


The Neuropsychology of Learning Disabilities:
Developing Evidence-Based Strategies for Reading, Writing, and Math

The lobes of the cerebral cortex in the left cerebral hemisphere, shown in lateral view.

Frontal lobe, Central sulcus, Precentral gyrus, Postcentral gyrus, Parietal lobe, Lateral sulcus, Occipital lobe, Temporal lobe, Cerebellum, Pons, Medulla oblongata.

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Course Outline

- Three-part (12 hrs) webinar series on reading, writing, & math disabilities sponsored by Jack Hirose & Associates.
- Introduce a brain-based educational model of dyslexia, dysgraphia, and dyscalculia and classify each disability into distinct subtypes.
- Discuss **evidenced-based** vs. **research-based** interventions for all students with academic learning issues.
- Introduce the concept of **diagnostic achievement** tests versus traditional achievement tests.
- Questions and Comments: **feifer@comcast.net**

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Dr. Feifer's Journey 1992 – present
www.schoolneuropsychpress.com



- School psychologist 20+ years
- Diplomate in school neuropsychology
- 2008 **Maryland School Psychologist of the Year**
- 2009 **National School Psychologist of the Year**
- Author: **8 books** on learning and emotional disorders
- Test Author: **FAR & FAM & FAW** (published by PAR)
- Currently in private practice at Monocacy Neurodevelopmental Center in Maryland.
- ABSNP Diplomate and Faculty Instructor

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Reading Presentation Goals

1. Discuss the prevalence of learning disabilities in both Canada and the United States.
2. Discuss the pitfalls of relying on an aptitude-achievement *discrepancy model* as the sole basis for identifying reading disorders in young children.
3. Introduce a *brain-based* educational model to identify and classify four *subtypes* of reading disorders.
4. Discuss four universal truths with respect to reading in order to provide a foundation for linking each reading subtype with specific interventions.
5. Introduce the **FAR**, a **diagnostic achievement test** to better diagnose reading disorders in children.

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Dispelling Neuromyths


Macdonald, K., Germine, L., Anderson, A., Christodoulou, J., McGrath, L. (2017).
Dispelling the Myth: Training in Education or Neuroscience Decreases but Does Not Eliminate Beliefs in Neuromyths. *Frontiers in Psychology*, 8, 1314.

1. VAK Learning Styles
2. Dyslexia and Reversals
3. Mozart Effect
4. We use just 10% of our Brains
5. Sugar causes ADHD
6. Right vs Left Brain Learners

General Public.....(m=68%)
Educators (m=56%)
High Neuroscience Exposure...(m=46%)

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Canadian LD Definition

LEARNING DISABILITY (Grades 1–12: Code 54)

This is the official definition adopted by the Learning Disabilities Association of Canada (LDAC) on January 30, 2002.


"Learning Disabilities" refer to a number of disorders which may affect the acquisition, organization, retention, understanding or use of verbal or nonverbal information. These disorders affect learning in individuals who otherwise demonstrate at least average abilities essential for thinking and/or reasoning. As such, learning disabilities are distinct from global intellectual deficiency.

Learning disabilities result from **impairments in one or more processes** related to perceiving, thinking, remembering or learning. These include, but are not limited to: language processing; phonological processing; visual spatial processing; processing speed; memory and attention; and **executive functions** (e.g., planning and decision-making).

Learning disabilities range in severity and may interfere with the acquisition and use of one or more of the following:

- oral language (e.g., listening, speaking, understanding)
- reading (e.g. decoding, phonetic knowledge, word recognition, comprehension)
- written language (e.g., spelling and written expression)
- mathematics (e.g., computation, problem solving).

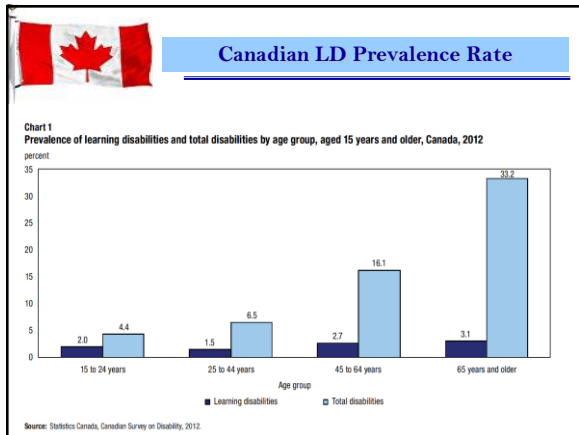
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Prevalence of LD in Canada

- More Canadian children have a learning disability than all other types of educational disabilities combined.
- According to Statistics Canada, **3.2%** of Canadian children have a learning disability – whereas up to **20%** may have dyslexia.
- More than half a million adults in Canada live with a learning disability, making it more challenging for them to learn in universities, and on the job.
- Research from the Literacy and Policing Project indicates that **65% of the incarcerated population** in Canada reads at less than a grade 8 level of literacy

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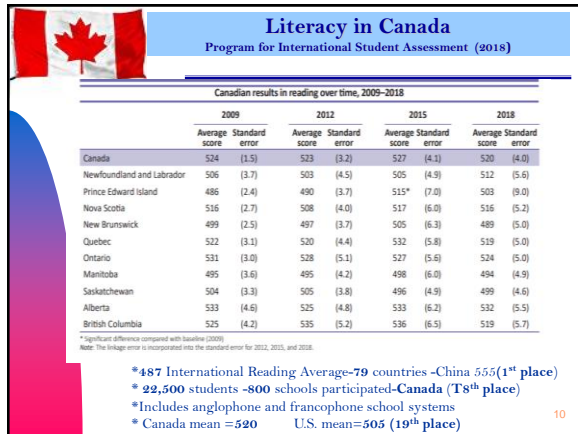
Canadian LD Prevalence Rate

