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The Intersection of Dyslexia, Reading Disorders, and Language Disorders

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Disclosure Statement

Relevant financial relationship(s), no relevant nonfinancial relationship(s)

- I have the following relevant financial relationship(s) in the products or services described, reviewed, evaluated or compared in this presentation.
  - Maggie Kjer is employed by Pearson Clinical Assessment. Pearson Clinical Assessment is the publisher of assessment tools used in dyslexia and learning disability evaluations.
- I have no relevant *nonfinancial relationship(s)* to disclose.

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AGENDA

- Language and Literacy
- What is Dyslexia?
- Evaluation of Dyslexia and Reading Disorders
  - GA Dyslexia Legislation Update
  - Dyslexia Screening
- WIAT-III and KTEA-3 Dyslexia Index Scores
- Importance of Spelling
- Wrap Up/Summary

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Learner Outcomes

As a result of this session, participants will be able to:

1) List four metrics used to determine the effectiveness of screening tools;
2) List key reading-related skills to measure at various ages;
3) Compare receptive and expressive vocabulary acquisition and describe the science behind analyzing vocabulary in reading referrals; and
4) Identify steps for an effective process to screen and assess Dyslexia in schools.

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Introducing Ron

- Language delayed until after age 3
- Very slow reading
- Difficulty pronouncing proper names
- Terrible at spelling words

- Extensive oral vocabulary
- Very bright boy

WHAT HAPPENS TO RON??

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Introducing Mark

- Severe language disorder (Aphasia, Language Processing)
- Unintelligible speech until age 10
- Very significant delays in sight words, phonics, PA
- Very bright boy
- Extremely mechanically inclined
- High mathematics scores and performance until Word Problems

WHAT HAPPENS TO Mark??

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Language & Literacy

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School Psychology and MTSS

The Roles and Responsibilities in relation to Literacy....

- Prevention
- Early identification (Screening)
- Assessment
- Intervention
- Monitoring
- Assistance and Advocacy

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NASP 2007

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Language and Reading Rationale

- Listening is the foundation of spoken language
- Spoken Language provides the foundation for reading and writings skills
- Spoken and written language have a reciprocal relationship
  - Children with spoken language problems very frequently have difficulty learning to read and write
  - Instruction in spoken language results in growth in written language and vice versa

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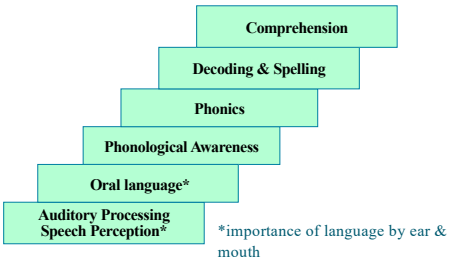
Language to Literacy Model

Jan Wasowicz (2000, 2014)



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Assistance & Advocacy - Why ?

- Phonetics is decoding
- Reading comprehension is simply language
  - Translating what is read into meaningful pieces of language
- Providing assistance to general education teachers, students, and parents
- Assuming collaborative and consultative literacy responsibilities on behalf of all students
- Extending the knowledge base for students and colleagues

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Literacy

- **Old:** ability to read, write, listen, speak, and use language
- **New:** ability to identify, understand, interpret, create, communicate, compute, using printed and written materials associated with varying contexts.
  - Continuum of learning to enable an individual to achieve goals, develop knowledge and potential and participate fully in the wider society

UNESC (United Nations Educational, Scientific, and Cultural Organization)

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Language and Literacy

- Communication disorders are among the most prevalent disabilities in early childhood.
- 10–15% of K children have a communication disorder.
- Half of all the "late talkers" have persistent language problems.
- If you improve one, you improve the others
  - Reading, writing, spelling, etc.
- A problem in one area affects the others.
- "Language knowledge and language proficiency differentiate good and poor readers." (Moats, 1999, 2010)

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Language and Literacy

- **Oral language** is made up of at least **five** key components (Moats 2010):
- Phonological skills
- Pragmatics
- Syntax
- Morphological skills
- Vocabulary (semantics)

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Oral and Written Language Connection

- Must first be *able to use conversation, recount events, give own perspective, set the stage, and tell stories in oral form* before successfully encountering these forms in **written language**.
- Sequence:
  1. Children attend to pictures in a book but do not form stories yet.
  2. Children attend to pictures and form oral stories
  3. Attend to pictures and then fluctuate between story telling and reading.
  4. Children attend to print and real reading occurs.

E. Sulzby (1991) Assessment of Emergent Literacy; Storybook Reading. *The Reading Teacher, 44,* 498-500

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Development of Reading:

Investigating "typical" to identify "atypical"

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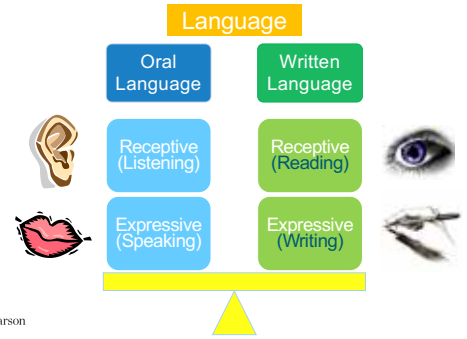
Reading & Language



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Acquisition of Language versus Reading

- Language is a NATURAL process
- Reading is an LEARNED process

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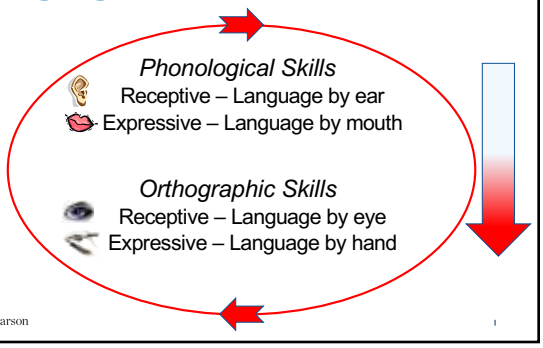
Reading is Language: Developmental Acquisition of Language



