California's New Dyslexia Bill: Using Research to Inform Screening, Collaboration, and Intervention

Dawn P. Flanagan, Ph.D.
St. John's University – New York

And

Co-Founder of

COMPREHENSIVE ASSESSMENT FOR INTERVENTION (CAI)
INNOVATIONS IN PSYCHOLOGICAL EVALUATION FOR INTERVENTION

www.caipsychs.com

1

OVERVIEW

- California's new dyslexia bill
- What is Dyslexia?
- Signs and symptoms
- Cognitive correlates
- Screening instruments and procedures for K-2
- Intervention

2

New Bill Includes Dyslexia Screening Requirement

- Governor Newsom signed the Education Omnibus Budget Trailer Bill (SB 114) on 7.12.23, which includes requiring K-2 universal screening for reading difficulties, including risk of dyslexia.
-
- The bill requires the State Board of Education to develop evaluation criteria and designate an expert panel to approve a list of culturally, developmentally, and linguistically appropriate screening instruments.
- Local Education Agencies (LEAs) will need to select screeners from the approved list and begin annual K-2 screening by the 2025-2026 school year.
- LEAs must share the screening results with parents and guardians including how to interpret the results and next steps for supports and services for students identified as "at risk".
- Parents and guardians may opt out if they do not want their child to be screened.

3

THE CRITICAL IMPORTANCE OF READING

- ***Essential for all academic subjects and increasingly as students progress through elementary school***
- ***Link between poor reading skills and behavior problems***
- ***Link between poor reading skills and depression***
- ***Increased risk of dropping out of high school***
- ***Less likely to obtain education beyond high school, lower levels of income***

Essentials of Assessing, Prevention, and Overcoming Reading Difficulties, 2015. Kilpatrick.

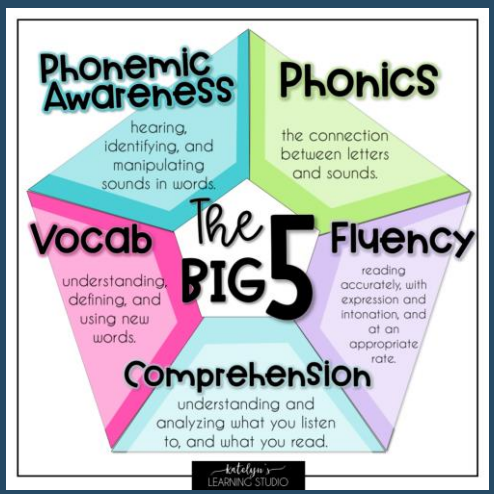
4

"Slow reading acquisition has cognitive, behavioral, and motivational consequences that slow the development of other cognitive skills and inhibit performance on many academic tasks. For example, knowledge bases that are in reciprocal relationships with reading are inhibited from further development. The longer this developmental sequence is allowed to continue, the more generalized the deficits will become, seeping into more and more areas of cognition and behavior. Or to put it more simply and sadly—in the words of a tearful 9-year-old, already falling frustratingly behind his peers in reading progress, 'Reading affects everything you do.' " (p. 390)

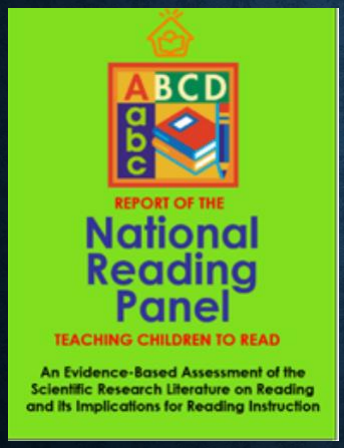
Stanovich, K. E. (1986). Matthew effects in reading: Some consequences of individual differences in the acquisition of literacy. *Reading Research Quarterly, 21,* 360-407.

5

- National Reading Panel submitted its final report in April 2000 – over two decades ago
- Should the Big 5 now be the Big 7?



6



Growth in Phonological, Orthographic, and Morphological Awareness in Grades 1 to 6

Virginia W. Berninger · Robert D. Abbott · William Nagy · Joanne Carlisle

Journal of Psycholinguistic Research
April 2010, Volume 39, Issue 2, pp 141-163

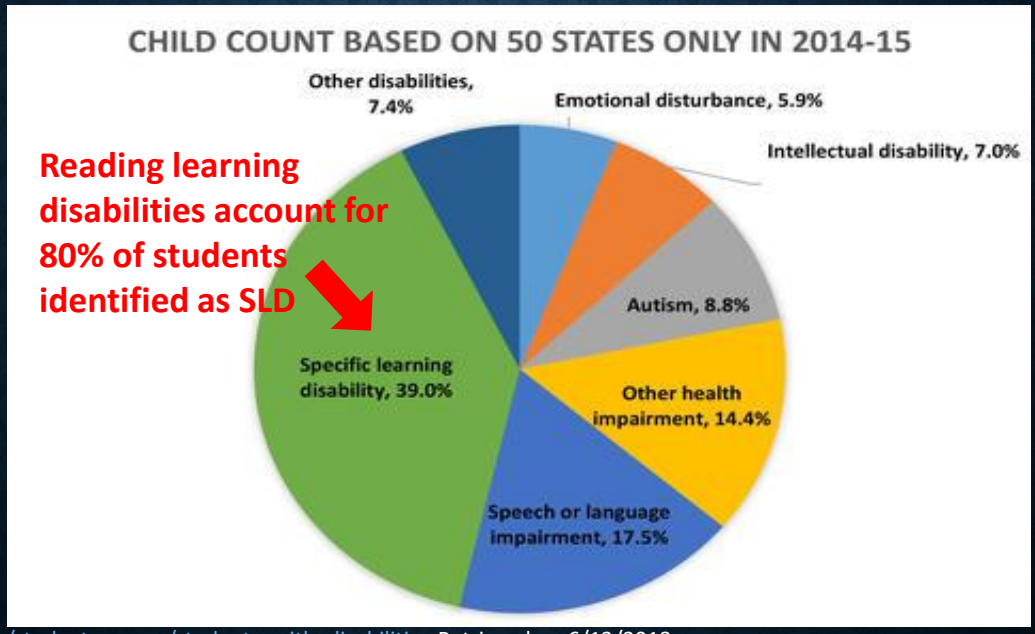
The Big 5 Plus 2

Abstract Growth curve analyses showed that (a) word-level phonological and orthographic awareness show greatest growth during the primary grades but some additional growth thereafter, and (b) three kinds of morphological awareness show greatest growth in the first three or four grades but one—derivation—continues to show substantial growth after fourth grade. Implications of the findings for the role of three kinds of linguistic awareness—phonological, orthographic, and morphological—in learning to read and spell words are discussed. A case is made that phonological awareness, while necessary, is not sufficient for learning to read English—all three kinds of linguistic awareness that are growing during the primary grades need to be coordinated and applied to literacy learning. This finding and a review of the research on linguistic awareness support the conclusion that the recommendations of the National Reading Panel need to be amended so that the research evidence supporting the importance of both orthographic and morphological awareness, and not only phonological awareness, is acknowledged. Moreover, evidence-based strategies for teaching each of these kinds of linguistic awareness and their interrelationships need to be disseminated to educational practitioners.

The Big 5 Plus Orthographic and Morphological Awareness

7

PERCENT OF STUDENTS AGES 6 THROUGH 21 SERVED UNDER IDEA BY DISABILITY CATEGORY



Reading learning disabilities account for 80% of students identified as SLD

https://nceo.info/student_groups/students_with_disabilities Retrieved on 6/12/2018

8

Dyslexia is the most common specific learning disability.

70 to 80% of special education referrals involve reading development concerns.

9

IDEIA – FEDERAL DEFINITION OF SLD

"A ***disorder in one or more of the basic psychological processes*** involved in understanding or using language, spoken or written, which manifests itself in the imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations. Such terms include such conditions as perceptual disabilities, brain injury, minimal brain dysfunction, **dyslexia**, and developmental aphasia"

10

OFFICE OF SPECIAL EDUCATION AND REHABILITATION SERVICES (OSERS): DYSLEXIA GUIDANCE MEMO (2015)

- OSERS has received communication from stakeholders, including parents, advocacy groups, and national disability organizations, who believe that ***State and local educational agencies are reluctant to reference or use dyslexia***, dyscalculia and dysgraphia in evaluations or eligibility determinations

- The purpose of this letter is to clarify that *there* ***is nothing in the IDEA that would prohibit the use of*** *the terms* ***dyslexia****, dyscalculia and dysgraphia in the IDEA evaluation, eligibility determinations or IEP documents* (emphasis added)

http://www2.ed.gov/policy/speced/guid/idea/memosdcltrs/guidance-on-dyslexia-10-2015.pdf

11

OFFICE OF SPECIAL EDUCATION AND REHABILITATION SERVICES (OSERS): DYSLEXIA GUIDANCE MEMO (2015)

- In implementing the IDEA requirements discussed above, ***OSERS encourages SEAs and LEAs to consider situations where it would be appropriate to use the terms dyslexia***, dyscalculia or dysgraphia to describe and address the child's unique, identified needs through evaluation, eligibility and IEP documents.

- OSERS further encourages States to review their policies, procedures and practices to ensure that they do not prohibit the use of the terms dyslexia dyscalculia and dysgraphia in evaluations, eligibility and IE documents.

http://www2.ed.gov/policy/speced/guid/idea/memosdcltrs/guidance-on-dyslexia-10-2015.pdf

12

WHAT IS DYSLEXIA?

*"Dyslexia is a **specific learning disability** that is **neurobiological** 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 the growth of vocabulary and background knowledge."*

~International Dyslexia Association, 2017

13

WHAT IS DYSLEXIA?

- Developmental dyslexia is an ***unexpected*** difficulty in reading.
  - These children appear to have all the factors necessary to become good readers: intelligence, motivation, skills for comprehension (knowledge of discourse, syntax and semantics) and exposure to reasonable reading instruction - and yet struggle to read
- Poor reading comprehension may or may not be the result of dyslexia
- Dyslexia involves a weakness within the language system, specifically at the phonological and/or orthographic level which impacts single-word reading
- A child with below average cognitive skills ***in all or nearly all areas*** would not be considered to have dyslexia (especially when reading is commensurate with overall ability)

14

WHAT IS DYSLEXIA?

"People with dyslexia have trouble matching the letters they see on the page with the sounds those letters and combinations of letters make… dyslexia is **an *unexpected* difficulty in reading in an individual who has the intelligence to be a much better reader.**"

Yale Center for Dyslexia

15

WHAT IS DYSLEXIA?

"…dyslexia refers to a difficulty in developing *word-level* reading skills despite adequate instructional opportunities (Fletcher et al., 2007; Hulme & Snowling, 2009; Vellutino et al., 2004)… The dyslexic has *adequate language comprehension* but poor word-level reading skills."

Kilpatrick, 2015

16

WHAT IS DYSLEXIA?

"Many students with specific reading disabilities have poor phonological awareness and difficulty connecting sounds to print which results in slow word perception, a delay in developing instant word reading, **and poor spelling**."

Nancy Mather, 2020

17

WHAT IS DYSLEXIA?

- **Dyslexic children**
  - Struggle to read fluently
  - Have difficulty spelling
  - Have difficulty learning other languages
  - Can learn to read with great effort
  - Have adequate skills and abilities in areas important for reading (e.g., vocabulary, language comprehension)
  - May have difficulty accessing the sounds of spoken language

18

SOCIAL-EMOTIONAL DIFFICULTIES ASSOCIATED WITH DYSLEXIA

- Stress and anxiety
- Low self-image
- Poor confidence
- Depression

19

EARLY WARNING SIGNS

- **Slight delay in speaking first words** (~ 15 months rather than 1 year) and sentences (~ 2 years rather than 18 months)
- **Difficulties in pronunciation once they start speaking** (leaving off beginning or ending sounds, misordering phonemes):
  - Pisquetti = spaghetti
  - Aminal = Animal
  - Stipacio= Pistacio
- **Early insensitivity to rhyme**: difficulties focusing on one part in a word and insensitivity to the sound structure of language
- **Accessing the incorrect phoneme** (and later circumlocution) and word retrieval
  - Volcano = Tornado
  - It's not the heat it's the ***humanity***
- **Weak phoneme knowledge interferes with the beginning reader's ability to learn the names and sounds of the letters of the alphabet**

Shaywitz (2013) Overcoming Dyslexia

20

SIGNS AND SYMPTOMS OF DYSLEXIA

- **Symptoms (Kindergarten and First Grade)**
  - Reading errors that show no connection to the sounds (child is often relying on pictures or contextual clues)
  - Trouble with segmenting, or understanding that words "come apart"
  - Complains about difficulty of reading tasks
  - Avoids reading tasks
  - Problems with sounding out simple, CVC words
  - Trouble associating letters with sounds

