Library®

- Brain Library® is a model that uses a library metaphor to show how experiences are analyzed, organized and stored for future reference
 - Books = experiences
 - Subjects areas are representations of the main neuro-cognitive domains:
 - The subjects are divided into 3 sections:
 1. **Sensory:** visual, auditory, etc..
 2. **Integrated Skills:** motor planning (praxis), language
 3. **Abilities:** Social & Cognitive
- Designed as a model for 'ideal' development

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The Brain Library^o

- Each new experience creates a book associated with the subject-areas that are active during the experience
 - Experiences write books for multiple subject-areas simultaneously
- Books are symbolic of whole or parts of experiences
- The librarian in our brain
 - Analyzes
 - Organizes
 - Stores
 - Retrieves

Based on the areas of the brain/nervous system that are required for those experiences

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The Brain Library^o

How it is Used

1. All information is taken in through the sensory-nervous system receptors
2. The librarian in your brain cross-references new experiences against past experiences (stored books) to give context
3. A response is formulated based on current information woven with past experience
 - Examples: walking for the first time, hitting a ball, answering a question, contemplating a moral dilemma

OT's = adaptive response

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The Brain Library^o Learning

- While performing higher level integrated skills the nervous system must continuously reference the foundation books
 - Higher level skills rely on foundation shelves to be sufficiently stacked
- Our successful navigation of modern life is dependent on our capabilities (cognitive & social intelligence)
 - The quality of our capabilities is reliant on a sufficiently stacked foundation AND integrated skills shelves

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52

Matthew Effect

- Matthew Effect
- Term coined by Keith Stanovich in 1986, referring to the phenomenon in which the gap between "slow starters" (i.e. Students with Dyslexia) and fast starters (typically developing children) widens as slow starters read less often and for shorter periods of time, which means they encounter fewer words when they do read (i.e., poor fluency) and over time they get far less practice as a result
- Over time the Mathew effect impacts language/vocabulary development and even IQ

Intervention is Essential

- Think of it as helping to write and stack the books in their Brain Libraries
- Limited knowledge gained through text
- Knowledge must be as experiential as possible
- Linked with language

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•Strategies

Scaffolding Educational Strategies

Show and Tell:

- Modeling an activity is key: circle us, kids in the class circle around a small group who demonstrates an activity
- Demonstrate outcome or the finished product before the students begin
- For example if it is an science based project it is important to show a model with a list of criteria or a rubric
- Talk through the how
 - As you are modeling something attach the appropriate simple language for a an activity
 - Talk out loud the critical thinking involved to answer questions

Scaffolding Educational Strategies

- Link experiential knowledge to the lesson
- Ask students to share experiences from their life that tie into what the lesson is about
- You may have to offer a few bubbles for hints to help them connect the dots (example Science summer)
- If not their own experience, experiences of characters in movies
- Use past lessons to pull students into new lessons

Scaffolding Educational Strategies

- Talking it through
- Chatting with purpose is good: children need time to internalize information. One of the best ways is to talk about a story, or project and have the student relay the learning process to you.
 - Think-pair-share
 - Turn-and-talk
 - Triad Teams
- Structured "light" questions: what was the most fun?, what was the most difficult?, what do you know now you didn't know yesterday?

Scaffolding Educational Strategies

- Front load vocabulary
- This strategy is key for students with Dyslexia but it is also good teaching.
- Introduce key vocabulary words from a story using pictures, or experiential examples,
- Have children create symbols for words and discuss
- THEN bring out the dictionary

Scaffolding Educational Strategies

- Use Visuals
- Graphic organizer
- Should be a way to organize information for a report
- Should be temporary

Scaffolding Educational Strategies

- Check in often
 - Pause, ask question, pause and review
- Pausing is key for kids with Dyslexia
 - They need time to process the language and link it to past information.
- Often it will take time to formulate an answer or figure out a link
 - Make pausing part of a whole class discussion so those students aren't put on the spot

Strategies: Where to start!

- First pick the right text.
- This is crucial to increase engagement in the task: A child must be able to read most of the text on their own.
- Independent reading: If they are not able to read at least 95% of the text in the book/material we are setting them up for increased anxiety and frustration
- Intervention: If the child is NOT able to read an assignment with 95% accuracy they will miss key instructions and demonstrate limited knowledge when in fact they just could not read the directions! The instructions and questions must be read to them to get an accurate picture of their knowledge of materials being tested!

Strategies: Where to start!