Table 2
Effect of disability on educational experiences for adults with a learning disability, aged 15 years and older, Canada, 2012

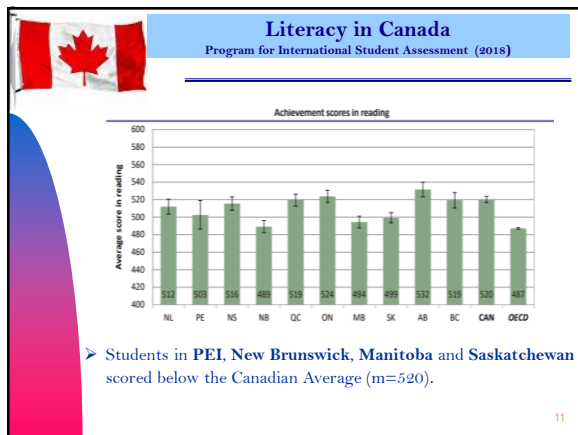
Effect of disability	Percentage
Took longer to achieve current level due to disability	64.6
Took fewer courses due to disability	63.5
Choice of courses/career influenced by disability	63.4
People avoided/excluded you in school due to disability	57.5
Bullied at school because of disability	49.8
Changed course of studies due to disability	49.0
Education interrupted due to disability	47.4
Attended special education classes in regular school	47.2
Discontinued education due to disability	41.4

Note: Learning disabilities includes those in school within the last 5 years and had disability while in school.
Source: Statistics Canada, Canadian Survey on Disability, 2012.

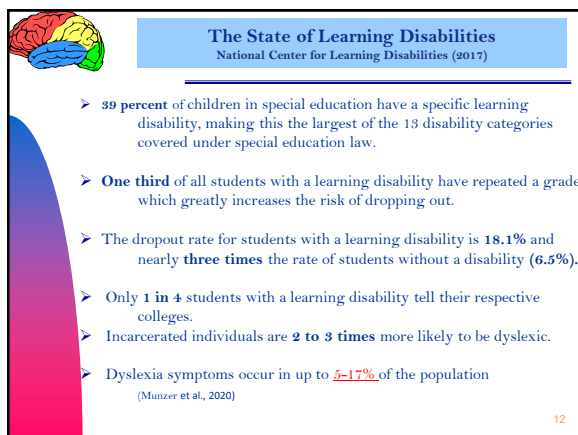
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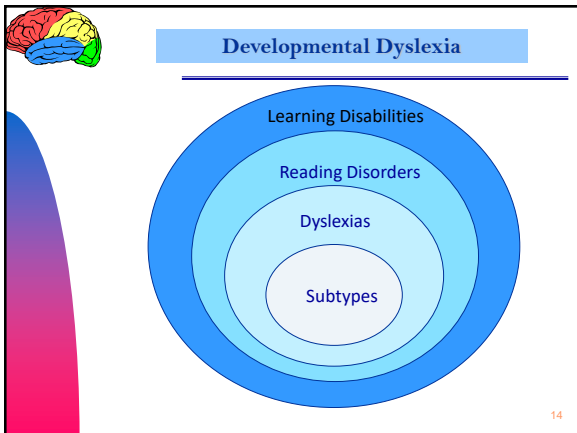
Defining Dyslexia

➤ "Dyslexia is characterized by difficulties with **accurate** and /or **fluent** word recognition and by poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction. Secondary consequences may include problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge."

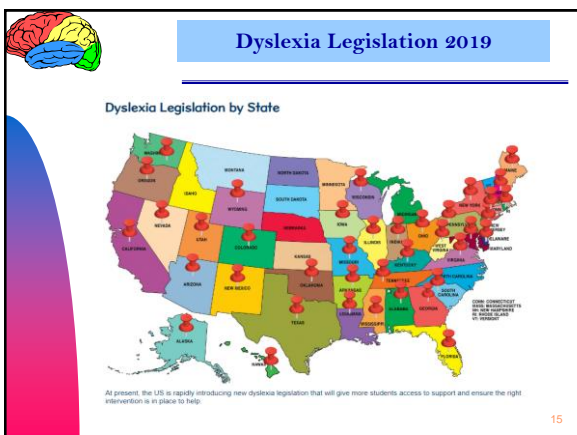
- International Dyslexia Association

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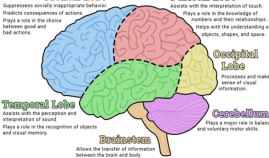
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School Neuropsychology

➤ **Neuropsychology:** An analysis of learning and behavior which examines brain-behavior relationships. The underlying assumption is that the brain is the seat of **ALL** behavior; therefore, knowledge of cerebral organization should be the key to unlocking the mystery behind most academic tasks.

The Human Brain



Frontal Lobe
 Suppresses socially inappropriate behavior.
 Predicts consequences of actions.
 Plans a route to the classroom.
 Controls goals and bad actions.

Parietal Lobe
 Assists with the interpretation of touch.
 Plays a role in the knowledge of numbers and their relationships.
 Plays a role in the understanding of objects, shapes, and space.

Occipital Lobe
 Processes and displays scenes of a road intersection.


Temporal Lobe
 Assists with the perception and interpretation of sounds.
 Plays a role in the recognition of objects and visual memory.