21

SIGNS AND SYMPTOMS OF DYSLEXIA

- **Symptoms (Second – Twelfth Grade)**
  - Very slow in acquiring reading skills (e.g., Reading is laborious, awkward)
  - Difficulty reading unfamiliar words, wild guesses
  - No strategy for reading new words
  - Avoids reading aloud
  - Use of nonspecific words like "stuff" due to difficulties naming items/objects
  - Pauses, hesitations when speaking
  - Using similarly sounding words incorrectly – tornado/volcano, lotion/ocean
  - Mispronouncing long, unfamiliar or complicated words
  - Needing extra time to respond to questions
  - Difficulty remembering dates, names, telephone #s
  - Difficulty finishing tests on time
  - Difficulty learning a new language

22

WORD READING DEVELOPMENT

Letters and Sounds

Requires basic phonology to learn sounds

Phonic decoding

Requires letter sounds and blending

Orthographic mapping

Requires letter sound skills and advanced phonological awareness

23

READING REQUIRES INTEGRATION OF BRAIN NETWORKS

Phonemic Awareness/Verbal

- The ability to perceive and manipulate the sounds that make up the words in a person's language
- Multifaceted: Sound blending, segmenting, manipulation, retrieval, sound matching and rhyming, etc.
- Can see inconsistent skills depending on the complexity of the task and the level of impairment

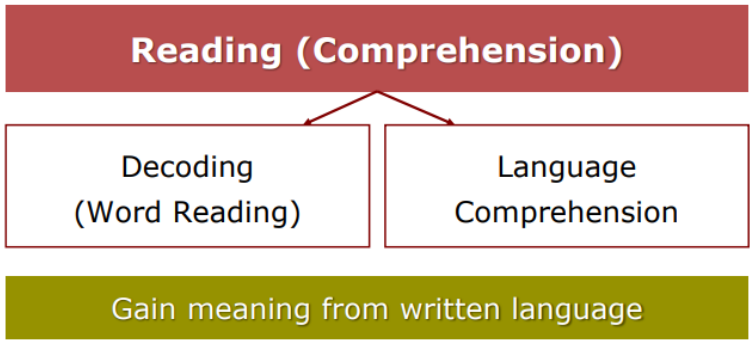
Orthographic Awareness/Visual

- Awareness of how print works and how it looks- the visual representation of a language including numbers, letters and punctuation marks
- Characterized by trouble remembering exception words, letter reversals and transpositions, trouble with rapid word recognition and over-reliance on phonics

•The smooth integration of the contributions from visual (orthographic symbols), verbal (phonological labels and sounds) ***and attentional*** *(conscious) systems are essential for reading*

24

The Simple View of Reading



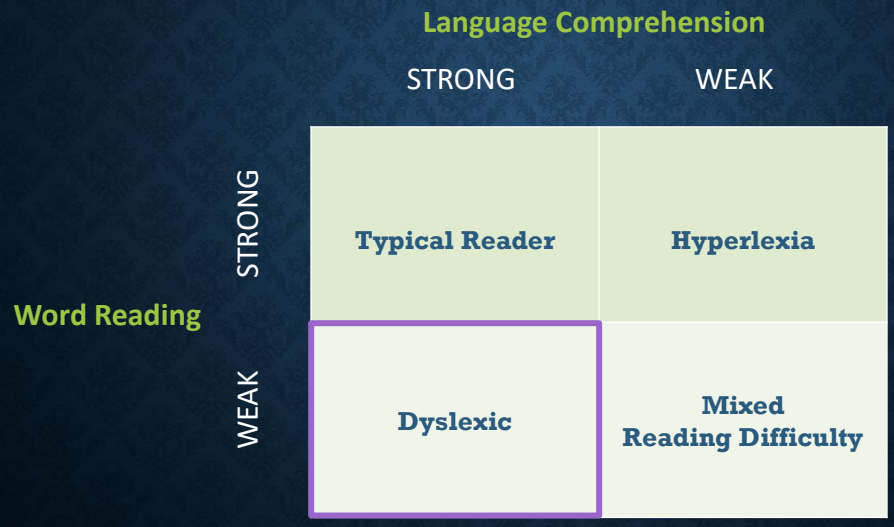
(Gough & Tunmer, 1986; Juel et al., 1986)

Pearson

WIAT-4

25

TYPES OF READING DIFFICULTIES



Essentials of Assessing, Prevention, and Overcoming Reading Difficulties, 2015. Kilpatrick, p. 54.

26

The Not So Simple View of Reading

Expanded Simple View of Reading

Direct and Indirect Effects Model of Reading (DIER)

Reading component	WIAT-4 subtest
Word reading	
Cipher skills	Phonemic Proficiency Word Reading Pseudoword Decoding Decoding Fluency
Word-specific knowledge	Orthographic Fluency Orthographic Choice Spelling
+	
Language comprehension *Vocabulary, syntax, and verbal working memory*	Listening Comprehension Oral Expression
↓	
Contextual reading fluency	Oral Reading Fluency
↓	
Reading comprehension	Reading Comprehension

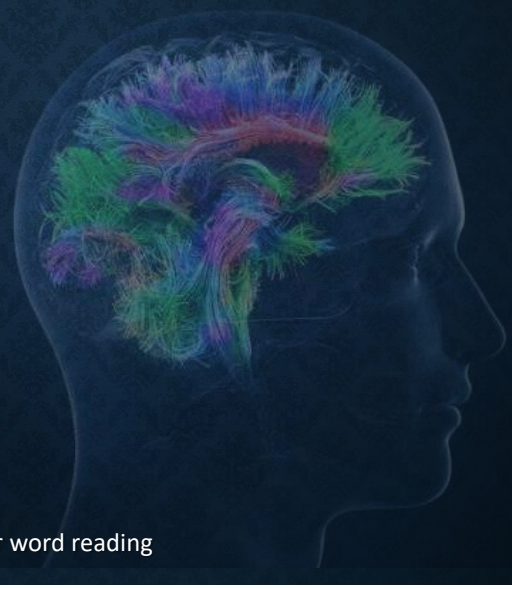
Pearson

WIAT-4

27

COGNITIVE CORRELATES OF DYSLEXIA

- Phonological Awareness
- Rapid Automatic Naming
- Orthographic Processing
- Working Memory
- Visual Attention Span
- Processing Speed
  - Strongest associations with irregular word reading



28

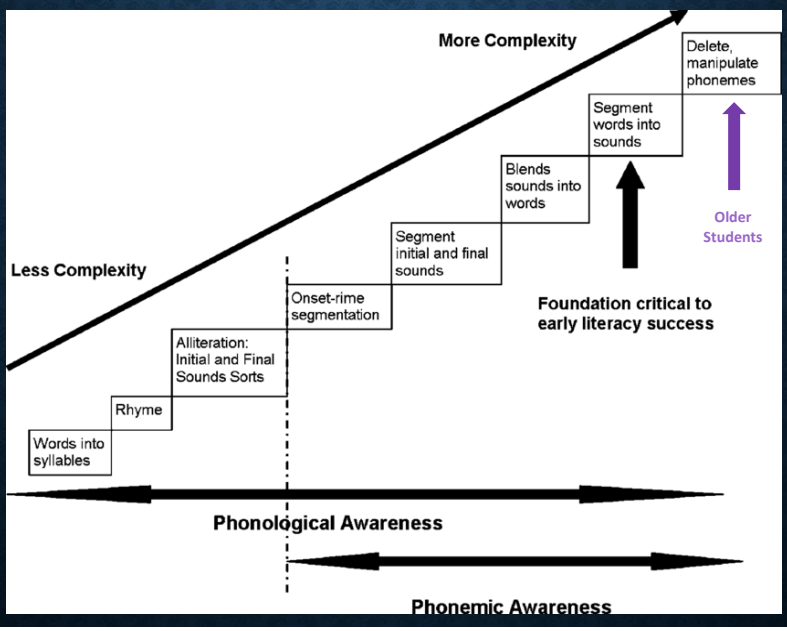
- Two most important phonological awareness abilities for *early reading* and *spelling* are *sound blending and segmentation*
- Two most important phonological awareness abilities for *older students* are *Phonological Manipulation* tasks like deletion and substitution

Phonological Awareness Continuum

Type	Description	Examples
Rhyme	Matching the endings of words	cat, hat, bat, sat
Alliteration	Producing groups of words that begin with the same initial sound	Ten tiny tadpoles
Sentence Segmentation	Segmenting sentences into spoken words	The dog ran away. 1 2 3 4
Syllable Segmentation	Segmenting words into syllables	bas ket ball
Compound Words	Blending and segmenting spoken words into 2 words	Snowman Snow Man
Onsets and Rimes Blending and Segmenting	Blending and segmenting the initial consonant or cluster (onset) and the vowel and consonant sounds spoken after it (rime)	/m/ /ice/ /sh/ /ake/
Phonemes Blending and Segmenting	Blending phonemes into words, segmenting words into individual phonemes and manipulating phonemes in spoken words VC, CV, CVC, CCVC, CVCC, CCVCC	At Po Cat Step Fast

29

COMPLEXITY IN PHONOLOGICAL AWARENESS



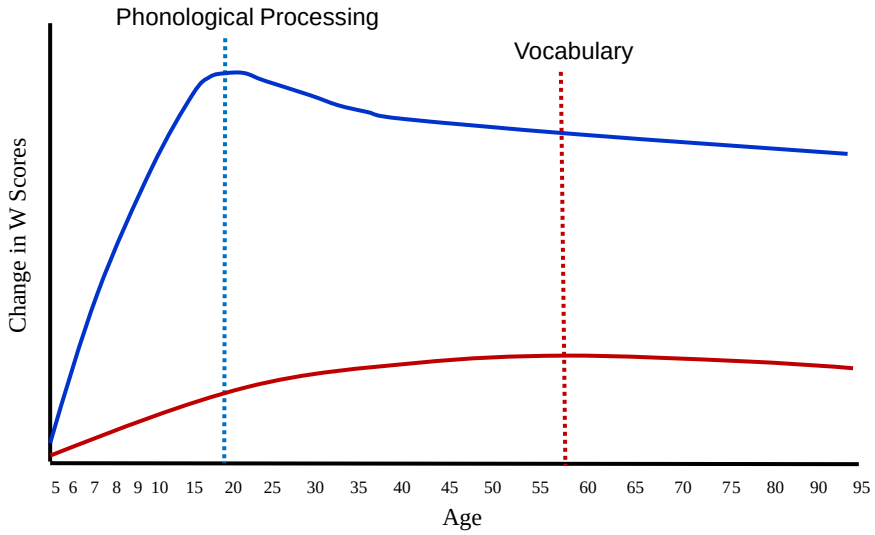
30

SIGNS OF POOR PHONOLOGICAL PROCESSING

- Early articulation errors
- Confusion of similar sounds, like b/p and f/v
- Difficulty learning letter sounds
- Poor nonword repetition, reading, and spelling

31

Language Proficiency vs. Language Development



Source: McGrew, K. S. & Woodcock, R. W. (2001). *Woodcock-Johnson III technical manual.* Itasca, IL: Riverside Publishing.

32

	Meaning vocabulary growth average increase is 2,500 words per year (McCormick, 1998)					
	Normal Growth n	Standard Score	50% increase #1	Standard Score	100% increase #2	Standard Score
K	2,500	100	1,500	76	1,500	76
1	5,000	100	2,250	67	3,000	76
2	7,500	100	3,000	64	4,500	76
3	10,000	100	3,750	63	6,000	76
4	12,500	100	4,500	62	7,500	76
5	15,000	100	5,250	61	9,000	76
6	17,500	100	6,000	61	10,500	76
7	20,000	100	6,750	60	12,000	76
8	22,500	100	7,500	60	13,500	76
9	25,000	100	8,250	60	15,000	76
10	27,500	100	9,000	60	16,500	76
11	30,000	100	9,750	60	18,000	76
12	32,500	100	10,500	59	19,500	76
	sd is 25% of mean			% increases are based on initial levels		

33

Vocabulary and Reading

- A child must know the word they decoded to recognize it and know its meaning.
- Reading vocabulary must be constrained early on to words that children likely already know.
- The rate of vocabulary acquisition is slow.
- Estimates indicate it takes 10 hours of exposure and use to internalize a single vocabulary word.
- Although there are millions of words in English, we use about 2000 for general conversation.
- Content vocabulary is learned primarily in school or from well-educated parents over the course of K-12
- In the case of ELs, the fact that they are behind in terms of acquisition of vocabulary means they are unlikely to ever catch up. Their vocabulary grows only by both ***time and exposure***

34

Closing the Gap May Be a Myth

35

Use Growth Scores with Parents

36

RAPID NAMING

- **The ability to rapidly name familiar objects or symbols**
  - Digits, letters, objects, colors.
- **Connected to reading accuracy, reading speed and reading comprehension**
- **Double-Deficit Theory of Dyslexia (Wolf and Bowers, 1999)**
  - In addition to phonological awareness, RAN has been identified as another core area associated with Dyslexia
  - People may have problems in one or both areas
  - Phonological deficits → reading accuracy; rapid naming deficits → reading fluency
  - Typically, if RAN and PA are weak, reading difficulties are more severe

Mather and Wendling (2012) Essentials of Dyslexia Assessment

37

ORTHOGRAPHY

Orthographic: the visual representations specific to words (not visual-spatial skills)