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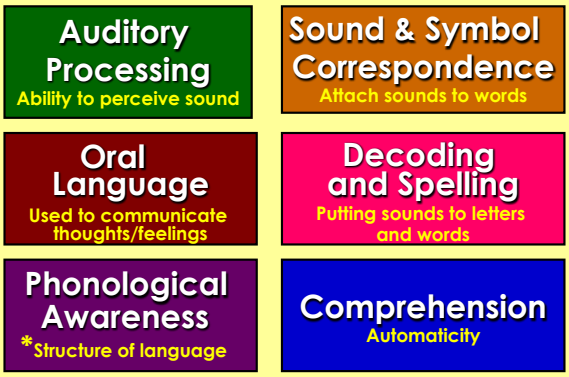
Language to Literacy Model



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Typical Development of Reading Skills **High Level**

Pre-K	"Pre-reading": Letter ID, Rhyming, ID Letters/phonemes in spoken words
Kindergarten	Letter/sound correspondence
Grade 1	Sight word development
Grade 2/3	Decode new words accurately…fluently.
Grade 3/4	Transfer oral language vocab to written language vocab
	Integrate word decoding and sentence comprehension.
	Read for comprehension

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Developing Language Competence (ASHA, 2001)

What is the connection between oral and written language?

a. Oral language provides the foundation for the development of reading and writing;
b. the relationship between oral language and literacy development is reciprocal in nature, with interconnections originating in early childhood;
c. children with speech and language impairments are at increased risk for difficulties with early and conventional literacy development; and
d. intervention for oral language can positively influence literacy development, and vice versa.

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Language & Literacy Connection

- The correlation between reading and listening comprehension increases from .35 in 1st grade to .60 in 4th grade.
  - Once **word recognition** is mastered, both reading and listening are controlled by similar cognitive processes.
- Linguistic knowledge (oral language skills) provides the foundation for the development of written language abilities
  - Students use their oral expression skills to demonstrate their comprehension of text.

A. Harris, E. Sipay (1990) *How to Increase Reading Ability: A Guide to Developmental & Remedial Methods*, Longman Publishing

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Phonological Code: Developmental sequence

- Learn to rhyme (preschool)
- Perceive syllable structure of words (Kdg)
- Manipulate phonemes in monosyllabic words (end of 1st)
- Segment phoneme & rime units in polysyllabic words

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Auditory Processing

- Auditory processing skills are strongly correlated to reading precursor skills between the ages of 3 and 6.

  Corriveau, Goswami, & Thompson, 2010
- An assessment like the *Auditory Skills Assessment* (Geffner & Goldman, 2010) may provide an "early warning indicator" for preschool age children

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Orthographic Awareness: Developmental sequence

- Recognize & produce letter-like symbols (preschool)
- Produce letters
- Represent written words in memory
  - Code whole written words; Sight Words (Kdg/1st)
  - Then single letters in words; Decoding
  - Finally, letter clusters; Reading (by 3rd)

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Formula for Reading

Simple View of Reading

R = D X LC

Reading =
Decoding x **Linguistic Comprehension**

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Components of Word Level Reading

- Cipher Knowledge
  - Using the code of written English to pronounce words
  - Recognizing that letters represent phonemes
- Word-specific knowledge
  - Familiarity with a word or a word part
  - "Sight word knowledge is built up from 1) basic letter-sound knowledge, and 2) experience with specific words"

Kilpatrick, 2015

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Components of Linguistic Comprehension

- **Vocabulary – semantic knowledge**
- Syntactic-grammatical knowledge
- Background knowledge
- Working memory
- Attention
- Inferencing
- Comprehension monitoring
- Nonverbal visual-spatial skills

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QUIZ

What is the difference between Phonemic Awareness and Phonics?

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Phonological Awareness

1. Recognizing Word/Sentence Length
2. Rhyming
3. Syllabication
4. Segmenting Onset/Rime
5. Phonemic Awareness
   - awareness of individual sounds/phonemes in spoken words

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Phonemic Awareness Skills

Identifying Sounds
Categorizing Sounds
Blending Sounds
Segmenting/Sounds
Deleting Sounds
Adding Sounds
Substituting Sounds

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The Connection Between Phonological Awareness and Phonics

Phonics

1. Letter / Sound Associations
2. Decoding (reading words)
3. Encoding (spelling)

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Importance of Phonics Instruction

- Systematic and Explicit Phonics Instruction Leads to:
  - Understanding of alphabetic principle
  - Significant improvement in Kindergarten and first grader's word recognition, spelling, and reading comprehension
  - **Benefits regardless of socioeconomic status of the students**

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Vocabulary: A Key Component for Reading

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Vocabulary

- Refers to the words we use to communicate
- Plays a critical part in learning to read
- Helps students make sense of the words ***they see*** by comparing them to the words ***they have heard***
- Is one of the 5 building blocks of reading (National Reading Panel, 2000)
- Can be divided into four types

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Four Types of Vocabulary

- Listening
- Speaking
- Reading
- Writing

- Most effective to support all four types of vocabulary for struggling students (NRP, 2001)

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VOCABULARY

Is one, if not the best predictor of future academic success

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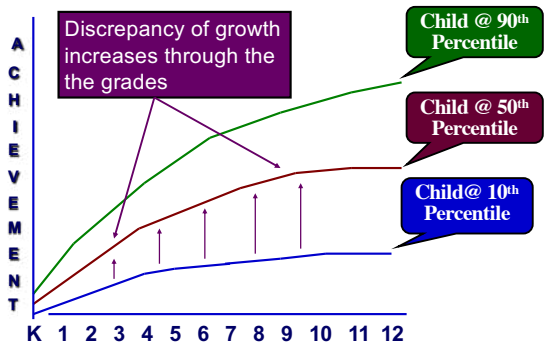
Vocabulary and Literacy Development