Cerebellum
 Coordinates and regulates voluntary motor acts.

Brainstem
 Allows the transfer of information between the brain and body.
 Plays a role in automatic functions such as the heartbeat and breathing.

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MAIN PITFALLS OF DISCREPANCY MODEL

1. There is no universal agreement on what the discrepancy should be.
2. A discrepancy model of reading disabilities precludes early identification.
3. *Intelligence is more a predictor of school success, and not necessarily a predictor of successful reading.
4. A discrepancy model promotes a '*wait and fail*' policy, forcing interventions to come after the fact.

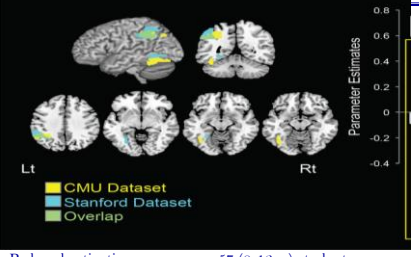
Side note: Do you really think human intellectual functioning can be captured by one unitary value?

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Tanaka, H. et al. (2011). *The Brain Basis of the Phonological Deficit in Dyslexia is Independent of IQ*. *Psychological Sciences*, 22(11), 1448-1451.



Parameter Estimates


Lt Rt

CMU Dataset
 Stanford Dataset
 Overlap

- Reduced activation seen among 57 (8-12yo) students from Carnegie Mellon and 74 students from Stanford (7-16yo) in discrepant AND non-discrepant readers in left parietal and visual word form area.
- **IQ is not a factor in phonological processing!!**
 (Siegal, 1991; Fletcher, et al. 1994; Stanovich, 2005; Shaywitz, 2010).

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Four Universal Truths of Reading


1. In all word languages studied to date, children with developmental reading disorders (dyslexia) primarily have difficulties in identifying, recognizing, categorizing, and/or manipulating phonological units at all linguistic levels (Goswami, 2007).

Screening for Success (Hulme & Snowling, 2016)

1. Phonological awareness skills.
2. Ability to link sounds with letters.
- *3. Rapid letter-naming skills.
 - a) Rapid naming of letters better than objects (Kilpatrick, 2015)
 - b) Rapid naming of letters is moderately correlated with reading performance (.28-.57%) and explains some of the reading variance independent of phonological awareness. (Truong et al., 2019).

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Four Universal Truths of Reading

2. The English language is not a purely phonological!
 - 1 letter grapheme: c a t. The sounds /k/ is represented by the letter 'c'.
 - 2 letter grapheme: l e a f. The sound /ee/ is represented by the letters 'e a'.
 - 3 letter grapheme: n i g h t. The sound /ie/ is represented by the letters 'i g h'.
 - 4 letter grapheme: t h r o u g h. The sound /oo/ is represented by the letters 'o u g h'.


➤ The English language includes over 1,100 ways of representing 44 sounds using a series of different letter combinations (Libery & Clark, 2006). In Italian there is no such ambiguity as just 33 graphemes are sufficient to represent the 25 phonemes.

➤ Therefore, 25% of words are phonologically irregular (i.e. "debt", "yacht", "onion", etc.) or have one spelling but multiple meanings—*homonyms*—(i.e. "tear", "bass", "wind", etc.)

➤ Summary: We need to develop orthography!!

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The Problem with English Orthography?

IF THE GH SOUND IN ENOUGH IS PRONOUNCED "F"
& THE O IN WOMEN MAKES THE SHORT "I" SOUND
& THE TI IN NATION IS PRONOUNCED "SH"
THEN THE WORD

"GHOTI"

IS PRONOUNCED JUST LIKE

"FISH"

WELCOME TO THE ENGLISH LANGUAGE

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Mapping the Brain: Orthography

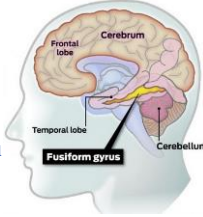
Orthographic Mapping (Kilpatrick, 2015):

- Provides automatic and instant recognition of words
- Left fusiform gyrus
- Dependent upon phonemic proficiency, which is the amount of letter sound knowledge that a child possesses.

Visual Rhyming Tasks (Cao et al., 2015)

- hate-gate (same ortho - phono endings)
- jazz-has (different ortho-same phono)
- pint-mint (similar ortho-diff phono)

* Results indicated that **left inferior parietal** lobe activated during visual rhyming, and **left superior temporal lobe** during auditory rhyming. Thus, we store visual patterns by sounds.

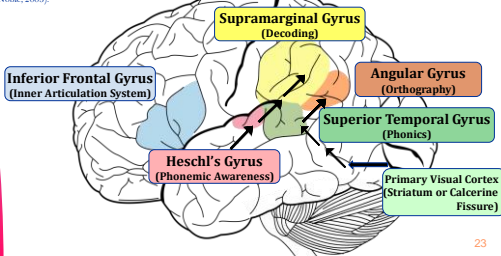


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The Reading Brain: How Words are Assembled

3. Specific neuroimaging techniques have demonstrated that **phonological** processing and **orthographic** processing are a by-product of the functional integrity of the **temporal-parietal** junctures in the left hemisphere of the brain (Pao-Alonso et al., 2018; Glezer et al., 2016; Sandak et al., 2004; McCandliss & Noble, 2003).