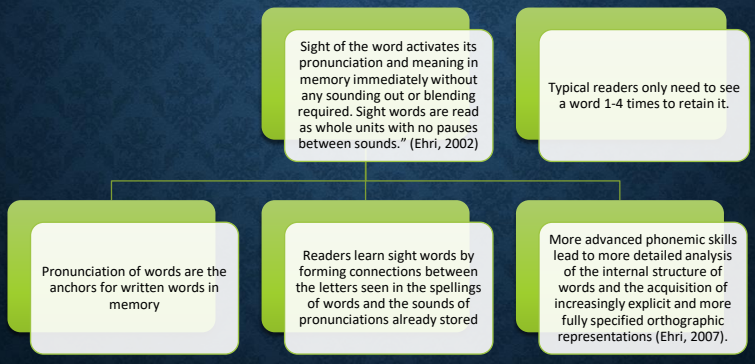
Orthographic coding: representing printed words in memory and accessing the whole word, a letter cluster, or a letter

Orthographic image: representing a specific written word in memory

Orthographic mapping: the process readers use to store written words for immediate, effortless retrieval; the process by which readers turn unfamiliar written words into familiar, instantaneous accessible sight words. (Kilpatrick, 2015, p 81)

38

SIGHT WORDS



39

ORTHOGRAPHIC SCREENING QUESTIONS

Please rate how often your child experiences the following:

Orthographic Skill	Don't Know	Rarely	Sometimes	Frequently
1. Difficulty learning how to form symbols (e.g., letters, numbers, punctuation marks)				
2. Forgets how letters look				
3. Confuses letters with similar appearances when reading and/or writing (e.g., d for b, n for h)				
4. Misreads little words in text (e.g., were for where)				
5. Reverses letters when spelling (e.g., b for d)				
6. Transposes letters when reading or writing (e.g., on instead of no)				
7. Has trouble remembering basic sight words (e.g., relies on sounding every letter of a word out)				
8. Has difficulty copying from a book or blackboard to a paper				
9. Spells the same words in different ways				
10. Omits word endings when spelling				
11. Trouble learning and remembering basic math facts				
12. Trouble counting in a sequence				
13. Spells words the way they sound rather than the way they look				
14. Reads at a slow rate				

Number of items endorsed as Sometimes or Frequently _____/14

40

SHORT-TERM/WORKING MEMORY

- Auditory Short-term Storage is associated with impaired word reading
- Working Memory Capacity is associated with impaired reading comprehension
- *Working memory deficits are uncommon in typical learners*

41

frontiers in HUMAN NEUROSCIENCE

ORIGINAL RESEARCH ARTICLE
published: 07 July 2014
doi: 10.3389/fnhum.2014.00479

Visual processing of multiple elements in the dyslexic brain: evidence for a superior parietal dysfunction

***Muriel A. Lobier*[1,2] *, *Carole Peyrin*[1,3], *Cédric Pichat*[1,3], *Jean-François Le Bas*[4] and *Sylviane Valdois*[1,3]**

[1] *Laboratoire de Psychologie et NeuroCognition, Université Grenoble Alpes, Grenoble, France*
[2] *Neuroscience Center, University of Helsinki, Helsinki, Finland*
[3] *CNRS, Laboratoire de Psychologie et NeuroCognition, UMR5105, Grenoble, France*
[4] *INSERM U836/Université Joseph Fourier – Institut des Neurosciences, Grenoble, France*

Edited by:
Donatella Spinelli, Università di Roma Foro Italico, Italy

Reviewed by:
Kristen Pammer, The Australian National University, Australia
Fabio Richlan, University of Salzburg, Austria

***Correspondence:**
Muriel A. Lobier, Neuroscience Center, P. O. Box 56, FI-00014 University of Helsinki, Finland
e-mail: muriel.lobier@gmail.com

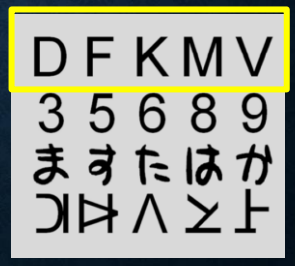
The visual attention (VA) span deficit hypothesis of developmental dyslexia posits that impaired multiple element processing can be responsible for poor reading outcomes. In VA span impaired dyslexic children, poor performance on letter report tasks is associated with reduced parietal activations for multiple letter processing. While this hints towards a non-specific, attention-based dysfunction, it is still unclear whether reduced parietal activity generalizes to other types of stimuli. Furthermore, putative links between reduced parietal activity and reduced ventral occipito-temporal (vOT) in dyslexia have yet to be explored. Using functional magnetic resonance imaging, we measured brain activity in 12 VA span impaired dyslexic adults and 12 adult skilled readers while they carried out a categorization task on single or multiple alphanumeric or non-alphanumeric characters. While healthy readers activated parietal areas more strongly for multiple than single element processing (right-sided for alphanumeric and bilateral for non-alphanumeric), similar stronger multiple element right parietal activations were absent for dyslexic participants. Contrasts between skilled and dyslexic readers revealed significantly reduced right superior parietal lobule (SPL) activity for dyslexic readers regardless of stimuli type. Using a priori anatomically defined regions of interest, we showed that neural activity was reduced for dyslexic participants in both SPL and vOT bilaterally. Finally, we used multiple regressions to test whether SPL activity was related to vOT activity in each group. In the left hemisphere, SPL activity covaried with vOT activity for both normal and dyslexic readers. In contrast, in the right hemisphere, SPL activity covaried with vOT activity only for dyslexic readers. These results bring critical support to the VA interpretation of the VA Span deficit. In addition, they offer a new insight on how deficits in automatic vOT based word recognition could arise in developmental dyslexia.

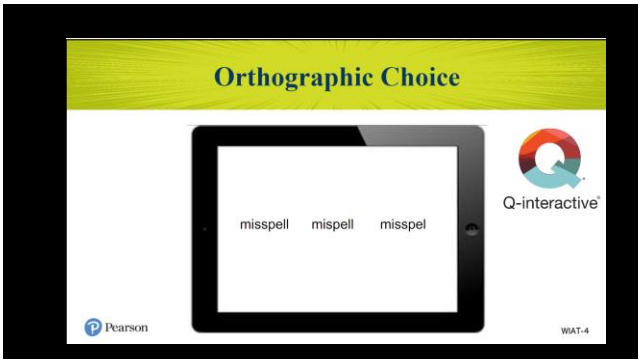
42

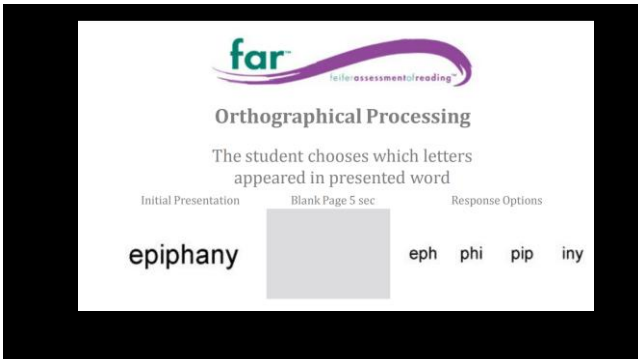
Visual Attention Span

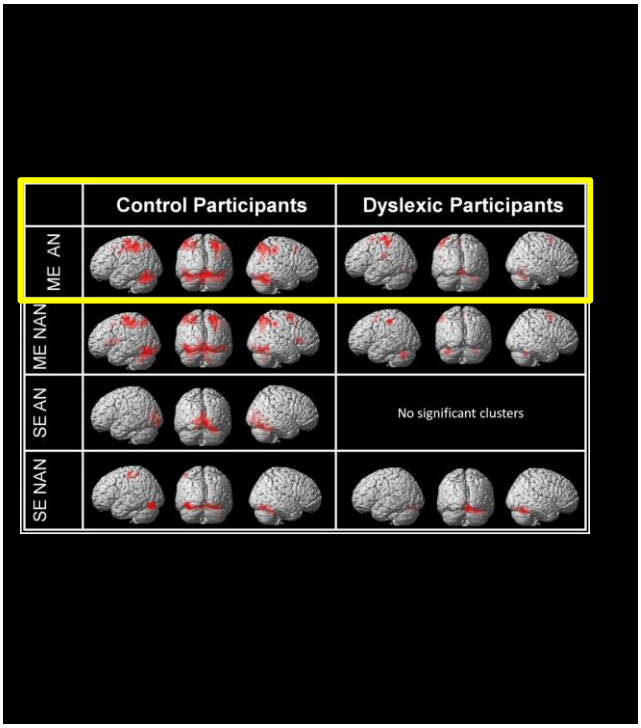
Neural networks associated with single and ME processing were more limited in dyslexic participants.

ME processing in dyslexic readers failed to elicit the broad parietal network present for control participants.









43

THE IMPORTANCE OF DYSLEXIA ASSESSMENT

- **Early identification is *CRITICAL* for children**:
  - It takes four times as long to remediate and intervene for a reading disability in 4th grade than it does in kindergarten. (Fletcher, Lyon, et al, 2007) – We need to focus on prevention
- Intensive, explicit and systematic evidence-based programs (EBP) are needed to remediate even children who are "at-risk" for a reading disability.
- Identified areas of weakness in underlying cognitive processes can be addressed through interventions
  - Phonological processing
  - Orthographical processing

44

COMPREHENSIVE ASSESSMENT: WHAT ACADEMIC SKILLS DO WE ASSESS IN A STUDENT REFERRED FOR READING DIFFICULTIES?

45

COMPREHENSIVE ASSESSMENT: WHAT COGNITIVE PROCESSES DO WE ASSESS IN A STUDENT REFERRED FOR READING DIFFICULTIES?

- **PHONOLOGICAL AWARENESS**
  - Phonological Awareness
  - Phonological Memory
    - Auditory Working Memory
- **ORTHOGRAPHY**
  - Perceptual Speed
  - Orthographical Memory
  - Visual Attention Span (processing multiple elements simultaneously)
- **RAPID AUTOMATIC NAMING**
  - Rapid Symbolic Naming
  - Rapid Nonsymbolic Naming
- **PROCESSING SPEED**
  - Verbal Fluency
  - Visual-Motor Speed

46

Multidisciplinary

Common Dyslexia Symptoms	Reading Specialist	Speech Pathologist	Special Education	School Psychologist
Difficulty learning to rhyme words	x	x	x	
Difficulty learning the letter names and letter sounds of the alphabet	x		x	
Confusions of letters and words with similar visual appearance	x		x	x
Confusion of letters with similar sounds	x	x	x	
Reversals and transpositions of letters and words	x		x	
Trouble arranging letters in the correct order when spelling	x		x	x
Difficulty retaining the visual representation of irregular words for reading and spelling	x		x	x
Inconsistent spelling of words	x		x	x
Difficulty pronouncing some multisyllabic words correctly (e.g., multiblication)	x	x	x	x
Slow word perception that affects reading rate and fluency	x	x	x	x
Poor phonemic awareness	x	x	x	x

47

IMPORTANCE OF UNIVERSAL SCREENING

> "Ninety percent of children with reading difficulties will achieve grade level in reading if they receive help by the first grade. Seventy-five percent of children whose help is delayed to age nine or later continue to struggle throughout their school careers."
>
> —Vellutino, Scanlon, Sipay, Small, Pratt, Chen & Denckla, 1996

48

UNIVERSAL SCREENING

- *Quick targeted assessments of discrete skills that indicate if students are making adequate progress in their reading achievement.*
- *Administered 3-4 times a year, offering alternate formats.*
- *Reliable and valid, following standardized directions and scoring protocols.*

49

UNIVERSAL SCREENING BY GRADE LEVEL

- **Kindergarten** – Phonological Awareness, Rapid Automatic Naming, Sound-Letter Identification, Phonological Memory (nonword repetition)
- **First Grade** – Phonemic Awareness (segmentation/manipulation), RAN (letter naming), sound-letter identification, Phonological Memory (nonword repetition), oral vocabulary, word recognition fluency
- **Second Grade** – Word Reading (real/nonsense), Oral Reading Fluency, Reading Comprehension

50

WJ IV INTERPRETATION AND INSTRUCTIONAL INTERVENTIONS PROGRAM

Dyslexia Evaluation Checklist: Parent Form

Woodcock Johnson IV Woodcock Johnson IV ECAD™

Student's Name (Last)_____ (First)_____ Date_____

Respondent's Name (Last)_____ (First)_____

Preferred Form of Address: ❑ Mr. ❑ Mrs. ❑ Ms. ❑ Miss

Relationship:

❑ 1. Mother
❑ 2. Father
❑ 3. Guardian
❑ 4. Stepmother
❑ 5. Stepfather
❑ 6. Grandmother
❑ 7. Grandfather
❑ 8. Sister
❑ 9. Brother
❑ 10. Aunt
❑ 11. Uncle
❑ 12. Other (specify) _____

Check only the items that describe your child.
Provide examples where indicated.