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Vocabulary & Reading

- K through 3: children use vocabulary to learn to read
- Grade 4 and up: children use reading to gain vocabulary

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The Importance of Vocabulary

- Related to the amount of literature consumed
- Strongly related to reading comprehension
- Correlates highly with general verbal ability
- Has a direct impact on overall literacy development

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Vocabulary Research Also Shows:

- Word learning depends on the other sounds and words the child already knows.
- How a new word relates to these existing words (neighborhood density) positively influences the speed of learning (Hoover & Storkel, 2005)

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Vocabulary Research Also Shows:

- Most vocabulary is learned indirectly
- Some vocabulary must be taught directly
- Poor vocabulary is a hallmark of language, literacy, and cognitive disabilities

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Evidence Based Practice Research Supports:

- That **vocabulary knowledge, story comprehension, and story sequencing:**
  - Are the language skills **that have the strongest relationship to improved reading outcomes**

(Snow, Tabors, Nicholson & Kurland, 1994, 2010).

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Vocabulary Assessment & Intervention

- Utilize tools to analyze types of vocabulary skills and errors
  - Use the analysis to link to intervention
- Published December 2018
  - PPVT-5
  - EVT-3
  - Bridge of Vocabulary (BOV-2)

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Current Definitions

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International Dyslexia Association

Dyslexia is a specific learning disability that is ***neurological*** *in origin.*
It 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.*

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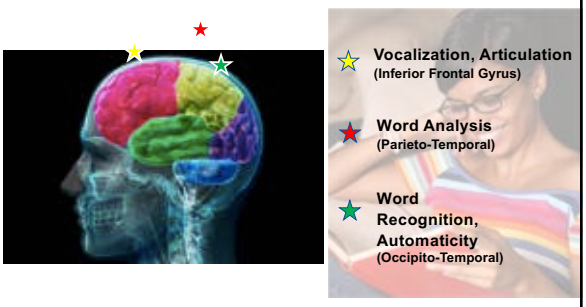
The Neurobiology of Reading (Typical)



Shaywitz (2004)

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The Neurobiology of Reading (Typical)

1.Imaging Research conducted on the neural pathways responsible for reading implicate these three brain regions in a **typical reader.**

2. Typical reading occurs as a "joint" effort between the areas of the brain responsible for **vocalization and articulation, word analysis, and word recognition and automaticity**.

Shaywitz (2004)

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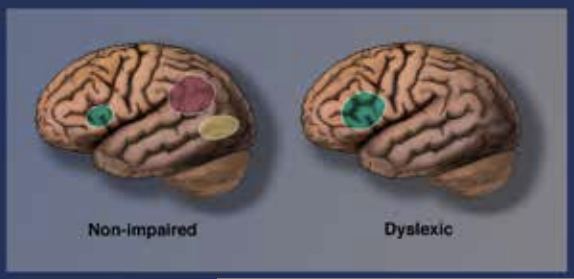
Neural Signature for Dyslexia: Inefficient Posterior Reading Systems



(Adapted from Shaywitz S: Overcoming dyslexia: a new and complete science-based program for reading problems at any level. New York, 2003, Alfred A. Knopf. Copyright 2003 by S. Shaywitz. Adapted with permission.)

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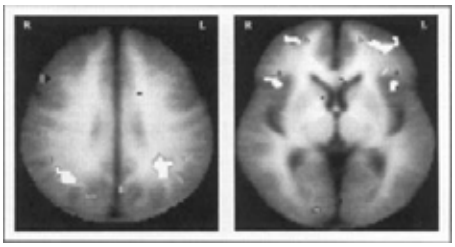
fMRI Activation: Non-impaired vs. Dyslexic Individuals



FOR EDUCATIONAL PURPOSES ONLY, with permission
Shaywitz, S. & Shaywitz, B. (2001)
http://www.ncsall.net/index.html@id=278.html

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Dyslexia "Definition" in Schools

- Dyslexia vs. SLD-Reading?
  - Differences between "diagnosis" of neurobiological condition and educational condition
- Dyslexia (as a medically diagnosed condition) can qualify a student for 504 plan.
- However, Dyslexia (identified in either school as a learning disorder or medically) can qualify a student for special education with a Learning Disability in Reading if…
  - ...student also has documented impact in classroom/educational performance.

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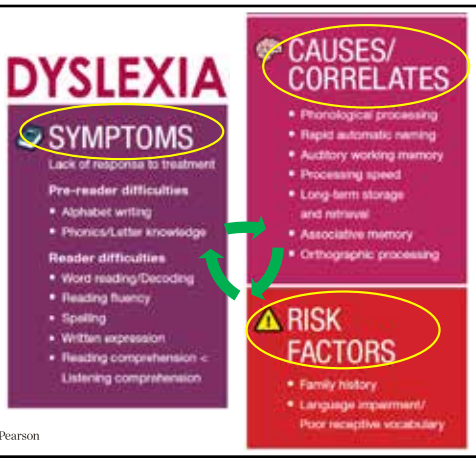

Breaux, K. & Eichstadt, T. (2017). Pearson Clinical Assessment Solutions: A Dyslexia Toolkit. NCS Pearson, Inc. San Antonio, TX.

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Key Indicators

International Dyslexia Association (2002). Definition of dyslexia. Retrieved from www.dyslexiaida.org; and Berninger et al., 2008.

- Symptoms
  1. Letter knowledge and Phonics
  2. Decoding Pseudowords
  3. Word Reading
  4. Reading Fluency
  5. Spelling (Most persistent impairment for individuals with dyslexia: Berninger et al., 2008)
  6. Written Expression
- Causes/Correlates
  1. Phonological processing (including phonological awareness and phonological coding)
  2. Rapid automatic naming (the phonological loop of working memory)
  3. Auditory verbal working memory
- Risk Factors
  1. Receptive Vocabulary

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Georgia Dyslexia Legislation

- SB 48
- Dyslexia screening to start within 5 years
- Teacher training may start now (PD for Reading and Dyslexia)
- Georgia's teacher credentialing agency, the Professional Standards Commission, to set new standards for what future teachers must learn about dyslexia. The agency must also establish a specialist "endorsement" by the end of this year.