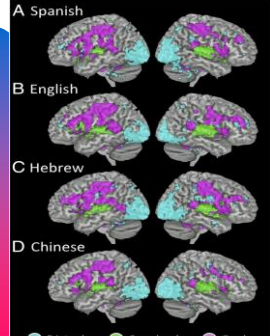


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A Universal Reading Brain

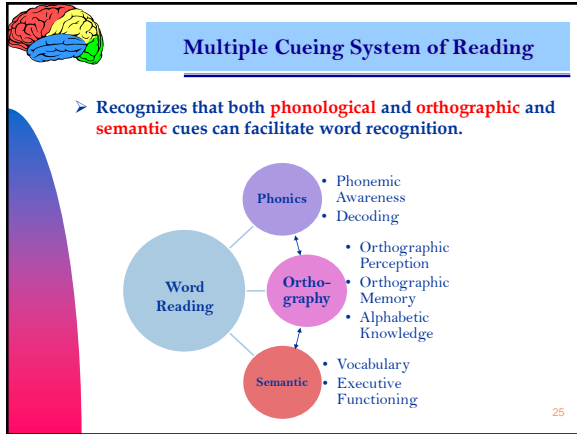
Rueckl et al., (2015). Universal brain signature of proficient reading: Evidence from four contrasting languages. *Proceedings of the National Academy of Sciences*, 112(36): 11510-11515.



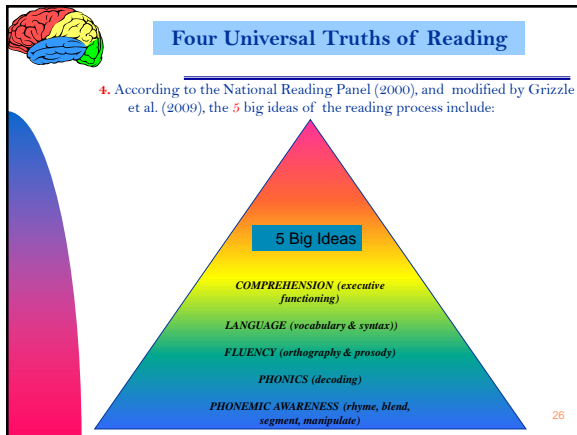
- Proficient reading entails the convergence of phonological and orthographic processing systems onto a common network of neural structures dominated by the left perisylvian regions of the brain.
- Dyslexics in transparent orthographic systems, such as Spanish, German, Italian, Greek have difficulty in acquiring reading speed as a hallmark deficit of dyslexia (Ziegler et al., 2003; Davies et al., 2007; Constantinidou & Stainthorpe, 2009; Wimmer et al., 2010).

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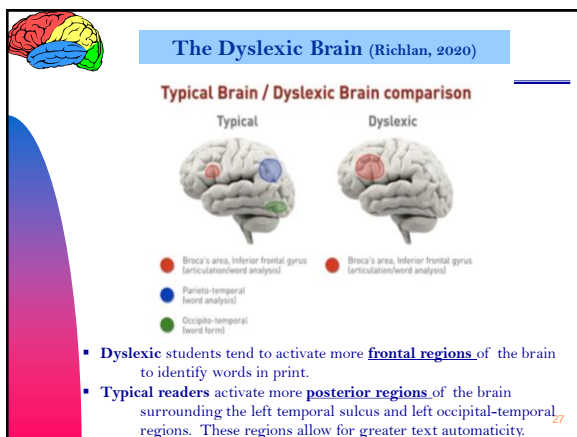
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Do Interventions Change the Brain?


- Research is beginning to show two specific brain changes with LD kids as a result of reading interventions:

1. Hemispheric "**normalization**" – the left hemisphere begins to assert dominance after just **four weeks** of intervention.
2. Hemispheric "**compensation**" – children with reading difficulty also activate brain structures in the frontal lobe following intervention, suggesting greater text attention and working memory engagement (IFG), and enhanced error detection and EF skills (ACC).

Barquero, L.A., Davis, N., & Cutting, L. E. (2014). Neuroimaging of reading intervention and activation: likelihood estimate meta-analysis. *Plos One*, 9(1), 1-16.

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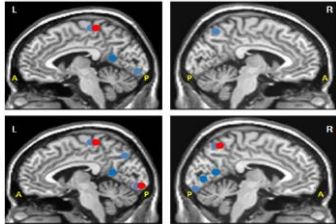


Do Interventions Change the Brain?

- Horowitz-Kraus, et al. (2014). Reading acceleration training changes brain children with reading disorders. *Brain and Behavior*, 880-902.
- 33 children with reading disorders: 8-12 years-old.
- RAP training...4 weeks...20 min daily...fluency and comprehension
- Computer presentation of sentences...which dissipate based on response accuracy...and students select correct answer.

Typical readers


Children with RD



● Test 1 ● Test 2

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Four Subtypes of Reading Disorders

- (1) **Dysphonetic Dyslexia** – difficulty sounding out words in a phonological manner.
- (2) **Surface Dyslexia** – difficulty with the rapid and automatic recognition of words in print.
- (3) **Mixed Dyslexia** – multiple reading deficits characterized by impaired phonological and orthographic processing skills. Most severe form of dyslexia.
- (4) **Comprehension Deficits** – mechanical side of reading is fine but difficulty persists deriving meaning from print.

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Subtypes of Dyslexia


1. **Dysphonetic Subtype** - great difficulty using phonological route in reading, so visual route to lexicon is used. These readers do not rely in letter to sound conversions, but rather over-rely on visual cues to determine meaning from print.

Neuropsychological Significance: Left temporal-parietal gradient (*supramarginal gyrus*).