A. Development

❑ 1. Has a history of ear infections
❑ 2. Had ear tubes inserted
❑ 3. Had difficulty learning to talk
❑ 4. Had speech therapy
❑ 5. Currently has speech therapy
❑ 6. Had some difficulty pronouncing new words
❑ 7. Currently has some difficulty pronouncing new words
❑ 8. Mispronounces some words by putting the sounds in the wrong order (e.g., *aminal* for *animal* or *pusgetti* for *spaghetti*) or leaving sounds out
If checked, provide example(s): _____

D. Prereading Skills

❑ 1. Likes to listen to books
❑ 2. Does not like to look at print when listening to books read by others
❑ 3. Had trouble learning how to rhyme words
❑ 4. Currently has trouble rhyming words
❑ 5. Had trouble learning the alphabet
❑ 6. Has trouble remembering letter sounds
❑ 7. Has trouble breaking apart the sounds in words and then blending them back together to pronounce the words
❑ 8. Currently has difficulty recognizing some letters
❑ 9. Complains about having to read
❑ 10. Shows anxiety or frustration about having to read
❑ 11. Dislikes reading aloud

51

_____
_____

❑ 9. Has difficulty following directions
❑ 10. Has difficulty remembering the details of a story that has been read aloud
❑ 11. Has difficulty with word retrieval such as remembering the names of people and places
❑ 12. Often uses the wrong word when speaking or has difficulty recalling the word he/she wants to use

B. Family History

❑ 1. Has one or more family members who have/had difficulty learning to read and spell
Relationship(s): _____
❑ 2. Has one or more family members who have/had difficulty with attention
Relationship(s): _____

C. Nonreading Skills

❑ 1. Is creative (e.g., loves to draw, sing, act, invent)
If checked, provide example(s): _____
_____
_____
❑ 2. Is good at assembling puzzles
❑ 3. Enjoys many activities that do not require reading
If checked, provide example(s): _____
_____
_____

E. Reading Skills

❑ 1. Confuses little words that look alike (e.g., *who* and *how*, *was* and *saw*)
If checked, provide example(s): _____
_____
_____
❑ 2. Does not read as well as others the same age
❑ 3. Takes a long time to finish homework that requires reading
❑ 4. Reads slowly and often has to reread to understand what he/she is reading
❑ 5. Needs a parent to read the assigned text aloud prior to doing the assignment

F. Spelling and Writing Skills

❑ 1. Spells words the way they sound rather than the way they look
❑ 2. Knows how to spell a word but then forgets it
❑ 3. May spell the same word in different ways on the same page
❑ 4. Had difficulty with handwriting
❑ 5. Currently has difficulty with handwriting
❑ 6. Has difficulty with written assignments

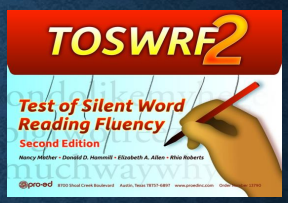
G. Additional concerns:

_____
_____
_____
_____

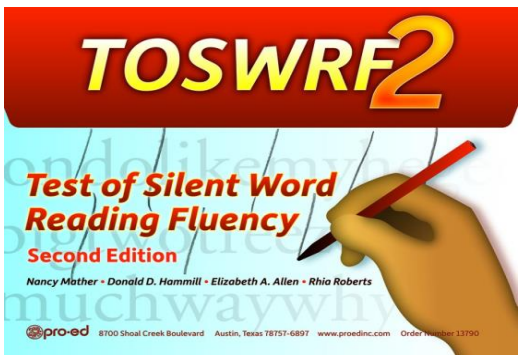
52

TIER 1 SCREENING INSTRUMENTS

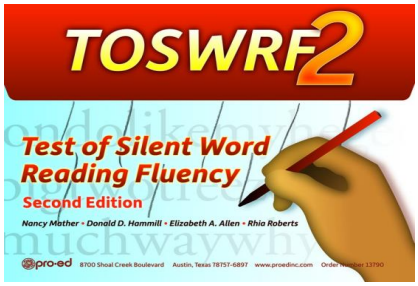
- Test of Silent Word Reading Fluency, Second Edition
  - Group administered
  - 5 minutes
  - Ages 6-3 to 24-11
  - Alternate Forms A-D
- Test of Word Reading Efficiency
  - Individually administered
  - 2 minutes
  - Ages 6-0 to 24-11
  - Alternate Forms A-D
- Test of Dyslexia (Nancy Mather)
  - To be published in 2023 (December)
  - Co-normed with rating scales



53



54



Ages: *6-3 through 24-11*
Testing Time: 3 minutes for a single form or 6 minutes for any two forms
Administration: Group or Individual (3 minutes)

provides a reliable and valid measure of students' ability to recognize printed words accurately and efficiently.

Students are presented with rows of words, ordered by reading difficulty; no spaces appear between the words *(e.g., dimhowfigblue)*. Students are given 3 minutes to draw a line between the boundaries of as many words as possible *(e.g., dim/how/fig/blue)*.

•Difficulty on this measure may suggest an orthographic processing weakness

•Monitor student progress up to four times per year.

55

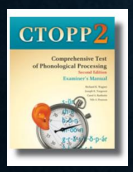
designed to be an efficient, effective, and repeatable assessment of reading skills using phonetically irregular words (i.e., words that do not conform to the rules of phonics as commonly taught in the United States).

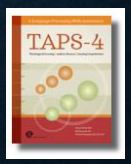
- It consists of three forms of 50 items each, all equated carefully based on a common standardization sample.
- Examinees read each phonetically irregular word aloud.
- Testing time is approximately two minutes for each form.
- Can be used for screening and progress monitoring; includes evaluation of reliable change
- The use of phonetically irregular words has the advantage of rapid assessment while ensuring that words read correctly are part of the reader's actual reading vocabulary.

56

ASSESSING PHONOLOGICAL PROCESSING

- Comprehensive Test of Phonological Processing -2nd Ed. (CTOPP-2)
- WJ IV COG Phonological Processing, Nonword Repetition (Phonological Memory) subtests
- WJ IV OL Sound Blending, Sound Awareness Tests
- Test of Phonological Awareness, 2nd Ed. (TOPA-2)
- Phonological Awareness Test (PAT-2 NU)
- Test of Auditory Processing, 4th Ed. (TAPS-4)

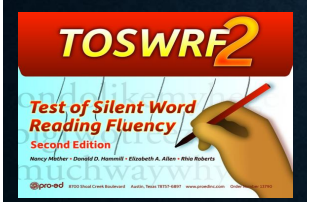


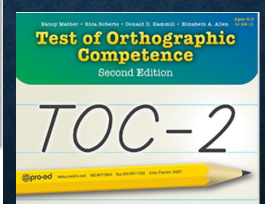



57

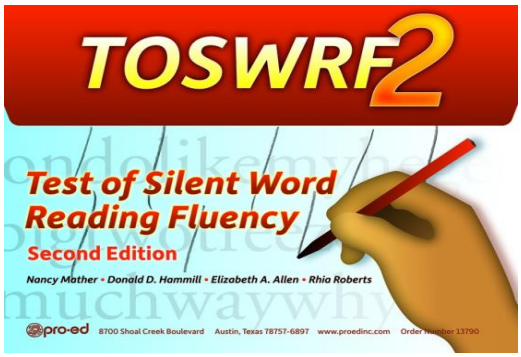
ASSESSING ORTHOGRAPHIC PROCESSING

- ***Examples of assessments of orthographic processing directly related to reading:***
  - Test of Silent Word Reading Fluency-2 (TOSWRF-2)
  - Test of Irregular Word Reading Efficiency (TIWRE)
  - Test of Orthographic Competence (TOC-2) – Note that the TOC began at age 6; TOC-2 begins at age 8!
  - Process Assessment of the Learner (PAL-II)
  - Early Reading Assessment (ERA)
  - Feifer Assessment of Reading (FAR)
  - WJ IV COG – Letter-Pattern Matching and Number-Pattern Matching

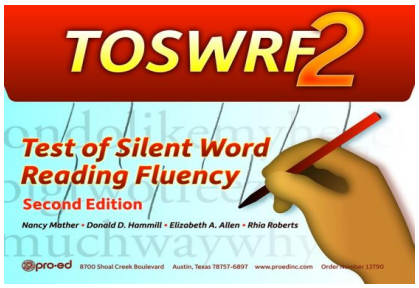




58



59



Ages: *6-3 through 24-11*
Testing Time: 3 minutes for a single form or 6 minutes for any two forms
Administration: Group or Individual (3 minutes)

provides a reliable and valid measure of students' ability to recognize printed words accurately and efficiently.

Students are presented with rows of words, ordered by reading difficulty; no spaces appear between the words *(e.g., dimhowfigblue)*. Students are given 3 minutes to draw a line between the boundaries of as many words as possible *(e.g., dim/how/fig/blue)*.

•Difficulty on this measure may suggest an orthographic processing weakness

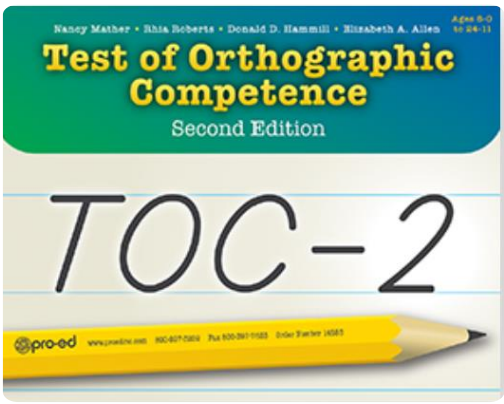
•Monitor student progress up to four times per year.

60

designed to be an efficient, effective, and repeatable assessment of reading skills using phonetically irregular words (i.e., words that do not conform to the rules of phonics as commonly taught in the United States).

- It consists of three forms of 50 items each, all equated carefully based on a common standardization sample.
- Examinees read each phonetically irregular word aloud.
- Testing time is approximately two minutes for each form.
- Can be used for screening and progress monitoring; includes evaluation of reliable change
- The use of phonetically irregular words has the advantage of rapid assessment while ensuring that words read correctly are part of the reader's actual reading vocabulary.

61



- **1. Punctuation.** The student is given a list of printed sentences that contain no punctuation except for spacing between the words (e.g., *where is edward b brown*). The task is for the student to supply the missing punctuation by editing the sentence.

- **2. Abbreviations.** The student is given a list of printed abbreviations (e.g., 4:00, Dr., USA) and is asked to write what each abbreviation means.

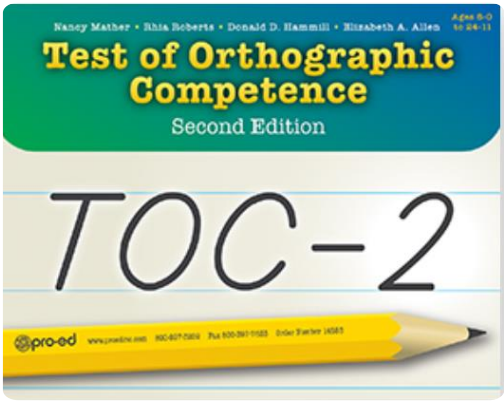
- **3. Sight Spelling.** The examiner says a word and the student is shown part of the word where one or more of the letters is missing (e.g., the examiner says the word *know* and the student sees " __ow".) The student is asked to fill in the missing letter or letters (which include an irregular or unusual orthographic element) to complete the spelling of the word.

- **4. Homophone Spelling.** The examiner says a word (e.g., *oar*) and the student is shown a picture (e.g., a picture of a boat oar) and the student is asked to provide the correct spelling of the homophone that is represented by the picture (i.e., the student must write the word "oar").

- **5. Word Scramble.** The student is shown sets of scrambled letters that can be rearranged to spell real words (e.g., the letters nra can be rearranged to spell the word ran). The student has three minutes to re-order as many groups of letters into words as possible.

- **6. Letter Choice.** The student is shown rows of words where one of four letters (p, d, b, or q) is missing from the word (e.g., _etter where the letter b is missing from the word or sai_ where the letter d is missing from the word). The student is given two minutes to write in the correct letters that will make each one into a real word.

62



- **Orthographic Knowledge (OK).** This composite is formed by combining the scaled scores from all six of the subtests: Punctuation, Abbreviations, Sight Spelling, Homophone Spelling, Word Scramble, and Letter Choice. It is the best estimate of a student's overall orthographic knowledge because it is the most reliable and valid score on the TOC-2.

2. Conventions (CO). This composite is formed by combining the scaled scores from the Punctuation and Abbreviations subtests. This composite represents the non-spelling (and sometimes not even alphabetic) aspects of the English writing system that are important to meaningful reading and writing.

3. Spelling Accuracy (SA). This composite is formed by combining the scaled scores from the Sight Spelling and the Homophone Spelling subtests. This composite represents a student's ability to accurately spell the irregular element of words and produce the correct spelling for a word that is a homophone.

4. Spelling Fluency (SF). This composite is formed by combining the scaled scores from the Word Scramble and the Letter Choice subtests, both timed tests. This composite represents a student's accuracy as well as speed of processing and recalling letter strings and spelling patterns. Spelling Fluency can be compared to the Spelling Accuracy composite to determine whether a student has developed accurate orthographic images but does not process these visual images quickly or automatically.