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Dyslexia Difficulties

- Students identified as having dyslexia typically experience primary difficulties in phonological awareness, including phonemic awareness and manipulation, single-word reading, reading fluency, and spelling.
- Consequences may include difficulties in reading comprehension and/or written expression.
- These difficulties in phonological awareness are unexpected for the student's age and educational level and are not primarily the result of language difference factors.
- Additionally, there is often a **family history** of similar difficulties.

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Why is this so challenging?

Within the dyslexia assessment space…

1. Comorbidity is the norm, not the exception
2. Misdiagnosis common (similar symptoms across disorders)
3. False negatives common (failure to identify)
4. Unreliable, inconsistent classification systems (criteria for eligibility and diagnosis vary)

   …and quite frankly in education, many of **us** do this differently, adding to the inconsistency...
5. Heterogeneity (diverse in content)
6. Complex or unusual histories/learning profiles

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Comorbid Conditions for Dyslexia

1. Language and Communication disorders ~50%
2. ADHD ~25-40%
3. Mental disorders (anxiety, depression, bipolar) ~20%
4. Dyspraxia (developmental coordination disorder) ~50%
5. Dysgraphia ~40%
6. Dyscalculia (math disorder) ~25%

*SLD in written expression is associated with dyslexia, dysgraphia, or OWL-LD

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Associated Academic Difficulties

- May also have problems in written expression, reading comprehension, and mathematics
- Most common co-occurring disorders are **specific developmental language disorders and ADHD**
- May also experience symptoms such as anxiety, anger, depression, lack of motivation, or low self-esteem

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Assessment Data for Comorbid Conditions

- Dyspraxia
  - Poor spatial awareness, balance, coordination
- Dysgraphia
  - Illegible handwriting, poor letter formation and spacing, slow/labored writing
- Dyscalculia
  - Number concepts, math calculation

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Possible Strength Profile

Possible strengths in:

- Fluid reasoning and problem solving
- Oral language (including listening, speaking, vocabulary, and grammar)
- Math

The development of interventions/strategies should consider an individual's cognitive processing strengths.

Reynolds, C. R. (1981). Neuropsychological assessment and the habilitation of learning: Considerations in the search for the aptitude x treatment interaction. School Psychology Review, 10(3), 343–349.

Shaywitz, S. E. (2005). Overcoming dyslexia. New York, NY: Alfred Knopf.

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What's in a Name?

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Dyslexia is often synonymous with

Reading Disability
Reading Disorder
Learning Disability in Reading
Specific Reading Disability
Specific Reading Difficulty

Sometimes used to refer to a more specific group of ***poor decoders***

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The Paradox of Dyslexia

Amy has difficulty reading the word *volcano*.

Shaywitz, S. (2003). *Overcoming dyslexia: a new and complete science-based program for reading problems at any level.* New York: Knopf.

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The Paradox of Dyslexia

When shown a picture of a volcano, she retrieves *tornado*, a word that sounds similar.

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The Paradox of Dyslexia

Once Amy hears the word *volcano*, it's clear she knows exactly what it means.

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The Paradox of Dyslexia

- No matter how you operationalize the concept or diagnosis/identify a learning disability, it does come down to some type of discrepancy.
- Dyslexia is determined in this example because Amy's reading skills are discrepant from her level of knowledge.
  - (Some say this is what we mean by "unexpectedness" when we talk about a learning disability.)

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Why is it more desirable to have dyslexia than a reading disability?

- Grass roots, parent movement
- Dyslexia is a meme
  - Unit of cultural transmission
  - Meme survives because it's easy to understand, communicate & remember
    - Not because it is true, useful, or potentially harmful

»*The Dyslexia Debate*

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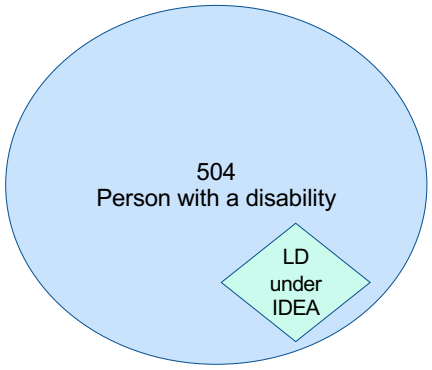
In some states, children with Dyslexia are categorized differently



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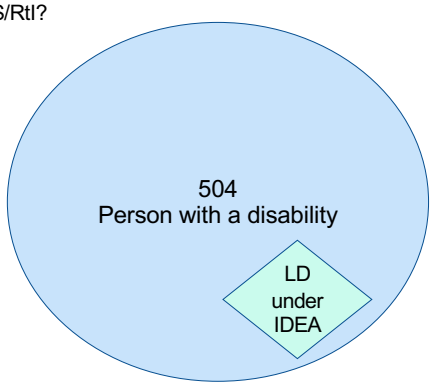
MTSS/RtI?