<u>Target Word:</u>	<u>Read As:</u>
<i>cat</i>	<i>couch</i>
<i>balloon</i>	<i>ball</i>
<i>jump</i>	<i>gym</i>
<i>ghost</i>	<i>goat</i>

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Remediation Strategies for DYSPHONETIC DYSLLEXIA

<u>Over Age 14:</u>	Wilson Reading System SRA Corrective Reading & REACH System Read 180 HOSTS Kaplan Spell/Read LEXIA Strategies for Older Students
<u>Ages 7 - 14:</u>	ASDEC Language Foundations (Orton-Gillingham) SRA Corrective Reading Earobics II LiPS LEXIA Primary Reading Horizons
<u>Under Age 7:</u>	Fast Forward II(Tallal) Earobics I Phono-Graphix Saxon Phonics Program Success for All Ladders to Literacy Foundations Road to the Code SIPPS Scott Foresman Early Intervention Reading

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The Morphological Connection ("Top-Down")

(Senechal & Kearman, 2007)


Morpheme: the smallest meaningful component of a word that still conveys meaning. Examples include:

Prefixes: *ante, extra, mis, para, pre, retro, super*
Suffixes: *able, tion, ment, ness, ship, tude, ward, ible*
Latin Roots: *cent, extra, hemi, meta, therm, ultra*

- Research suggests that children learn to anticipate words through a combination of phonological, orthographic, and morphological strategies.
- Knowledge about morphological awareness contributes to individual differences in reading and spelling that cannot be entirely attributed to orthographic and phonological processing.

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Wilson Reading System


- Designed specifically for adolescents and adults with dyslexia. Also, very appropriate for ELL students.
- Recommended 4-5 days per week...45 -90 min per day.
- Emphasis is on **six syllable subtypes**:

- Closed syllables (just one vowel..."cat")
- Open syllables (ends in long vowel..."baby")
- Vowel-Consonant **E** Syllables (silent **e** elongates vowel..."make")
- Vowel-Team Syllables (two vowels make one sound..."caution")
- R-Controlled Syllables (vowel followed by "r" changes sound..."hurt")
- Consonant-**le** Syllables (end of word ending in "le"..."turtle")

- Students create their own diacritical markers.
- Students rely upon finger tapping to learn syllable boundaries.
- Comprehension component does not rely upon metacognitive strategies, but rather **visualization**.

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Subtypes of Dyslexia

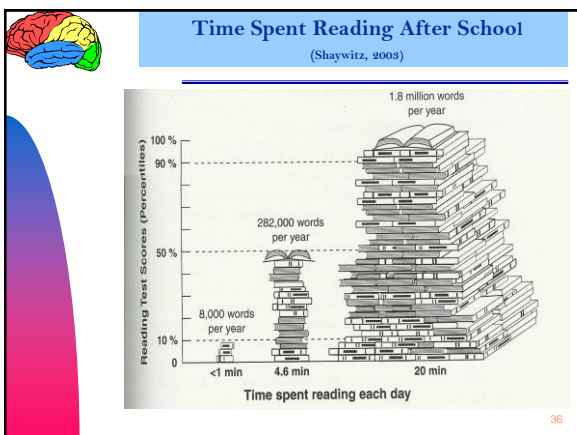
2. **Surface dyslexia** - an over-reliance on sound symbol relationships as the process of reading never becomes automatic. These children break every word down to its phonetic base, and read slowly due to poor *orthographic perception and processing*.

WORD	→	READ AS
island	→	izland
grind	→	grinned
listen	→	liston
begin	→	beggin
lace	→	lake


➤ Extreme difficulty reading words where phonemes and graphemes are not in 1 to 1 correspondence: **yacht**
debt

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Skilled Readers Dominant Pathway

- According to research at an English university, it doesn't matter in what order the letters in a word are, the only important thing is that first and last letter is at the right place. The rest can be a total mess and you can still read it without problem. This is because we do not read every letter by itself but the word as a whole.



- Skilled readers use a combination of phonological cues, orthographical cues, and semantic cues to anticipate and facilitate automatic word recognition.


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Remediation Strategies for SURFACE DYSLEXIA

Over Age 12:	Academy of Reading Wilson Reading System Laubach Reading Series Read 180
Ages 7 - 12:	Read Naturally Great Leaps Reading Quick Read RAVE-O Fast Track Reading
Under Age 7:	Destination Reading Reading Recovery Early Success Fluency Formula

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Read Naturally

- A fluency based program designed to develop speed, accuracy, and proper expression.
- Designed to be used 3 times per week...30 minutes, mainly for students between 2nd (51wpm) through 8th (133 wpm) grades.
- Each level of the program has 24 non-fiction stories.
 - Student placed in level and goal is set.
 - Cold read for one minute graphing wpm and identifying difficult words.
 - Read with tape three times consecutively.
 - Hot read is attempted.
 - Comprehension questions involve main idea, details, vocabulary, inferences, and short answers.

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Does Vision Therapy Work?