5. Spelling Efficiency (SE). This composite is formed by combining the four spelling tests: Sight Spelling, Homophone Spelling, Word Scramble, and Letter Choice. This composite represents both a student's accuracy and speed of processing and recalling letter strings and spelling patterns, and is useful as an estimate of orthographic processing.

63

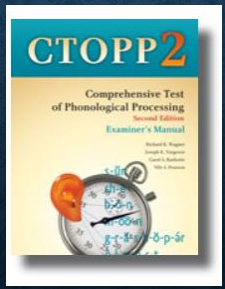
ASSESSING RAPID AUTOMATIC NAMING

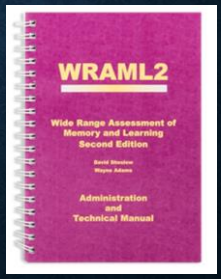
- **WISC-V**: Naming Speed Literacy
- **KTEA-3**: Letter Naming Facility, Object Naming Facility
- **WJ IV OL**: Rapid Picture Naming, (Retrieval Fluency)
- **FAR**: Rapid Automatic Naming
- **CTOPP-2**: Rapid Letter Naming, Rapid Digit Naming, Rapid Color Naming, Rapid Object Naming

64

ASSESSING WORKING MEMORY

- **WISC-V**: Digit Span
- **WJ IV COG**: Numbers Reversed, Memory for Words
- **CTOPP-2**: Nonword Repetition, Memory for Digits
- **WRAML-2**: Verbal Working Memory, Symbolic Working Memory

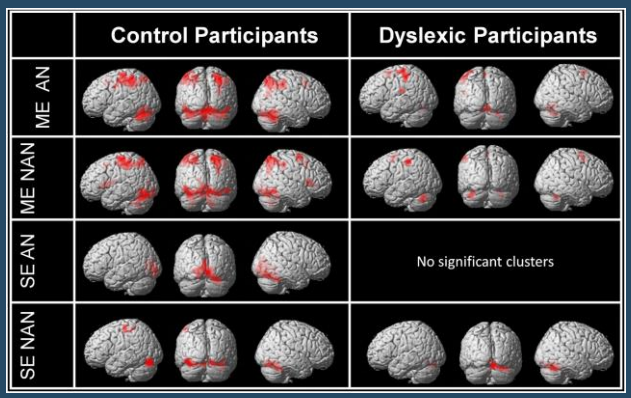




65

RESEARCH GUIDES PRACTICE

- Application of neuroimaging techniques for diagnosis and treatment of learning Disabilities



66

Article

May 1993

Anomalous Cerebral Structure in Dyslexia Revealed With Magnetic Resonance Imaging

Christiana M. Leonard, PhD; Kytja K. S. Voeller, MD; Linda J. Lombardino, PhD; et al

Arch Neurol. 1993;50(5):461-469. doi:10.1001/archneur.1993.00540050013008

• **Objective.** —To develop quantitative methods for identifying cerebral anomalies on magnetic resonance images of subjects with language disorders and other learning disabilities.

Results. —All groups had left-sided asymmetry for the temporal bank and right-sided asymmetry for the parietal bank. The group with dyslexia had exaggerated asymmetries, owing to a significant shift of right planar tissue from the temporal to parietal bank. They also had a higher incidence of cerebral anomalies bilaterally (subjects with dyslexia, six of nine; relatives, two of 10; and controls, zero of 12).

Conclusions. —Quantitative assessment of high-resolution magnetic resonance images can reveal functionally relevant variations and anomalies in cerebral structure. Further refinement of these measurement techniques should improve the diagnosis, classification, and treatment of language disorders and other learning disabilities.

67

Int J CARS (2008) 3:181–189
DOI 10.1007/s11548-008-0210-0

ORIGINAL ARTICLE

An MRI-based diagnostic framework for early diagnosis of dyslexia

A. El-Baz · M. Casanova · G. Gimel'farb · M. Mott · A. Switala

Purpose A computer-aided diagnosis (CAD) system for early diagnosis of dyslexia was developed and tested. Dyslexia can severely impair the learning abilities of children, so improved diagnostic methods are needed. Neuropathological studies show abnormal anatomy of the cerebral white matter (CWM) in dyslexic brains. We sought to develop an MRI-based macroscopic neuropathological correlate to the minicolumnopathy of dyslexia that relates to cortical connectivity: the gyral window. The brains of dyslexic patients often exhibit decreased gyrifications, so the thickness of gyral CWM for dyslexic subjects is greater than for normal subjects. We developed an MRI-based method for assessment of gyral CWM thickness with automated recognition of abnormal (e.g., dyslexic) brains.

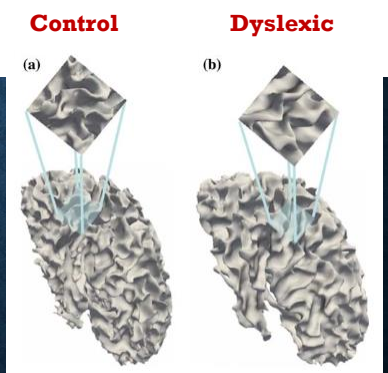


Fig. 3 Segmented CWM for a control (**a**) and a dyslexic (**b**) patient. Note that the gyri for the normal person appear thinner than for the dyslexic subject

68

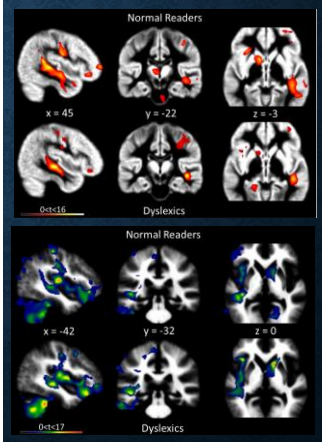
Gray and White Matter Distribution in Dyslexia: A VBM Study of Superior Temporal Gyrus Asymmetry

Marjorie Dole, Fanny Meunier, Michel Hoen

Published: October 1, 2013 • https://doi.org/10.1371/journal.pone.0076823

Abstract

In the present study, we investigated brain morphological signatures of dyslexia by using a voxel-based asymmetry analysis. Dyslexia is a developmental disorder that affects the acquisition of reading and spelling abilities and is associated with a phonological deficit. Speech perception disabilities have been associated with this deficit, particularly when listening conditions are challenging, such as in noisy environments. These deficits are associated with known neurophysiological correlates, such as a reduction in the functional activation or a modification of functional asymmetry in the cortical regions involved in speech processing, such as the bilateral superior temporal areas. These functional deficits have been associated with macroscopic morphological abnormalities, which potentially include a reduction in gray and white matter volumes, combined with modifications of the leftward asymmetry along the perisylvian areas. The purpose of this study was to investigate gray/white matter distribution asymmetries in dyslexic adults using automated image processing derived from the voxel-based morphometry technique. Correlations with speech-in-noise perception abilities were also investigated. The results confirmed the presence of gray matter distribution abnormalities in the superior temporal gyrus (STG) and the superior temporal Sulcus (STS) in individuals with dyslexia. Specifically, the gray matter of adults with dyslexia was symmetrically distributed over one particular region of the STS, the temporal voice area, whereas normal readers showed a clear rightward gray matter asymmetry in this area. We also identified a region in the left posterior STG in which the white matter distribution asymmetry was correlated to speech-in-noise comprehension abilities in dyslexic adults. These results provide further information concerning the morphological alterations observed in dyslexia, revealing the presence of both gray and white matter distribution anomalies and the potential involvement of these defects in speech-in-noise deficits.



69

RESEARCH GUIDES PRACTICE

- Understanding what is important to assess is critical
- Does a typical comprehensive evaluation include measurement of the most important abilities, processes, and skills?
- Example

70

"Tests of accuracy and speed of word recognition and pseudoword reading are essential for understanding whether an individual is experiencing reading difficulties" (p. 26).

WJ IV ACH: LWI 76 (5th%)

Word Attack: Not administered.

WJ IV ACH: Spelling 69 (2nd%)

Source: Siegel, L. S., & Hurford, D. P. (2019). The case against discrepancy models in the evaluation of dyslexia. *Perspectives on Language and Literacy, 45*(1), 23–28.

71

Reading and Spelling

"The core impairment is in basic literacy skills such as *reading accuracy*, *reading fluency*, and/or *spelling*" (p. 158).

Most recent report card: Did not Meet Standards in Reading and Writing

Letter Word Identification: 76 (5%)
Spelling: 69 (2%)

Exceeded Standards in Social Studies and Science

Source: Pennington, B. F., McGrath, L. M., & Peterson, R. L. (2019). Reading disability (Dyslexia*). Diagnosing learning disorders: From science to practice* (3rd ed.). Guilford.

72

Reading and Spelling

- Phonics Knowledge
  - Pseudoword Reading (untimed and timed) – Not measured
- Sight Word Acquisition (Letter-Word Ident. 76)
  - Irregular Word Reading (untimed and timed) – Not measured
- Reading Rate (Oral Reading Fluency—timed) – Not measured
- Comprehension Efficiency (timed passage reading with questions) – Not measured
- Spelling (regular and exception words) (Spelling 69)

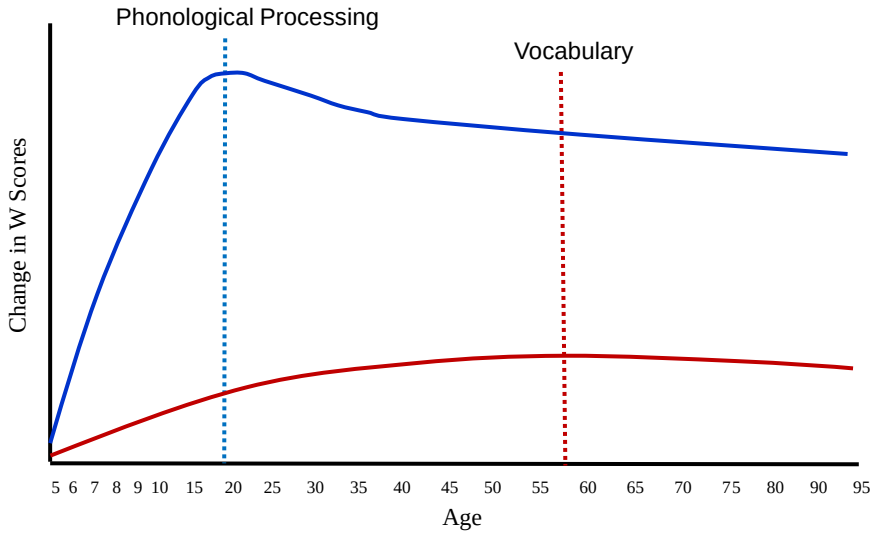
73

Linguistic Risk Factors

- Linguistic risk factors are related to and affect the development of reading and spelling and predict an individual will have difficulties with reading and spelling development.
- Some are more trainable than others (e.g., phonological awareness vs. working memory).
- English Learners are at risk

74

Language Proficiency vs. Language Development

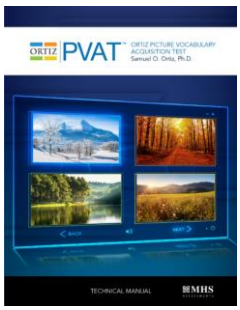


Source: McGrew, K. S. & Woodcock, R. W. (2001). *Woodcock-Johnson III technical manual.* Itasca, IL: Riverside Publishing.

75

The Ortiz Picture Vocabulary Acquisition Test

Sampling bilinguals—continuous (99 levels of exposure: 1%-99%)



Author: Samuel O. Ortiz

Table 5. Length of Exposure to English: Ortiz PVAT English Learner Normative Sample

Length of Time Exposed to English	English Learner Normative Sample (*N*)	English Learner Normative Sample (%)
0–6 months	128	10.8
7–11 months	131	11.0
1–2 years	168	14.1
3–4 years	165	13.9
5 years	119	10.0
6–7 years	118	9.9
8–9 years	113	9.5
10–11 years	90	7.6
12–13 years	70	5.9
14–15 years	51	4.3
16 years or more	37	3.1
Total	1,190	100.0

Performance is based on comparison of exact amount of language development determined by percentage of lifetime exposure—not by category.