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Types of Reading Disorders

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Types of Reading Difficulties

R = D X LC

	Strong Language Comprehension	Weak Language Comprehension
Strong Word Reading	**Typical Reader**	**Hyperlexic**
Weak Word Reading	**Dyslexia or Compensator**	**Mixed Reading Difficulty**

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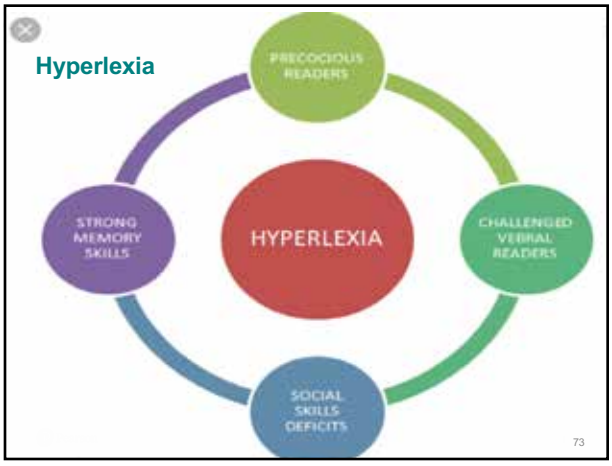

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Virginia Berninger

Two grants from National Institute of Child Health and Human Development

- Studied component process in normal writing and writing disabilities development
- Extended from phonetics to orthographic consideration & connectivity of processes
  –studies had huge sample sizes

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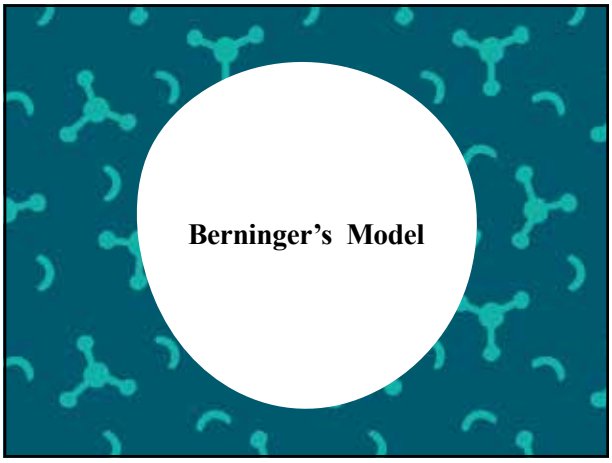

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Basic Definitions

Phonology – How sounds (*phonemes*) are organized and used to produce meaning

Orthography – How sounds are represented by written or printed symbols (*graphemes*)

Morphology – How words are formed or structured (from *morphemes*)

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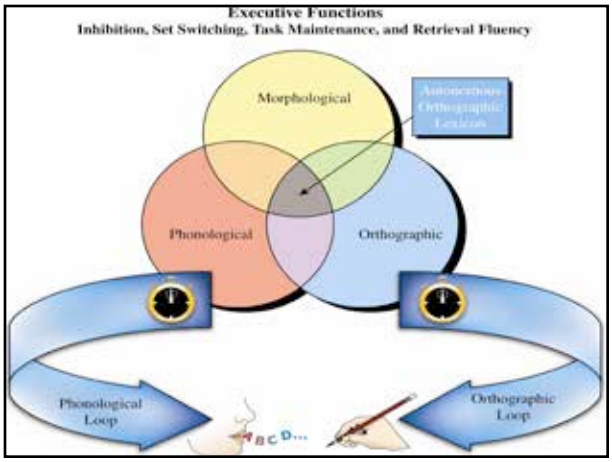

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Phonological vs Orthographic Processing

- *Phonological processing* disorder and *orthographic processing* disorders refer to the particular brain processes at work in people who experience difficulty when they read. **An individual who has a phonological processing disorder will have difficulty perceiving and manipulating the phonemes that would enable them to "hear" the sounds of the words they read.***

- * Shaywitz, S. (2003) Overcoming Dyslexia: A new and complete science-based program for reading problems at any level. New York: Knopf
- http://www.cullinaneducation.com/learningdifferences_Dyslexia.html

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Phonological vs Orthographic Processing

- *Orthographic processing* involves recognizing and remembering the **spatial orientation and sequence of language symbols.** When individuals with orthographic processing disorders attempt to read, their brains have trouble perceiving and/or processing the direction and sequence of written language.

- * Shaywitz, S. (2003) Overcoming Dyslexia: A new and complete science-based program for reading problems at any level. New York: Knopf
- http://www.cullinaneducation.com/learningdifferences_Dyslexia.html

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Berninger: Types of Learning Disabilities

Scientifically supported diagnosis is as important as scientifically supported instruction.

3 Research-Supported Specific Written Language Disabilities

- Dyslexia, or a Specific Reading Disability
- Oral/Written Language LD
- Dysgraphia

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Differential Diagnosis Related to Coding of Three Word Forms

- The nature of the specific written language deficit is related to the coding operation (storage and processing for phonological, orthographic, and morphological word forms) that is impaired.
- Orthographic coding impairment = dysgraphia
- Orthographic coding and phonological coding impairment = dyslexia.
- Impaired orthographic, phonological, and morphological/syntactic coding = OWL LD

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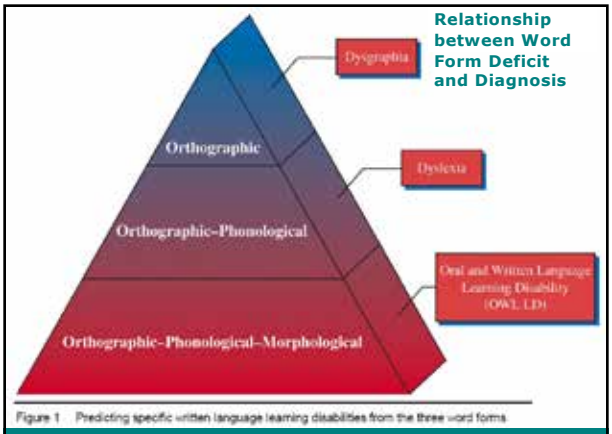

Figure 1 Predicting specific written language learning disabilities from the three word forms

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Not all Reading Problems are Dyslexia
(Berninger, 2006)

- **Dyslexia** is a specific type of reading disability affecting accuracy and rate of reading real words, phonological decoding, oral reading of passages, and written spelling.
- Dyslexia: Phonological core deficit in storage, phonological loop, and executive functions.
- Except for phonological processing, oral language skills are spared and comprehension is good.