Paired Reading

- 1) Make sure text is at instructional level (child can read approximately 90%)
- 2) Sit next to child so you are both following along in the book
- 3) Have child read out loud and when the pause (3-5 seconds) or stumble on a words
- 4) Point to the words and pronounce it correctly. Then have her/him repeat the word and continue reading

Strategies: Where to start!

• Paired Reading

- Read aloud for roughly 2 minutes as child follows along slightly (adjust time to at their attention levels). Then have child read the same passage aloud, receiving corrective feedback as needed
- As a child progresses you can use a higher level of paired reading. You read the passage at the same time the child does. They should follow you by a fraction of a second
- I-reading: computer program

Multi-Sensory is supported for Dyslexia

- Writing words in Sand while sounding out
- Using popsicle sticks to create letters and words
- Air-writing
- Word building using colored letters (Barton)
- Tapping out sounds as you say them (Wilson)

OT Interventions

- Interactive Metronome
- ILS
- Reflex integration
- Visual motor intervention
- Cursive hand writing
- Infusing sensory into learns letters and sounds

READING PROGRAMS

- Reading recovery or Foundations not effective
- Wilson Reading Program and Orton Gillingham programs were specifically designed for kids with Dyslexia
- EDMARK: good but the vocabulary not broad nor high enough : teaching method is solid but higher level vocabulary must be introduced
- Road to Decode, Road to Read Books
- International Dyslexia program: Reading programs must follow a structured literacy framework

READING PROGRAMS

- International Dyslexia program: Reading programs must follow a structured literacy framework
 - Phonology
 - Sound Symbol Association
 - Syllable Instruction
 - Morphology
 - Syntax
 - Semantics

Structured Literature

- **Structured Literacy** instruction is systematic and cumulative.
 - Systematic means that the organization of material follows the logical order of the language
- The sequence must begin with the easiest and most basic concepts and elements and progress methodically to more difficult concepts and elements.
 - Cumulative means each step must be based on concepts previously learned
- Explicit Instruction
- Diagnostic Teaching

Accommodations!! Guidelines from Department of Justice Civil Rights Division

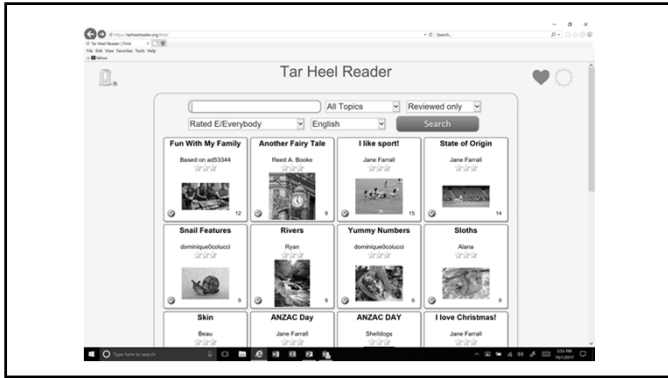
- 1) Tests covered: GED, SAT or ACT, LSAT or MCAT, GRE or GMAT and Licensing exams such as medical licensing exams
- 2) What Accommodations? Extended time, Screen reading technology, Distraction-free, Scribes to recorded dictated notes and essays
- 3) Someone with a learning disability may achieve a high level of academic success, but may nevertheless be substantially limited in one or more of the major life activities of reading, writing, speaking, or learning because of the additional time or effort he or she must spend to read, write, speak or learn compared to most people in the general population
- 4) Documentation: Recommendations of qualified professionals, proof of past testing accommodations, observations from educators, results of psycho-educational or other professional evaluations, applicant's history of diagnosis

Assistive Technology IDEA

- It is imperative that by the time students hit 4th grade they are able to access the text for information
- Continue reading remediation while simultaneously providing ways for students to access the content of the curriculum
- In accordance with IDEA, AT can assist students in accessing the general curriculum
 - (ie: supplemental aides and services)
- IDEA requires that AT be considered for every eligible student

Assistive Technology

- Audio Books are key
 - Often children who read less, experience a decrease in acquired vocabulary which impacts continued cognitive development
- Make sure students have access to the audio version of textbooks
 - Bookshare (www.bookshare.org) and Learning Ally (www.learningally.org)
- Make sure students are listening to books for pleasure as well
 - Many books can be downloaded to an I-pad or Kindle with both print and audio
 - There are also opportunities to have the book highlight print as you listen
 - This is great for kids with Dyslexia