Table 6. Percentage of Life Exposed to English: Ortiz PVAT English Learner Normative Sample

Percentage of Life Exposed to English (%)	English Learner Normative Sample (*N*)	English Learner Normative Sample (%)
0–20	280	23.5
21–40	196	16.5
41–60	196	16.5
61–80	209	17.6
81–100	309	26.0
Total	1,190	100.0

76

Fairness and English Learners:
Ensuring True Peer Comparability

Stratification Variables in Dual Standardization Norm Samples of the Ortiz PVAT

English Speakers (*N* = 1,530)

- Ages 2:6 to 22:11
- Gender: equal split
- Stratification:
  - Geographic region
  - Parental education level (PEL)
  - Race/ethnicity

English Learners (*N* = 1,190)

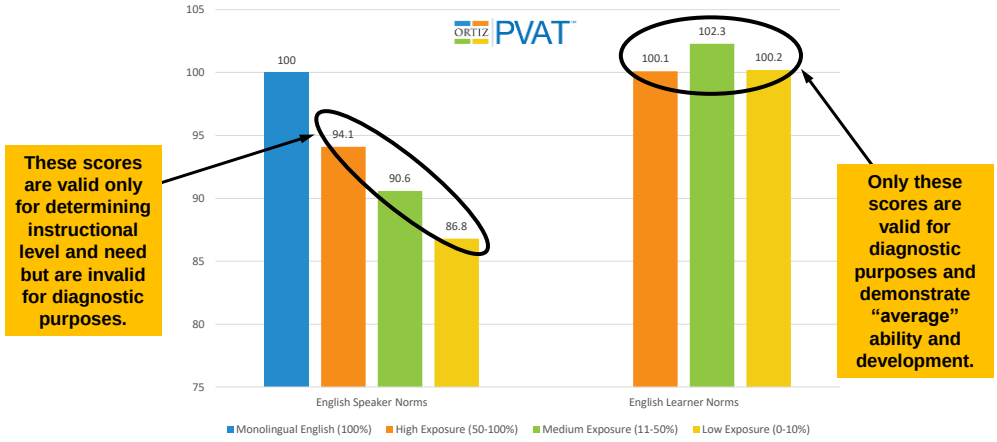
- Ages 2:6 to 22:11
- Gender: equal split
- Stratification:
  - Geographic region
  - Parental education level (PEL)
  - Language spoken at home (53 different languages)
  - Proportion of lifetime exposure to English (i.e., opportunity to learn English):
    - 11 categories for length of exposure to English
    - 0-6 months up to 16+ years

Inclusion of these variables in the stratification of the EL Norm Sample is a completely unique feature of the Ortiz PVAT not found in any other test.

77

The Ortiz PVAT – Advances in fairness and testing

Developmental Language/Exposure-based Comparison Provides Validity and Fairness for ELs



78

It's More Than Phonological Processing

A single deficit model suggests that difficulties with reading stem primarily from poor phonological awareness (PA).

- The International Dyslexia Association (IDA) definition emphasizes PA only.
- State definitions and handbooks often only emphasize PA.

79

Phonological Awareness

The phonological deficit view that has dominated the field for years is inadequate for explaining all cases of reading disorder (Peterson & Pennington, 2012; Snowling & Hulme, 2012) and its importance has been overstated (Swanson et al., 2003).

Segmentation 110
Sound Blending 96

PA is trainable

Sources: Peterson, R. L., & Pennington, B. F. (2012). Developmental dyslexia. *The Lancet, 379*(9830), 1997–2007.

Snowling, M. J., & Hulme, C. (2012). Annual research review: The nature and classification of reading disorders—a commentary for proposals on DSM-5. *Journal of Child Psychology and Psychiatry, 53*, 593–607.

Swanson, H. L., Trainin, G., Necoechea, D. M., & Hammill, D. D. (2003). Rapid naming, phonological awareness, and reading. A meta-analysis of the correlational evidence. *Review of Educational Research, 73,* 407–444.

80

Multiple Deficit View

Adherence to a single deficit profile has limited utility; using only poor phonological awareness as a criterion for dyslexia would result in missing about one-half of the cases.

Source: Pennington, B. F., Santerre-Lemmon, L., Rosenberg, J., MacDonald, B., Boada, R., Friend, A., Leopold, D. R., Samuelsson, S., Byrne, B., Willcutt, E. G., & Olson, R. K. (2012). Individual prediction of dyslexia by single versus multiple deficit models. *Journal of Abnormal Psychology, 121*(1), 212–224. https://doi.org/10.1037/a0025823

81

Multiple Deficit View

"Thus, requiring a deficit in phonological processing (or any other cognitive skill) for diagnosis is inappropriate and would unfairly exclude some individuals with clinically impairing literacy difficulties" (p. 159).

Source: Pennington, B. F., McGrath, L. M., & Peterson, R. L. (2019). Reading disability (Dyslexia). *Diagnosing learning disorders: From science to practice* (3rd ed.). Guilford.

82

Linguistic Risk Factors

- Phonological Awareness – Average
  - Blending and Segmenting – Average
  - Manipulation – Not Measured
- **Rapid Automatized Naming (Rapid Symbolic Naming 82; Rapid Picture Naming 57)**
  - Letters
  - Numbers
- Working Memory (Numbers Reversed 88)
- **Orthographic Processing (Letter Pattern Matching 74; LWI 76)**
- Visual–Verbal Paired-Associate Learning – Not Measured

83

Linguistic Risk Factors

Orthographic processing is also a linguistic risk factor. Findings from a recent meta-analysis indicated that individuals with dyslexia have a deficit in orthographic knowledge that is as large as that of phonological awareness and RAN.

(Letter Pattern Matching 74; Letter Word Identification 76)

Source: Georgiou, G. K., Martinez, D., Vieira, A. P. A., & Guo, K. (2021). Is orthographic knowledge a strength or
a weakness in individuals with dyslexia? Evidence from a meta-analysis. *Annals of Dyslexia*, *71*, 5–27. https://doi.org/10.1007/s11881-021-00220-6

84

Confusable Letters

On letter-naming tasks, individuals with dyslexia have longer fixation times and more regressions than typical readers when the selected letters are confusing (Dahhan et al., 2020).

(Letter Pattern Matching 74)
Rapid Letter Naming not Measured

Source: Dahhan, N. Z. A., Kirby, J. R., Brien, D. C., Gupta, R., Harrison, A., Munoz, D. P. (2020). Understanding the biological basis of dyslexia at a neural systems level. *Brain Communications*, 2, 1–16. fcaa173, https://doi.org/10.1093/braincomms/fcaa173

85

Visual–Verbal Paired-Associate Learning (PAL)

"The learning of mappings between orthography and phonology is critical for learning to read and likely operates at numerous levels, including the process of learning letter–sound correspondences and the learning of mappings at the level of single letters, letter groups, and whole words when acquiring a word recognition system" (p. 47).

WJ IV Visual Auditory Learning was not Measured

Source: Warmington, M., & Hulme, C. (2012). Phoneme awareness, visual-verbal paired associate learning, and rapid automatized naming as predictors of individual differences in reading ability. *Scientific Studies of Reading*, *16*, 45–62.

86

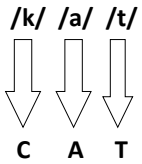
Orthographic Mapping

Forming the connections between the phonemes and the graphemes.

Whole word: **cat**

Analyzed into phonemes:

Mapped to graphemes:



Recognized as the whole word: **cat**

Exposure leads to automatic recognition – sight word vocabulary (timed word reading tests)

87

Vocabulary and Reasoning

- Vocabulary: high comorbidity with developmental language disorder
- Vocabulary: *unexpected* nature of dyslexia (Oral and Picture Vocabulary was Average)
- Reasoning: rule out cognitive impairments, English Language Learners (C-TONI Average; WJ IV COG Gf). Use the C-LIM to examine score validity.
- Vocabulary and Reasoning: used to examine the unexpected nature of dyslexia (ability–achievement discrepancies)

88

WHY SCREEN FOR DYSLEXIA

- Because certain cognitive processing processes can be trained

89

REMEDIATION OF COGNITIVE PROCESSES

- ***Phonological processing*** – areas of the brain normally involved in phonological processing associated with no activation prior to intervention; substantial increase in activation and improved reading skills after intervention

90

Dyslexia-specific brain activation profile becomes normal following successful remedial training

P.G. Simos, PhD, J.M. Fletcher, PhD, E. Bergman, MD, J.I. Breier, PhD, B.R. Foorman, PhD, E.M. Castillo, PhD, R.N. Davis, MA, M. Fitzgerald, BA and A.C. Papanicolaou, PhD

Objectives: To examine changes in the spatiotemporal brain activation profiles associated with successful completion of an intensive intervention program in individual dyslexic children.

Methods: The authors obtained magnetic source imaging scans during a pseudoword reading task from eight children (7 to 17 years old) before and after 80 hours of intensive remedial instruction. All children were initially diagnosed with dyslexia, marked by severe difficulties in word recognition and phonologic processing. Eight children who never experienced reading problems were also tested on two occasions separated by a 2-month interval.

Results: Before intervention, all children with dyslexia showed distinctly aberrant activation profiles featuring little or no activation of the posterior portion of the superior temporal gyrus (STGp), an area normally involved in phonologic processing, and increased activation of the corresponding right hemisphere area. After intervention that produced significant improvement in reading skills, activity in the left STGp increased by several orders of magnitude in every participant. No systematic changes were obtained in the activation profiles of the children without dyslexia as a function of time.

Conclusions: These findings suggest that the deficit in functional brain organization underlying dyslexia can be reversed after sufficiently intense intervention lasting as little as 2 months, and are consistent with current proposals that reading difficulties in many children represent a variation of normal development that can be altered by intensive intervention.

91

Neural deficits in children with dyslexia ameliorated by behavioral remediation: Evidence from functional MRI

Elise Temple[†‡], Gayle K. Deutsch[§], Russell A. Poldrack[¶], Steven L. Miller[‖], Paula Tallal[‖‡‡], Michael M. Merzenich[‖††], and John D. E. Gabrieli[†§]

Abstract

Developmental dyslexia, characterized by unexplained difficulty in reading, is associated with behavioral deficits in phonological processing. Functional neuroimaging studies have shown a deficit in the neural mechanisms underlying phonological processing in children and adults with dyslexia. The present study examined whether behavioral remediation ameliorates these dysfunctional neural mechanisms in children with dyslexia. Functional MRI was performed on 20 children with dyslexia (8–12 years old) during phonological processing before and after a remediation program focused on auditory processing and oral language training. Behaviorally, training improved oral language and reading performance. Physiologically, children with dyslexia showed increased activity in multiple brain areas. Increases occurred in left temporo-parietal cortex and left inferior frontal gyrus, bringing brain activation in these regions closer to that seen in normal-reading children. Increased activity was observed also in right-hemisphere frontal and temporal regions and in the anterior cingulate gyrus. Children with dyslexia showed a correlation between the magnitude of increased activation in left temporo-parietal cortex and improvement in oral language ability. These results suggest that a partial remediation of language-processing deficits, resulting in improved reading, ameliorates disrupted function in brain regions associated with phonological processing and produces additional compensatory activation in other brain regions.

92

REMEDIATION OF COGNITIVE PROCESSES

- ***Orthographic processing*** – individuals in orthographic processing interventions showed reliable change (reading/spelling), normalization of brain activation, and treatment-specific response to brain areas associated with orthographic processing.

93

Individual fMRI activation in orthographic mapping and morpheme mapping after orthographic or morphological spelling treatment in child dyslexics

Todd L. Richards[a], Elizabeth H. Aylward[a], Virginia W. Berninger[b], Katherine M. Field[a], Amie C. Grimme[a], Anne L. Richards[a, d], William Nagy[c]

Journal of Neurolinguistics
Volume 19, Issue 1, January 2006, Pages 56–86

Abstract

Four sets of word-form tasks were administered during fMRI scanning to 18 child dyslexics and 21 controls to identify unique brain activation associated with four kinds of mapping—orthographic, morpheme with and without phonological shift, and phoneme—before treatment, and to measure the effect on each kind of mapping after orthographic and morphological spelling treatment (to which dyslexics were randomly assigned). Dyslexics and/or controls showed significant pretreatment activation in group maps in 18 brain regions during one or more of the mapping tasks. Average fMRI z-scores were used to determine for each kind of fMRI mapping which of the 18 brain areas (a) differentiated dyslexics and controls before treatment; (b) showed significant pre- to post-treatment activation change in dyslexics; (c) showed post-treatment 'normalization' of activation; and (d) changed differently for dyslexics as a function of the kind of treatment received. Dyslexics in orthographic treatment showed reliable change, normalization, and treatment-specific response in right inferior frontal gyrus and right posterior parietal gyrus. Implications of the findings of the combined group map and individual (region of interest) analyses for neurolinguistics, including assessment, treatment and brain plasticity, and the role of different word forms in spelling at a specific developmental stage, are discussed.

94

SCREENING FOR DYSLEXIA K-2

95

Tests that are Familiar and that are Likely in Your District

KTEA-3

Subtest	Composite
Phonological Processing Letter & Word Recognition Letter Naming Facility	KTEA-3 Dyslexia Index: Grades K–1
Nonsense Word Decoding Spelling Word Recognition Fluency	KTEA-3 Dyslexia Index: Grades 2–12+

WIAT®4

Subtest	Composite
Phonemic Proficiency Word Reading	WIAT-4 Dyslexia Index: Grades PK-3
Word Reading Orthographic Fluency Pseudoword Decoding	WIAT-4 Dyslexia Index: Grades 4-12+

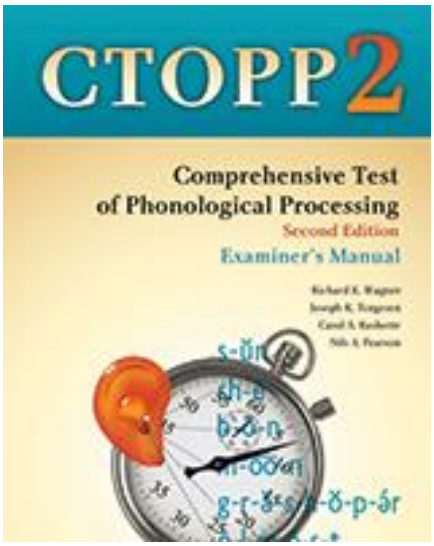
96

far™ feiferassessmentofreading™

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 (ISO)	K to college	1
	Oral Reading Fluency (ORF)	K to college	2 to 3
	Positioning Sounds (PS)	PK to college	3 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 (IRR)	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

97

- **CTOPP2**- A measure of phonological awareness, phonological memory, and rapid naming. 12 subtests in total.