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Not all Reading Problems are Dyslexia
(Berninger, 2006)

OWL LD

- In oral and written language learning disability (OWL LD), oral language skills, including comprehension, are impaired in addition to the same skills that are impaired in dyslexia.
- Preschool history of some difficulty learning oral language
- Problems in decoding, reading words, oral reading fluency, and/or reading comprehension

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Not all Reading Problems are Dyslexia
(Berninger, 2006)

OWL LD con't

- Problems in writing (spelling + syntax)
- But substantial oral language problems in phonological, morphological, and syntactic awareness and often word retrieval.
- Struggle in learning oral language and then in using oral language to (a) learn from teacher talk and (b) learn written language.

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LD Subtypes: Reading Disorders

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Learning Disorders Reading: Subtypes

1. Phonological
2. Orthographic
3. Mixed Phonological-Orthographic

Dyslexia

4. Language
5. Comprehension deficit
6. Fluency subtype

Dysgraphia (often a co-occurring condition with one of the other listed subtypes)

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1. LD Reading Subtype: Phonological

- Phonological is the core deficit
- Have difficulty mentally representing the sound patterns of the words in their language
  - Causes great difficulty in using the phonological route to reading and spelling
- Over-rely on visual and orthographic cues while reading
- May memorize whole words as a strategy for word recognition
- Sometimes referred to as dysphonetic or phonological dyslexia.

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2. LD Reading Subtype: Orthographic

- Have difficulty in using the visual-lexical route to reading and writing words.
- Instead, the phonological route to lexicon is used
- Tend to sound words out letter by letter, over relying on sound-symbol relationships.
- Pseudoword reading is typically better than real word or exception word reading because non-words are usually phonetically decodable
- Sometimes referred to as surface dyslexia, visual form dyslexia or dyseidetic dyslexia

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3. LD Reading Subtype: Mixed Phonological and Orthographic

- More frequently occurring than either Phonological or Orthographic
- Causes great difficulty in using the phonological route to reading and spelling, as well as difficulty in using the visual-lexical route to reading and writing words
- Causes severe impairment in learning to read
  - They have no usable key to the reading and spelling code, and seemingly arbitrary error patterns are often observed.
- Difficulty mentally representing sound patterns of words in language

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3. LD Reading Subtype: Mixed Phonological and Orthographic

- Strong in Listening Comprehension
  - Learn better with direct instruction and experiential learning
- Mixed LD reading is manifested in weaknesses in:
  - Phonological Processing
  - Decoding
  - Word Reading
  - Reading Fluency, and
  - Spelling

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4. LD Reading Subtype: Language

- Have problems with both Oral and Written language
- Referred to as Oral and Written Language Learning Disability (OWL-LD), (Grammatical) Specific Language Impairment (SLI or G-SLI), or Language Learning Disability (LLD)
- Students with OWL-LD show particular difficulty processing grammar and syntax.

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5. LD Reading Subtype: Comprehension

- A specific comprehension deficit is sometimes referred to as hyperlexia.
- Hyperlexia can refer to
  - Students who exhibit poor language comprehension skills and exceptional word recognition and decoding skills OR
  - Students with poor language comprehension and relatively good basic reading skills
- Have difficulty with listening comprehension and reading comprehension
  - Read accurately and fluently, but fail to grasp the meaning of what they have read

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6. LD Reading Subtype: Reading Fluency

- Students with poor reading fluency due to a *naming speed deficit* typically have *adequate phonological processing* skills
- Able to read and decode words accurately, but they read connected text very slowly
- Reading fluency deficits cannot be identified until word-reading skills are acquired; however, naming speed deficits may be identified earlier.
- Specific deficits in naming speed have been shown to impede reading fluency.

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Co-occurrence of Reading Disability and Specific Language Impairment

- Studies of elementary-age children: comorbidity of reading disability and specific language impairment ranges from 50%- 68%
- Longitudinal data show specific language impairment with writing disorder range from 55-61%, depending on gender – higher in boys

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Screen, Assess, Intervene, Monitor Model: SAIM

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Screening: The Science

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Following the Assessment Workflow

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Screening Versus Assessment

- "Screening" instrument--by definition--should quickly "sort" students into two groups: "at risk" vs. "not at risk."
- Data representing performance from those with and without the condition in order to validate the instrument for this purpose
- Minimal investment of resources (cost, time-on-task for student/teacher, etc.)
- *In contrast, diagnostic/assessment instruments are intentionally designed to probe more broadly and deeply.*

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Screening Results

At-Risk

Not At-Risk

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Screening Tools

The Pearson toolkit for dyslexia screening includes the following measures:

- Shaywitz DyslexiaScreen™
- Wide Range Achievement Test, fifth edition (WRAT5™)
- Kaufman Test of Educational Achievement, third edition (KTEA™-3), Brief Form
- Dyslexia Index scores, newly developed for the KTEA-3 Comprehensive Form and the Wechsler Individual Achievement Test®, third edition (WIAT®-III)

Universal screening data is used to make informed decisions about intervention and progress monitoring to follow. RTI, MTSS...

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Shaywitz DyslexiaScreen™

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Shaywitz DyslexiaScreen

- Brief teacher survey for identifying students at-risk for dyslexia.
- Intended for use with students experiencing academic difficulties, but can also be used to screen all students.
  - Therefore…universal or Tier 2 capable
- 5 minutes (or less) using an online form
- Digital administration and scoring
- The classification accuracy data indicate moderately high sensitivity and specificity

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What does the Shaywitz measure?

- Observational Ratings Analyze:
  1. Phonological,
  2. Linguistic, and
  3. Academic performance
- Ratings based on classroom teacher observations
  - Subjectivity limited because teacher answers questions after having worked with student daily for 6-8 weeks.

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Forms

- The Shaywitz DyslexiaScreen offers four forms:
  - **Form 0:** Grade K (Ages 5-6) consists of 10 items.
  - **Form 1:** Grade 1 (Ages 6-7) consists of 12 items.
  - **Form 2**: Grade 2 (Ages 7-8) consists of 10 items.
  - **Form 3:** Grade 3 (Ages 8-9) consists of 10 items.