Assistive Technology

- Microsoft Natural Reader
- Read & Write (Google App)
- Word Processing- Spell Check, Grammar Check, Thersaurus, speech recognition, auto-correct and auto-summary
- Concept Mapping- Kidspiration, Inspiration, and Webspiration (www.inspiration.com) provide applications for concept mapping grades k-12

Dyslexia Resources

- International Dyslexia Association: <https://dyslexiaida.org>
- The Yale Center for Dyslexia and Creativity- <http://dyslexia.yale.edu/index.html>
- Decoding Dyslexia: <http://www.decodingdyslexia.net>
- Reading Rockets- www.readingrockets.org

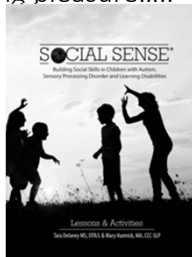
True of False

- Dyslexia mainly affects boys ? False
- Dyslexia runs in families? - True
- It is not possible to tell if a child has Dyslexia before 4 years old? False
- The main sign is a child who reverses b's and d's ? False
- A person with Dyslexia has average or above average IQ? - True
- People with Dyslexia usually do NOT become automatic readers - True
- Dyslexia is a visual problem? False
- Dyslexia affects up 1 in 5 people - True
- People with dyslexia have brain differences - True

True of False

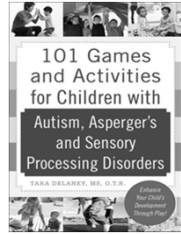
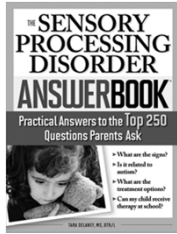
- Occupational Therapists can help those with dyslexia

For your reading pleasure.....



Available: www.pesi.com

For your reading pleasure.....



Available: Amazon, Barnes n Noble, Pesi.com

79

HAVE A GREAT WEEKEND



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80

The order of things

- Symbols before rhythms
- Compound word before multisyllabic, bathroom, before toilet
- Word families
- Learn to blend before we learn to pull words apart
- When we teach we overlap these concepts

Phonology

- Phonology: the study of sound structure of spoken words
 - Critical element of *Structured Language* instruction
- A phoneme is the smallest unit of sound in a given language that can be recognized as being distinct from other sounds in the language. For example, the word *cap* has three phonemes (/k/, /ă/, /p/), and the word *clasp* has five phonemes (/k/, /l/, /ă/, /s/, /p/).
- Phonological awareness: phonemic awareness or the ability to segment words into their component sounds
 - Rhyming,
 - Counting words in spoken sentence
 - Clapping syllables in spoken word

Sound-Symbol Association

- Once students have developed the awareness of phonemes of spoken language then
 - Must learn how to map the phonemes to symbols or printed letters.
 - Sound-symbol association must be taught and mastered in two directions:
 - Visual to auditory (reading)
 - auditory to visual (spelling).
 - Students must master the blending of sounds and letters into words as well as the segmenting of whole words into the individual sounds.
- The instruction of sound-symbol associations is often referred to as phonics. Although phonics is a component of *Structured Literacy*, it is embedded within a rich and deep language context.

Syllable Instruction

- A syllable is a unit of oral or written language with one vowel sound.
- Instruction includes teaching of the six basic syllable types in the English language:
 1. Closed
 2. vowel-consonant-*e*
 3. Open
 4. consonant-*le*,
 5. *r*-controlled
 6. Vowel pair.
- Knowledge of syllable types is an important organizing idea.
- Syllable division rules heighten the reader's awareness of where a long, unfamiliar word may be divided for great accuracy in reading

Morphology, Syntax & Semantics

- **Morphology.** A morpheme is the smallest unit of meaning in the language. The Structured Literacy curriculum includes the study of base words, roots, prefixes, and suffixes. The word *instructor*, for example, contains the root *struct*, which means *to build*, the prefix *in*, which means *in or into*, and the suffix *or*, which means *one who*. An instructor is one who builds knowledge in his or her students
- **Syntax.** Syntax is the set of principles that dictate the sequence and function of words in a sentence in order to convey meaning. This includes grammar, sentence variation, and the mechanics of language
- **Semantics.** Semantics is that aspect of language concerned with meaning. The curriculum (from the beginning) must include instruction in the comprehension of written language

Morphology, Syntax & Semantics

- **Structured Literacy** is distinctive in the principles that guide how critical elements are taught:
 - Systematic and Cumulative
 - Explicit Instruction
 - Diagnostic Teaching