American Academy of Pediatrics
Joint Statement—Learning Disabilities, Dyslexia, and Vision

ABSTRACT

Learning disabilities, including reading disabilities, are commonly diagnosed in children. Their etiologies are multifactorial, reflecting genetic influences and developmental differences. Learning disabilities are complex problems that require complex solutions. Early recognition and referral to qualified educational professionals for evidence-based educational interventions are essential to achieve the best possible outcome. Most experts believe that dyslexia is a language-based disorder. Vision problems can interfere with the process of learning; however, vision problems are not the cause of primary dyslexia or learning disabilities. Research evidence does not support the efficacy of eye exercises, perceptual-cue therapy, or general vision therapy or lenses for improving the long-term educational performance of children with learning disabilities. Diagnostic and treatment approaches that lack scientific evidence of efficacy, including eye exercises, behavioral vision therapy, or special interest lenses or lenses, are not endorsed and should not be recommended. Pediatrics 2006;118:400-404


BACKGROUND

Reading is the process of extracting meaning from written symbolic characters. It is a complex task that is a large amount of time and effort is devoted to the complicated task of learning to read. Because of the difficulties that some children experience with learning to read, the group mandated that the Executive Secretary of the National Institute of Child Health and Human Development assemble a national panel of education and scientists to review the literature to research the optimal methods of teaching children to read. The 2000 report of the National Reading Panel titled "Teaching Children to Read: An Evidence-Based Assessment of the Scientific Research Literature on Reading and Its Implications for Reading Instruction" found research findings with implications for specific approaches to teaching reading to all children.

Learning disabilities remain a concern for the children and families seeking the best outcome. The research that has accumulated is a major obstacle to learning, which may have significant educational

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Subtypes of Dyslexia


3. **Mixed Dyslexia** - severely impaired readers with characteristics of both **phonological** deficits, as well as **orthographic** deficits. These readers have no usable key to unlocking the reading and spelling code. Very bizarre error patterns observed.

<u>WORD</u>	<u>READ AS:</u>
Advice	Exvices
Correct	Corex
Violin	Vilen
Museum	Musune
Possession	Persessive
Material	Mitear

➤ Multiple breakdowns along many reading pathways. ⁴¹

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Remediation Strategies for MIXED DYSLEXIA

(1) **Eclectic Model** - Take an eclectic and approach capitalizing on the particular strengths of the child. Consider using a multi-sensory type of Orton-Gillingham program, coupled with a fluency model such as Read Naturally, and the computerized models of Read 180.


(2) **Top Down Strategies** - Often atypical development mapping individual sounds to the visual word form association areas.

(3) **Socioeconomic Status** - is a very strong predictor of reading skills due primarily to the home literacy environment. Therefore, schools need to provide **more reading opportunities**.

(4) **Motivation and Confidence** -Great Leaps, Read Naturally, etc. tend to give immediate feedback.

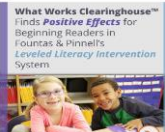
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Balanced Literacy Models


- **Leveled Literacy Intervention (LLI)** is a short-term supplementary, small-group literacy intervention designed to help struggling readers achieve grade-level competency.
- The intervention provides explicit instruction in phonological awareness, phonics, fluency, vocabulary, reading comprehension, oral language skills, and writing.
- Approximately 25 studies supporting its effectiveness.



What Works Clearinghouse™ finds Positive Effects for Beginning Readers in Fountas & Pinnell's Leveled Literacy Intervention System.

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Read 180 (Dr. Ted Hasselburg)

- A 90 minute per day balanced literacy program.
- Designed for grades 4th – 12th.
- 1) 20 minute whole group instruction where teachers model fluent reading skills.
- 2) Students then move to three-20 min stations.
 - a) **Teacher Station** – small group differentiated instruction to reinforce previous concepts.
 - b) **Computer Station:**
 - Reading Zone (phonics, fluency, vocab)
 - Word Zone (automaticity of decoding)
 - Spelling Zone
 - Success Zone (comprehension strategies)
 - c) **Library Station** – read silently and written language activities.
- Software adapts level of instruction to learner.
- Expensive, but research based...recommended for most struggling readers.

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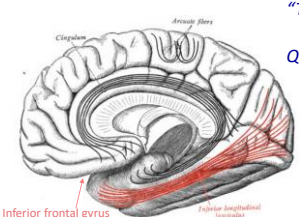


Main Components of Reading Comprehension

1. **Content Affinity** - attitude and interest toward specific material.
2. **Working Memory** - the ability to temporarily suspend information while simultaneously learning and taking in new information.
3. **Executive Functioning** – targeted strategies used to self-organize verbal information to facilitate recall.
4. **Language Foundation** – vocabulary knowledge is vital for passage comprehension.

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Morphosyntax and Comprehension

"The red greened the blue with a yellow."
 Q. Who got greened?

Inferior Longitudinal Fasciculus – transfers semantic information from posterior to anterior brain regions (inferior frontal gyrus) in order to facilitate comprehension. The greater the integrity of this pathway, the better the comprehension (DeTudo et al., 2019).

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Reading Comprehension Interventions

- 1. Stop & Start Technique** – student reads a passage out loud and every 30 seconds "stop" to ask questions.
- 2. Directional Questions** – ask questions at the beginning of the text instead of the end.
- 3. Read Aloud** – reading out loud allows student to hear their own voices and facilitates working memory.
- 4. Story Maps** – pre-reading activity where graphic organizers are used to outline and organize the information.
- 5. Active Engagement** – encourage active, not passive reading, by having children take notes or putting an asterisk next to important information. Also, multiple colors for highlighting.