98

Pearson's Dyslexia Toolkit

SCREEN	ASSESS	INTERVENE	MONITOR
aimsweb™Plus – includes the Shaywitz DyslexiaScreen™ and the Dyslexia Probability Calculator™	Wechsler Individual Achievement Test® (4th ed.; WIAT-4)	Intervention Guide for LD (Learning Disability) Subtypes	Growth Scale Values (GSVs)
Shaywitz DyslexiaScreen Forms 0–3, Adolescent-Adult, and Corrections	Process Assessment of the Learner™ (2nd ed.; PAL™–II): Diagnostics for Reading and Writing	Process Assessment of the Learner (PAL) intervention products	Progress Monitoring Assistant™
Dyslexia Probability Calculator	Kaufman Test of Educational Achievement™ (3rd ed.; KTEA™–3) Comprehensive Form	KTEA–3 teaching objectives and intervention statements & WIAT-4 intervention goal statements	Relative Performance Index (RPI) scores
Wide Range Achievement Test, (5th ed.; WRAT™5)	Woodcock Reading Mastery Tests™ (3rd ed.; WRMT™–III)	SPELL-Links™ to Reading & Writing™ SPELL-Links Class Links for Classrooms™ SPELL-Links Wordtivities™	aimswebPlus
Kaufman Test of Educational Achievement™ (3rd ed.; KTEA™–3) Brief Form	***Tests of intellectual functioning and oral language*** *are also included!.*		Review360®
Dyslexia index scores for the KTEA–3 and WIAT®-4			

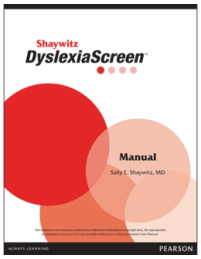
99

The ***Dyslexia Probability Calculator*** currently delivered using aimswebPlus, considers the impact of family history for dyslexia and helps educators triage students according to risk levels. The Calculator provides a probability of dyslexia that estimates the likelihood that a student has dyslexia based on the following four factors:

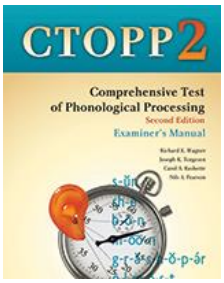
(1) the results of the Shaywitz DyslexiaScreen,
(2) the psychometric properties of the Shaywitz DyslexiaScreen (how accurately it classifies students with and without dyslexia),
(3) whether the student has a family history of dyslexia (if this information is available), and
(4) the prevalence rate of dyslexia in the population. The results are interpreted categorically as low, moderate, or high probability of dyslexia which can inform the intensity of the intervention.

6 Breaux, K. C.(2020). Diagnostic probability calculator. (U.S. Patent Application No. 16429945). U.S. Patent and Trademark Office.

100



Shaywitz Dyslexia Screen - A brief rating form of observed reading-related behaviors by teachers of children K-3



CTOPP2- A measure of phonological awareness, phonological memory, and rapid naming. 12 subtests in total.

101

	Skill/ability/indicator	IDA key indicator[a]	Test/ source	Low/ below average	Average	High/ above average	At risk (Y)/ not at risk (N)	N/A or not observed
Symptoms of difficulty	Intervention response[b]							
	Alphabet writing							
	Letter knowledge and phonics	✓						
	Decoding pseudowords	✓						
	Word reading	✓						
	Reading fluency	✓						
	Spelling	✓						
	Written expression	✓						
	Reading comprehension							
	Listening comprehension[c]							

102

	Skill/ability/indicator	IDA key indicator[a]	Test/ source	Low/ below average	Average	High/ above average	At risk (Y)/ not at risk (N)	N/A or not observed
Causes/correlates	Phonological processing	✓						
	Rapid automatic naming	✓						
	Auditory verbal working memory	✓						
	Processing speed							
	Long-term storage and retrieval							
	Associative memory							
	Orthographic processing							
Risk factors	Dyslexia screening results							
	Family history							
	History of language impairment							
	Receptive vocabulary[d]	✓						
Possible strengths	Fluid reasoning							
	Oral language; verbal comprehension							
	Math skills							

103

a The key skill areas recommended for dyslexia assessment by the International Dyslexia Association.24

b Including poor response to instruction and n or more symptoms as inclusionary criteria may improve the stability of dyslexia identification over time.

c Greater impairment in reading comprehension relative to listening comprehension is a symptom of dyslexia when there is not a co-occurring developmental language disorder.

d Receptive vocabulary may be either a risk factor for dyslexia at a young age when associated with a language impairment, a correlate among older individuals with dyslexia who read less than their peers, or a relative strength for individuals with dyslexia.

104

Table 7. CELF–5 Measures of Key Language Areas for a Dyslexia Evaluation

Language area	CELF–5
Auditory verbal working memory (phonological memory)	Recalling Sentences
Receptive vocabulary	Linguistic Concepts Word Classes Word Definitions
Written expression	Structured Writing
Listening comprehension	Following Directions Semantic Relationships Sentence Comprehension Understanding Spoken Paragraphs
Reading comprehension	Reading Comprehension
Grammatical ability	Formulated Sentences Recalling Sentences Sentence Assembly Word Structure

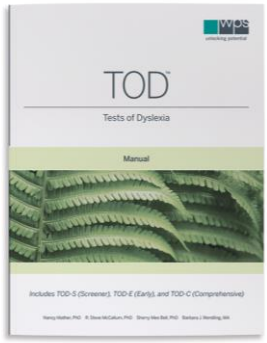
105

Table 4. WISC–V Measures of Key Cognitive Processing Areas for a Dyslexia Evaluation

Cognitive processing area	WISC–V index score
Auditory working memory (phonological memory)	Auditory Working Memory Index (AWMI)
Rapid automatic naming	Naming Speed Index (NSI)
Verbal comprehension and reasoning	Verbal Comprehension Index (VCI)
Processing speed	Processing Speed Index (PSI)
Long-term storage and retrieval	Storage and Retrieval Index (SRI)
Associative memory (learning efficiency)	Symbol Translation Index (STI)
Fluid reasoning	Fluid Reasoning Index (FRI)

106

Tests of Dyslexia (TOD)



- TOD-Screener
- TOD-Early
- TOD-Comprehensive
- TOD Rating Scales
- Dyslexia Interventions and Recommendations

Purposes

- The TOD typically has two main purposes:
  - Using the TOD-S to screen for risk of dyslexia in either a group or individually and to determine if further assessment with the TOD-C or TOD-E is needed
  - Using the TOD-S in conjunction with either the TOD-C or TOD-E (depending on age/grade), and TOD Rating Scales to conduct a comprehensive dyslexia evaluation in cases where a referral question regarding dyslexia already exists

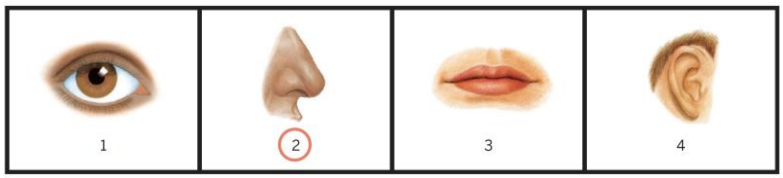
TOD-Screener (TOD-S)

- Consists of 3 tests
- Uses three versions of the Response Booklet:
  - Grades K–1
  - Grades 2–5
  - Grade 6–Adult
- Can be administered individually or to a group using the same version of the Response Booklet
- Offers an online administration option for individuals or groups

110

TOD-Screener (TOD-S)

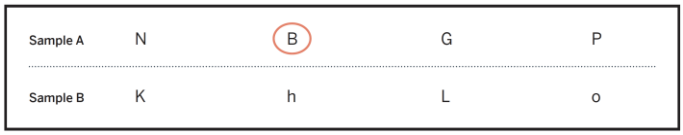
1S. *Picture Vocabulary*—The examinee looks at four pictures and circles the one that best depicts a word that the examiner presents orally.

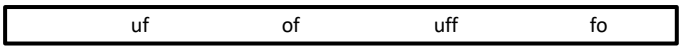


111

TOD-Screener (TOD-S)

2S. *Letter and Word Choice*—The examiner reads a letter or word aloud and the examinee circles the correct letter, or correctly spelled word, from a choice of four options (e.g., *A*, *O*, *K*, *M*; *prak*, *park*, *karp*, *rakp*).

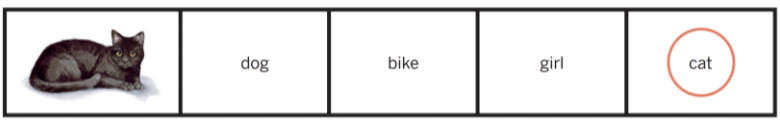




TOD-Screener (TOD-S)

3S. *Word Reading Fluency*—This is a timed test and has two parts: Part A for Grades K–1 and Part B for Grade 2 and up.

- **Part A:** *Word Reading Fluency*. In Part A, the examinee looks at a picture and then circles the correct word from a row of four words as quickly as possible. (2 minutes)



TOD-Screener (TOD-S)

3S. *Question Reading Fluency*—Part B for Grade 2 and up.

- **Part B:** *Question Reading Fluency.* In Part B, the examinee reads questions silently and then circles the correct response from a row of four words as quickly as possible (e.g., What can we eat? *tree, ball, egg, shoe*). (3 minutes)

Sample A	What is this animal? 	dog	rabbit	boy	(cat)
Sample B	What has only two legs?	man	cat	dog	socks

TOD-Screener (TOD-S)

- Takes only 10–15 minutes to administer
- Can be administered individually or to a group of students from Grade K–Adult (ages 5 years, 0 months–89 years, 11 months)
- Helps identify students that are at risk for reading difficulties
- Determines if further testing is needed
- Meets requirements for universal screening
- Measures reading fluency, orthographic processing, and vocabulary knowledge

TOD-S Dyslexia Risk Index

- Two TOD-S tests (*Letter and Word Choice*; *Word or Question Reading Fluency)* yield the Dyslexia Risk Index (DRI).
- Indicates the need for further evaluation.
- DRI scores in the at-risk range suggest further testing is needed with the TOD-C or TOD-E.

Table 3.2 Risk for Dyslexia Based on Dyslexia Risk Index (DRI) Standard Score

Risk	Interpretive description	Standard Score range
No or Low Risk	Above Average	110-130
Possible Risk*	Average	90–109
At-Risk	Below Average	89 and below

*Lower possible risk at high end of average range and higher possible risk at lower end of average range.

116

TOD-Screener and Risk Index (TOD-S)
Grade K-Adult

1. Picture Vocabulary+
2. **Letter and Word Choice**
3. **Word Reading Fluency (K–1) *or* Question Reading Fluency (Grade 2 and up)**

Dyslexia Risk Index (DRI) = **Bold** Tests

+Picture Vocabulary is useful in the DRI and EDDI interpretation.

117

TOD-Early (TOD-E)

- Appropriate for Grades K–2 (students in Grade 1 or Grade 2 who read connected text should take the TOD-C, and those who don't should take the TOD-E)
- Includes 9 tests
  - 3 from the Screener
  - 6 additional tests
- Designed to provide a deeper look at reading and spelling; explores the need for comprehensive evaluation
- Meets requirements for a more in-depth screening

118

TOD-Early (TOD-E)

1S–3S. TOD-Screener Tests: Picture Vocabulary, Letter and Word Choice, and Word Reading Fluency

4E. *Sounds and Pseudowords*—This test has three parts:

1. Examinee points to or says the number of the picture that begins with the sound the examiner says.
2. Examinee tells the sound that a letter makes.
3. Examinee reads aloud phonically regular nonsense words.

119

TOD-Early (TOD-E)

5E. *Rhyming*—The examinee points to or says the number of a picture that rhymes with a word that the examiner presents orally.

Later items ask the examinee to provide a rhyming word for a word that the examiner presents orally.

120

TOD-Early (TOD-E)

6E. *Early Rapid Number and Letter Naming*—The examinee is presented with rows of letters (A B C) and numbers (1 2 3) in a random sequence and must name as many as possible within 1 minute.

A	3	C	1	2	B

121

TOD-Early (TOD-E)

7E. *Letter and Sight Word Recognition*—This test has two parts:

1. Examinee points to and then names specific letters.
2. Examinee points to and then reads sight words.

122

TOD-Early (TOD-E)

8E. *Early Segmenting*— This test has three parts that the examiner orally presents:

- Examinee breaks apart compound words.
- Examinee breaks multisyllabic words into syllables.
- Examinee breaks words into phonemes.