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Reports

- Results include a simple classification:
  - **At Risk for Dyslexia** or
  - **Not At Risk for Dyslexia**
- Two report options: Individual or Group via Q-Global
- Also available on aimswebPlus – with more reporting options

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Shaywitz DyslexiaScreen Evidence Base

- Developed from a sample of students followed prospectively and longitudinally from school entry into early adulthood to study the development of reading, learning, and attention
- Followed by National Clinical Study at each level
  - Excellent reliability & validity data

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Classification Accuracy

- Sensitivity (True Positives)
  - Proportion of students identified with dyslexia who are classified as At Risk for Dyslexia by the teacher ratings
- Specificity (True Negatives)
  - Proportion of students identified as typical readers and classified as Not At Risk for Dyslexia by the teacher ratings

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Classification Accuracy (Based on National Clinical Study)

Table 3.6 Classification Accuracy and ROC Area, by Form

Shaywitz DyslexiaScreen™	Sensitivity	Specificity	ROC Area
Form 0 (Kindergarten)	.73	.71	.81
Form 1 (Grade 1)	.70	.88	.89
Form 2 (Grade 2)	1.00	.75	.92
Form 3 (Grade 3)	.94	.82	.94

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How do we evaluate screener effectiveness?

- 4 points of data
  1. Reliability
     - Reflection of error
  2. Sensitivity and Specificity?
     - True + and False +
     - True – and False –
  3. Area Under the ROC (receiver operating characteristic) Curve (AUC)
  1. Clinical Studies
     - How does it perform?
     - Effect size (differentiates between 2 groups)

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What is Area Under ROC Curve (AUC)?

- History: Developed during World War II to analyze radar and help operators decide whether a blip on the screen represented an enemy target, a friendly ship, or just noise.
- Plot true positive rate against the false positive rate across various thresholds.
- Tests Discrimination: Gives an indication of binomial group distribution (with and without)
- .5 AUC is chance accuracy (worthless, flip a coin)
- 1.0 AUC indicates perfect test
- .80 - .90 + range indicates good to excellent

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Examples of Screener Effectiveness

Test or index score	Grade/ Age	Subtests/Items	Mean reliability	Effect size	AUC	Administration time (min.)
Shaywitz DyslexiaScreen™: Form 0	Kindergarten	10 items	.87	1.48	.81	< 5
Shaywitz DyslexiaScreen™: Form 1	1	12 items	.90	0.95	.89	< 5
Shaywitz DyslexiaScreen™: Form 2	2	10 items	.83	1.47	.92	< 5
WRAT5: Reading Composite	1–12+ Ages 6–85+	Word Reading + Sentence Comprehension	.96	1.70	.89	10–20
KTEA™–3 Brief: BA–3 composite	K–12+ Ages 5–25	Letter & Word Recognition + Spelling + Math Computation	.98	2.11	.93	20

Note. AUC = Area Under the Curve estimate. Data for KTEA–3, WIAT–III, and WRAT5 were derived from age-based standard scores. Alpha reliability is reported for the Shaywitz DyslexiaScreen forms; split half reliability is reported for all other tests. All scores from the dyslexia groups were significantly ($p < .01$) lower than those of the non-dyslexia matched control groups. Clinical n-counts for the KTEA–3 and WIAT–III Dyslexia Index scores of grades K–1 were insufficient ($n < 20$) for group comparisons; for this reason, group means, effect sizes, and AUC estimates for the Dyslexia Index 1 scores were based on a sample of students in grades 1–4, ages 6–18.

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Example: Combining Two Methods to Make Screening Process More Precise

A Hybrid Screening Method: 2-Stage Performance and Rating

1. Use CBM (such as aimswebPlus) targeted probe data to determine performance
   - Shows us who is having difficulty reading
   - Validates question of "poor reading performance"
2. After 6-8 weeks with student in classroom, teacher completes the Shaywitz DyslexiaScreen online (3 options)
   - Shows us who is "at-risk" specifically for Dyslexia
   - Gives us better idea for "next steps"

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How should I interpret screener results?

- **At Risk for Dyslexia** considerations include:
  - Increasing the frequency and duration of interventions
  - Selecting a more intensive intervention program
  - Closely monitoring the student's academic performance
  - Referring the student for a more comprehensive diagnostic evaluation.
- A student classified as **Not At Risk for Dyslexia**
  - Language and academic skills may be monitored and supported within the general academic setting.
- **Remember, screeners do not provide a diagnosis.**

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KTEA-3 & WIAT-III
Dyslexia Index Score

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Dyslexia Index Scores -Purposes

- Screening
  - To be considered a valid dyslexia screener, a test must provide evidence that the results differentiate between individuals with and without dyslexia.
  - Ideal for dyslexia screening because of the brief administration time and clinical sensitivity

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Dyslexia Index Scores -Purposes

- Screening - continued
  - Ideal for dyslexia screening because of the brief administration time and clinical sensitivity
  - Results can help determine which students require more frequent progress monitoring, more intensive instruction or intervention, or a comprehensive psychoeducational evaluation.