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Story Mapping Technique


Story Map

```

graph TD
    MC(Main Characters) --- TA(Title & Author)
    S((Setting)) --- TA
    P[Problem] --- TA
    R[Resolution] --- TA
    TA --- Plt{Plot}
  
```

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Executive Functioning Strategies: Before-During-After

(Nicolielo-Carrillo et al., 2018)

Reading Strategy	Duration
1. You imagine how the story will be by reading the title.	Before
2. You construct a story map to pre-organize main themes.	Before
3. You observe how the story is organized by skimming chapter headings and making relevant predictions.	Before
4. You read parts of the story again when not understanding certain parts.	During
5. You observe figures, graphics, and pictures to better understand content.	During
6. You re-read parts of the story again when distracted.	During
7. You use a highlighter on text that is important.	During
8. You read carefully and slowly to ensure comprehension.	During
9. You search unfamiliar words in the dictionary.	During
10. You re-read the story multiple times to gain deeper understanding.	After
11. You write down 3 main points of the story to ensure comprehension.	After
12. You discuss the information with others to ensure comprehension.	After

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SOAR to SUCCESS

- A comprehension program for grades 3-6.
- 30-35 minute lessons...18 weeks.
- 4 Key Strategies:
 - a) Summarize
 - b) Clarify
 - c) Question
 - d) Predict
- * 5 Key Aspects of Program:
 - 1) Revisiting – re-read previous story with a partner.
 - 2) Reviewing – graphic organizer used to summarize.
 - 3) Rehearsing – preview text and make predictions of book to be read that day.
 - 4) Read and Reciprocal Teaching – silent reading and practicing strategies.
 - 5) Reflecting – discussing story.

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Lindamood Visualization and Verbalization for Language Comprehension and Thinking

- Created by Nanci Bell
- Recommended 3-5 times per week for 60 minutes.
- 12 week program- whole class or individual.
- Based upon 12 structure words (*i.e. what, size, color, shape, etc.*) used to provide a framework to create visual images. The student begins with picture imaging, word imaging, sentence imaging, multiple sentence imaging, and paragraph imaging.
- Pacing is determined by student progress.
- Researched based (Johnson-Glenberg, 2000; Sadoski & Wilson, 2006).
- Consideration for students with **Autism, Hyperlexia, ELL**, and students with lower verbal abilities.


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DYSLEXIA FINAL POINTS

1. (Q) Do you need an IQ of 90 or above to be dyslexia?
(A) **Not at all**
2. (Q) Do you need an IQ of 90 or above to have a specific learning disability?
(A) **It depends on your district**
3. (Q) Should students with dyslexia automatically qualify for special education services?
(A) **Not necessarily....depends upon severity and what reading services are offered in your district.**
4. (Q) Which IDEA category should students with dyslexia be served under?
(A) **Learning Disabled**



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3 Models of SLD Assessment


1. Discrepancy Model – SLD is derived from a significant discrepancy between a student's IQ and their overall score on an achievement test.

***Criticisms:** Over-reliance on a Full Scale IQ to capture the dynamic properties of learning, the statistical impreciseness of the method, inability to identify young learners (Feifer, 2018), and bias towards culturally different backgrounds (Naglieri & Otero, 2017).*

2. Response to Intervention (RtI) – SLD is derived by default, and determined when a student fails to adequately respond to interventions delivered with fidelity over time using a multi-tiered model of support services.

***Criticisms:** RtI method lacks reliability to consistently identify specific learning disabilities in children (Maki et al., 2017). In addition, much of the research on RtI involves basic reading skills only.*

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3. Models of SLD Assessment

3. Patterns of Strengths and Weaknesses (PSW) – SLD determination involves a complete assessment of a variety of cognitive processes as well as academic achievement. A pattern of cognitive and academic strengths and weaknesses should emerge.

***Criticisms:** Excessive time, huge testing battery required, statistical impreciseness of crossing batteries with different samples to derive constructs, and over-relying on computer programs to interpret tests and not the test publisher (McGill et al. 2018).*

*** SOLUTION:** A modified version of PSW blending both cognitive skills and academic skills. **A DIAGNOSTIC ACHIEVEMENT TEST!**

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Comprehensive Reading Evaluation

- Intelligence tests (Gc)
- Phonemic/Phonological Awareness (Ga)
- Rapid Naming (Glr)
- Verbal Memory Tests (Gsm)
- Reading Fluency (Gs)
- Orthographic Skills (Gv)
- Attention (Gs)
- Executive Functioning (Gf)

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Comprehensive Reading Evaluation

- Phonemic/Phonological Awareness:**
NEPSY II: Phonological Processing
PAL II: Phonological Coding
WJAT IV: Phonemic Proficiency
CTOPP-2
KTEA III
WJ IV
- Rapid Naming:**
PAL II: RAN, NEPSY II: Speeded Naming, CTOPP-2,
KTEA III, WJIV
- Verbal Memory Tests:**
CVLT-III, NEPSY II: List Memory,
PAL II Verbal Working Memory, PAL II, WJ IV
- Reading Fluency:**
GORT 5, CBM, WJAT III ORF, WJIV, KTEA III
WJAT IV Oral Reading Fluency
- Orthographic Skills:** PAL II Receptive Coding, WIAT IV
Orthographic Fluency, KTEA III, TOC
- Attention:** NEPSY II Auditory Attn, Connors 3, TEACH-II, CAS-2
- Executive Functioning:** BRIEF-2, NEPSY II Inhibition, WJAT IV
Reading Comp (Inferential vs. literal), DKEFS, CEFT


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Steven G. Feifer, D.Ed., ABSNP

- A neurodevelopmental assessment of reading
- Pre-K to College (Ages 4-21)...1,074 students
- 15 subtests in complete battery
- Diagnoses 4 subtypes of reading disorders
- Includes the FAR-S dyslexia screening battery
- * Diagnostic achievement tests less likely impacted by the pandemic than traditional achievement tests.**



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FAR Test Review

Test Review
A Review of the Failer Assessment of Reading (FAR)
 S. G. Faller and R. G. Heider