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Dyslexia Index Scores -Purposes

- Evaluation
  - The KTEA-3 Dyslexia Index scores can serve as a starting point for a more comprehensive psychoeducational test battery.
  - If the Dyslexia Index results suggest that further testing is necessary, administer the KTEA–3 Comprehensive Form
  - All standard scores from the Dyslexia Index subtests can validly be applied to a KTEA–3 Comprehensive

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KTEA-3 Dyslexia Index scores

- Theoretically sound, reliable, and clinically sensitive composite scores for **identifying risk for dyslexia** among students in grades kindergarten through 12, or individuals ages 5 through 25
- In 20 minutes or less, obtain a Dyslexia Index score to screen for dyslexia and identify individuals who may benefit from a comprehensive evaluation or a more intensive intervention approach.
- *A single score such as the Dyslexia Index is not sufficient to diagnose dyslexia. Rather, a diagnosis of dyslexia is based on a convergence of evidence gathered from multiple sources.*

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KTEA-3 Dyslexia Index scores

- Two Dyslexia Index scores are provided for the KTEA–3: one for grades K–1, and another for grades 2–12
- Each of these Dyslexia Index scores are obtained by administering three subtests from either Form A or Form B of the KTEA–3
- The materials needed to administer and score the Dyslexia Index subtests are available as part of the KTEA–3 Comprehensive Form

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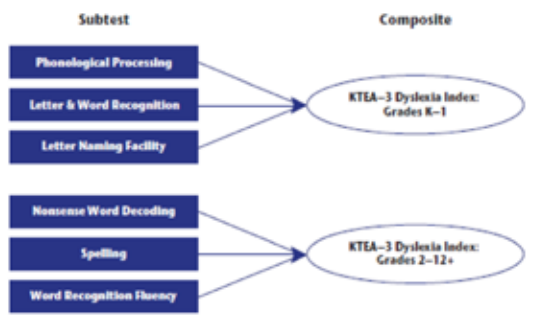
KTEA-3 Dyslexia Index Scores



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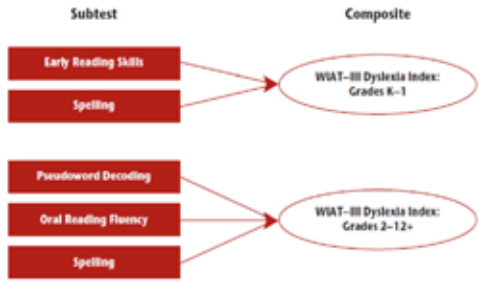
WIAT-3 Dyslexia Index scores



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Dyslexia Index Scores: KTEA-3 and WIAT-III

- Excellent reliabilities (.90s) at every age/grade
- Strong clinical sensitivity
- Administration times range from 12-20 minutes for each score
- Composite structures are based on clinical data as well as a strong empirical foundation

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Dyslexia Index Scores: Features and Benefits

- Results are easy to interpret: 6 categories of Risk for Dyslexia (ranging from very low to very high)
- Manual provides recommendations for next steps
- Response Booklet pages for Spelling subtest (applies to Grades 2-12+ scores) are included as reproducible forms

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Dyslexia Index Scores: Features and Benefits

- Useful as a quick dyslexia screener that can also contribute to a more in-depth subsequent evaluation using the KTEA-3 or WIAT-III (without re-administering those subtests)
-

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Dyslexia Index Scores: Features and Benefits

- Included in each of the Dyslexia Index Manuals:
  - Dyslexia Index composite norms tables, reliability, and validity data
  - Score Computation Form and Graphical Profile (reproducible forms for hand scoring)
  - Reproducible Response Booklet pages for administering the KTEA-3 and WIAT-III Spelling subtest (applies to Grades 2-12+ scores)
  - Interpretation guidance and recommendations for next steps

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Dyslexia Index Scores Manuals

Item Number	Description	2018 Price
015801524X	KTEA-3 Dyslexia Index Scores Manual	$28
0150023189	KTEA-3 Dyslexia Index Scores Manual on Qg	$28
0158015258	WIAT-III Dyslexia Index Scores Manual	$28
0150023197	WIAT-III Dyslexia Index Scores Manual on Qg	$28

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Assessment for Dyslexia

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Diagnostic Assessment Tools

The Pearson toolkit for dyslexia evaluations includes four diagnostic achievement tests:

- Kaufman Test of Educational Achievement™, third edition (KTEA™-3) Comprehensive Form
- Process Assessment of the Learner, second edition: Diagnostics for Reading and Writing (PAL-II Reading and Writing)
- Wechsler Individual Achievement Test®, third edition (WIAT®-III)
- Woodcock Reading Mastery Tests, third edition (WRMT®-III)

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PHONOLOGY & PHONOLOGICAL AWARENESS

SOUND-SYMBOL ASSOCIATIONS

MORPHOLOGY

SYNTAX

SEMANTICS

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Diagnostic Assessment

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Diagnostic Assessment

Go deeper. Understand in which specific areas the student struggles; make data-based decisions for interventions and progress monitoring.

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Interventions for Dyslexia

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SPELL-Links to Reading & Writing™ Class Links for Classrooms

SPELL-Links™ to Reading & Writing

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Title	SPELL-Links Class Links for Classrooms	SPELL-Links to Reading & Writing
Product category	Word Study Structured Literacy Instruction	Word Study Structured Literacy Instruction
Target populations	Tier 1, Tier 2	Tier 2, Tier 3, SPED, Dyslexia, ELL, Speech-Language
Formatted for	Whole class, large group	1:1, small group w/ activity adaptations for use with large group and whole classroom
Grades	K, early 1st grade	K–12
Materials included for application to reading and writing	Decodable stories for each target pattern	Pattern-loaded reading and writing materials for each target pattern
Other materials include	Lesson plans and activities, word lists and word cards, home link activities, performance tracking tools, mastery measurements	Lessons plans and activities, word lists and word cards, home link activities, performance tracking tools, mastery measurements

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Case Study

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Key Takeaways

Dyslexia is as much a writing disorder as it is a reading disorder

Spelling is the most persistent impairment for individuals with dyslexia (Berninger et al., 2008)

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How are you involved with Dyslexia or Literacy?

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Resources

Elliott, J.G. & Grigorenko, E.L. (2014) The Dyslexia Debate. New York, NY: Cambridge University Press.

Kilpatrick, D.A. (2015) Assessing, Preventing, & Overcoming Reading Difficulties. Wiley: Hoboken, NJ.

Texas Dyslexia Handbook 2018

https://tea.texas.gov/academics/dyslexia/

Written Language Disorders

https://www.asha.org/Practice-Portal/Clinical-Topics/Written-Language-Disorders/

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