Reviewed by: Jennifer M. Johnson, Michael B. Hargrave, and Patricia A. Anderson, The University of Memphis, TN, USA
 DOI: 10.1177/0013164418781028

Test Description:
 The Failer Assessment of Reading (FAR; Faller & Heider, 2017) is a comprehensive reading test that is individually administered to children and adults aged 4 to 18 years. The structure of the FAR is based on a gradient model of brain functioning (Lezak, 1988; Luria, 1966) and reflects a neuropsychological approach to reading. This structure is designed to detect the presence of a reading disorder by measuring the cognitive and linguistic processes that support proficient reading. According to the authors, the FAR is unique because it allows for the identification of specific reading-related deficits including surface dyslexia, dysgraphia, dyslexia, word-recall deficits, and a reading comprehension deficit. The FAR is composed of 13 subtests that yield a Sound Index (SI) and two measures: the Phonological Index (PI), the Fluency Index (FI), the Manual Index (MI), and the Comprehension Index (CI), as shown in Figure 1. A Scoring Form consisting of the one subtest from the PI, FI, and CI is also available.

Administration, Scoring, and Interpretation:
 Users of the FAR must be trained in psychological assessment procedures and familiar with measurement theory and psychometrics to administer, score, and interpret test results. The Professional Manual provides a detailed description of the administration, scoring procedures, and interpretation guidelines. The manual and other material supporting the FAR are available in the extensive manual booklets. Materials included for administration include three stimulus books, a keybook, an examiner response form, an examiner record form, a record at print, and a response. The examiner's guide first determines the number of subtests administered and the appropriate completion time. Specifically, practitioners are advised to administer the FAR to children aged 4 to 10 years, 11 to 17 years, and adults aged 18 years and older. All items and those in Grade 2 to college are administered (4 subtests = 15 min). Administration of the FAR requires 15 min, and the score from subtests are used during interpretation. The FAR yields grade-based standard scores (M = 100, SD = 15) for each subtest and index, as well as confidence intervals, percentile ranks, z-scores, and normal curve equivalents for index scores. Age and grade equivalents are available for each subtest. Item scores, consistent with professional standards, are neither reported nor are interpreting item

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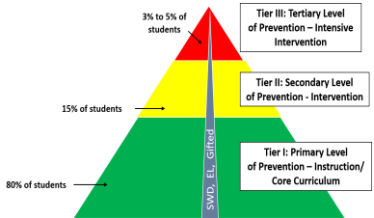
Structure of the FAR

Index	Subtest	Grade range	Approximate administration time in minutes
Phonological Index (PI)	Phonemic Awareness (PA)	PK to college	5 to 10
	Nonsense Word Decoding (NWD)	Grade 2 to college	2
	Isolated Word Reading Fluency (ISOF)	K to college	1
	Oral Reading Fluency (ORF)	K to college	2 to 3
	Positioning Sounds (PS)	PK to college	2 to 4
Fluency Index (FI)	Rapid Automatic Naming (RAN)	PK to college	2
	Verbal Fluency (VF)	PK to college	2
	Visual Perception (VP)	PK to college	1
	Orthographical Processing (OP)	K to college	8
	Irregular Word Reading Fluency (IIRF)	Grade 2 to college	1
Comprehension Index (CI)	Semantic Concepts (SC)	PK to college	5 to 8
	Word Recall (WR)	PK to college	4
	Print Knowledge (PK)	PK to Grade 1	4
	Morphological Processing (MP)	Grade 2 to college	7
	Silent Reading Fluency (SRF)	Grade 2 to college	8

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FAR Screener



Students receive services at all levels, depending on need.

- The Every Student Succeeds Act (ESSA) calls for schools to improve educational outcomes by coordinating intervention services through a multi-tiered system of support (MTSS).

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Phonemic Awareness: Rhyming

All grades


"I'm going to say two words, and I would like you to tell me if they rhyme (sound the same)."

Rhyming (PK-2nd): Fish, dish

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Phonemic Awareness: Blending

All grades

"Now I am going to say parts of words. I want you to put the parts together to make a whole word."


Blending (9th+): Advantage

Item	Correct response	# of syllables	Score
ad : van : tage	advantage	3	0 1



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Phonemic Awareness: Segmenting


"Now I am going to say a word. I want you to say the word back to me one part at a time and tap the table for each part you hear."

Item	Correct response	Correct # of taps	Score
1. toothpaste	tooth : paste	2	0 1
2. wagon	wa : gon	2	0 1



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Phonemic Awareness: Manipulation

"I am going to say a word and then take of its sounds away."

9.	Say "bend" without the /b/ sound.	end	0	1
10.	Say "cord" without the /d/ sound.	core	0	1



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Rapid Automatic Naming

x q e v t g i o
f h z u y d k e



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Semantic Concepts
All Grades

Synonyms Presentation

error

earn blunder correct
chance grasp



Antonyms Presentation

divide

reject deride split
combine hinder

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The FAR Advantage

- Based upon a model of brain functioning.
- Use in conjunction with an academic achievement test
- Explains **WHY** a student is having reading difficulty, not just **WHERE** the student is reading.
- Directly informs intervention decision making.
- Can diagnose, screen, or use for progress monitoring
- Ecologically valid because neurocognitive processes are built into the test. Also, less impacted by the pandemic.
- Puts the “T” back in IEP’s!!!

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Let's Stay Connected!



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Tests: FAR- 2015 FAM- 2016 FAW - 2020
Psychological Assessment Resources

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