123

TOD-Early (TOD-E)

8E. *Early Segmenting* —Third part: phonemes

Grade 2 starts here

Third part example:

(Now) I am going to say a word and then you tell me the sounds that you hear in the word. If I say the word *toe*, you would say /t/ /ō/. If I say the word *hot*, you would say /h/ /o/ /t/.

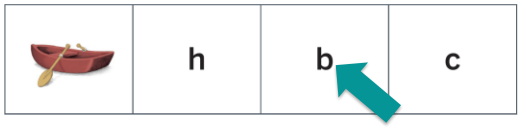
Now you do one. Tell me the sounds in the word *go*.

TOD-Early (TOD-E)

9E. *Letter and Sound Knowledge*—This test has three parts. The examinee points to or says the letter or letters that represent the first, last, or middle sound in words that the examiner presents orally. Part 1: beginning sound

Part 1 example:

Look at the picture of the boat. The first sound in the word *boat* is /b/. Because the letter *b* makes the /b/ sound, you would point to the letter *b* (point to the letter *b*).



TOD-Early Interpretive Options

- Early Dyslexia Diagnostic Index
  - Early Linguistic Processing Index
  - Early Reading and Spelling Index
- Composites
- Individual tests

126

TOD-Early Indexes

Early Dyslexia Diagnostic Index (EDDI) = Early Linguistic Processing Index + Early Reading and Spelling Index

127

TOD-Early Composites

Early Sight Word Acquisition	Early Phonics Knowledge	Early Basic Reading Skills	Early Phonological Awareness
Letter and Word Choice	Sounds and Pseudowords	Letter and Sight Word Recognition	Rhyming
Letter and Sight Word Recognition	Letter and Sound Knowledge	Letter and Sound Knowledge	Early Segmenting

128

TOD-Early (Grades K–2)

- TOD-Early Tests

1. Picture Vocabulary+
2. **Letter and Word Choice**
3. **Word Reading Fluency** (K–1) *or* **Question Reading Fluency** (Grade 2 and up)

Dyslexia Risk Index (DRI) = **Bold** Tests

+Picture Vocabulary is useful in the DRI and EDDI interpretation.

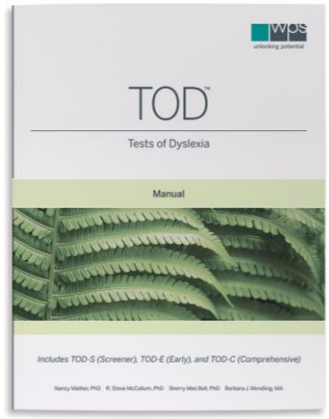
1. Picture Vocabulary+
2. **Letter and Word Choice**
3. **Word Reading Fluency**
4. **Sounds and Pseudowords**
5. **Rhyming**
6. **Early Rapid Number and Letter Naming**
7. **Letter and Sight Word Recognition**
8. **Early Segmenting**
9. **Letter and Sound Knowledge**

Early Dyslexia Diagnostic Index (EDDI) = **Bold** Tests

129

Summary of TOD-Early

- Appropriate for Grades K–2
- Provides 6 tests in addition to 3 in the Screener
- Gives a broader view of the student's reading and spelling skills
- Measures basic reading skills, spelling, phonological processing, rapid automatized naming plus the skills measured in the Screener
- Administered individually



130

Dyslexia Identification

Discrepancy Model

Vocabulary and reasoning strengths predict intact performance.

+

Intact performance in academic areas not affected by dyslexia (e.g., mathematics, science).

Consistency Model

Linguistic risk factors (e.g., phonological awareness, RAN) predict weaknesses in reading and spelling.

Poor decoding, spelling, and/or slow reading rate

Unexpected Underachievement

Expected Underachievement

131

The Ortiz PVAT – Applications

Pre-school Screening and Evaluation – dual norms permit evaluation of basic language development (receptive vocabulary) in very young children (minimum age: 2 years, 6 months) in both native English speakers and English learners prior to the beginning of formal instruction.

Progress Monitoring of English Language Proficiency – many tests, for example those used to monitor compliance with Title III ELA requirements are not well designed for that purpose and give misleading results regarding progress and growth and no information relative to the acquisition of BICS vs. CALP.

Determination of Instructional Level – the Assessment Report indicates the linguistically appropriate level of instruction and the degree of intensity required to assist the student in making progress toward grade-level standards and expectations. Specific instructional strategies are also provided.

Progress monitoring of Reading and Writing Vocabulary – the Progress Report provides data for evaluating increases in receptive vocabulary that may reflect relative progress in response to specific interventions that are being employed.

Evaluation of Growth in General Language Ability – unlike tests that do not allow measurement of growth, a specific index documenting actual growth in English vocabulary/language acquisition across short and long intervals is provided.

Development of Intervention/Treatment Strategies – performance is linked directly to specific and customized recommendations for language-based intervention and treatment strategies relative to true peers.

Diagnostic and Disability Evaluation – provides the only norm-referenced "true peer" comparison necessary for evaluating "difference vs. disorder" in general language-related disabilities/disorders related to vocabulary acquisition.

132

RESEARCH-BASED TIER 1 PROGRAMS

- **Phonemic Awareness**
  - Road to the Code
  - Funnix
  - Phonemic Awareness in Young Children
  - Voyager Passport
  - FOCUS
  - Wilson Fundations

Phonics

- Kaleidoscope
- Saxon Phonics
- Phonics for Reading
- Wilson Fundations

http://www.readingrockets.org/pdfs/Reading-intervention-programs-chart.pdf

133

RESEARCH-BASED TIER 1 PROGRAMS

Fluency

- Open Court
- Voyager Universal Literacy System
- Wilson Fundations

Comprehension

- Kaleidoscope
- Voyager Universal Literacy System
- Voyager Passport
- Soar to Success

http://www.readingrockets.org/pdfs/Reading-intervention-programs-chart.pdf

134

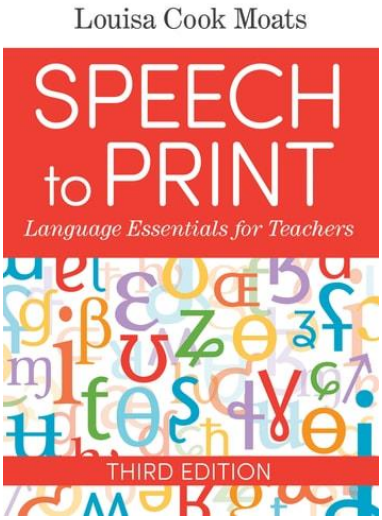
"One of the most fundamental flaws found in almost all phonics programs, including traditional ones, is that they teach the code backward. They go from letter to sound instead of sound to the letter.... the print to sound (conventional phonics) approach leaves gaps, invites confusion, and creates inefficiencies."

- Dr. Louisa Moats (1998)

135

The Science of Teaching Reading

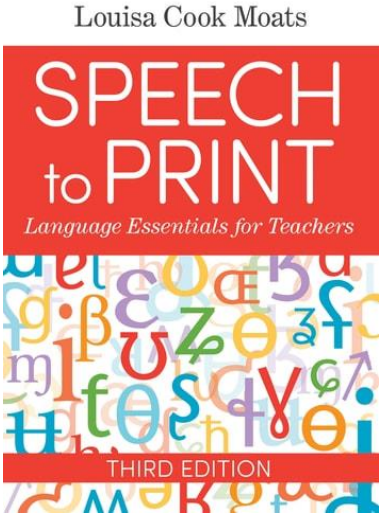
- The speech-to-print approach allows for a more logical and complete understanding of how the English system works; our 26 alphabet letters do not contain symbols for some speech sounds that still must be represented (/sh/, /ng/, and others), and many letters often do several different jobs in our orthography.
- For example, if we teach students that “u” is a vowel, there is an obvious contradiction: In "quit," it represents a consonant (/w/).
- Letters are not consonants or vowels—they are used one at a time and in combination to represent consonant and vowel phonemes.



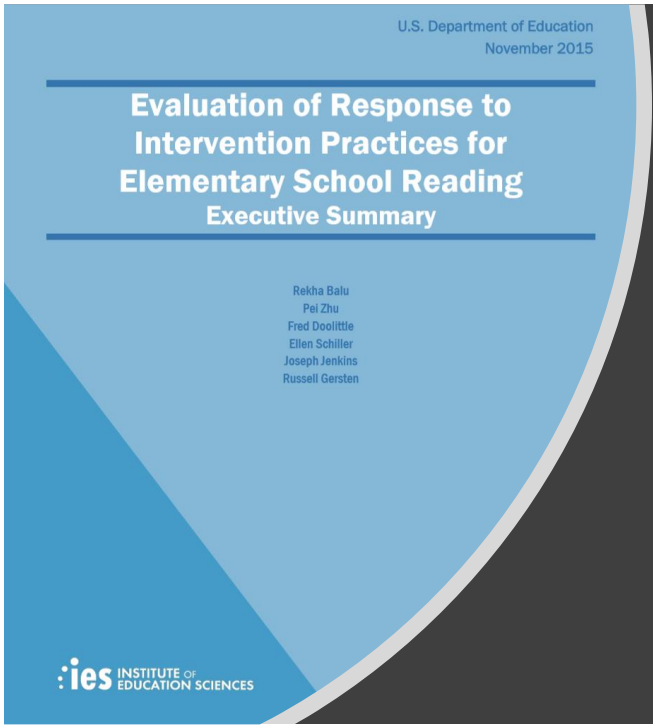
136

The Big Picture

- Any systematic, explicit teaching of the code is better than none.
- Unfortunately, too many prevalent practices reflect the (unstated) assumption that learning to read and spell depends on rote visual memory of strings of letters.
- This assumption underlies the use of leveled readers that beginners are expected to “read” by pointing to whole words as they recite the text from memory.
- With this look-and-say approach, context-driven guessing substitutes for knowing what the letters represent.
- To be clear, this is not what we mean by a “speech to print,” *and it’s time we got this right in our classrooms.*



137



- The U.S. Department of Education commissioned a study that examined the efficacy of RTI and its implementation
- 146 elementary schools using RTI were included in the study
- *Results showed that RTI had a negative effect on the academic achievement of first graders and had no effect on second and third graders*

138

Exceptional Children
2017, Vol. 83(3) 255–268

DOI: 10.1177/0014402917693580
journals.sagepub.com/home/ecx
SAGE

Critique of the National Evaluation of Response to Intervention: A Case for Simpler Frameworks

Douglas Fuchs[1] and Lynn S. Fuchs[1]

Abstract

In 2010, the Institute of Education Sciences commissioned a much-needed national evaluation of response to intervention (RTI). The evaluators defined their task very narrowly, asking "Does the use of universal screening, including a cut-point for designating students for more intensive Tier 2 and Tier 3 interventions, increase children's performance on a comprehensive reading measure?" Their regression-discontinuity analysis showed that first-grade children designated for (but not necessarily receiving) more intensive intervention in the 146 study schools performed significantly worse than children not designated for it. There were no reliable differences between designated and nondesignated students in Grades 2 or 3. The provocativeness of these findings notwithstanding, the evaluation's focus and design weakens its importance. RTI implementation data were also collected in the 146 study schools. These data suggest many of them were not conducting RTI in a manner supported by research and policy. Such findings and others' evaluations of RTI advance the idea that simpler frameworks may encourage more educators to implement RTI's most important components with fidelity.

139

Many teachers exposed to the science of reading and how to teach reading following the science have this kind of reaction

EBLI Evidence-Based Literacy Instruction

"I realized that what I had been taught to do in college, in my masters classes, my additional 30 credits after my masters, and even through district PD was actually what was failing kids. It has been a whirlwind three years, but I finally feel -- after 20 years of teaching -- that with EBLI, I finally have the tools I need to teach EVERY child to read."

JULIE VANLIER
Kindergarten Classroom Teacher

140

EBLI

TEACHING THE WORLD TO READ

An accelerated, systematic, explicit, and integrated instructional **speech-first approach** to spelling and reading.

"We know that children who have not developed foundational reading abilities by approximately nine years of age are highly likely to struggle with reading throughout their educational tenure, if not the rest of their lives, and may never read efficiently enough to acquire information or to enjoy the process."

National Institute for Child Health and Human Development, 2003

141

The power of speech-first approach

Logical Understanding

There are 44 speech sounds represented by 26 letters or groups of letters in the alphabet.

Representation of Phonemes

Helps develop phonemic awareness skills while weaving in new phonics information at the same time, in the same activity.

Skill Transferability

Enhances transferable skills enabling reading and spelling proficiency across unfamiliar words.

EBLI Evidence-Based Literacy Instruction

142

Logic Model for EBLI

PROBLEM STATEMENT

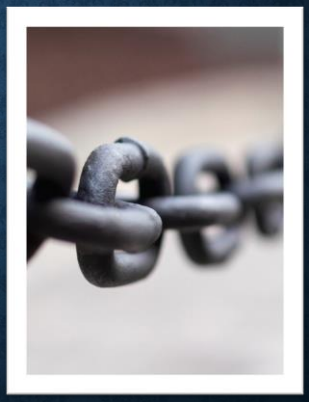
A significant number of students need help to achieve adequate literacy levels in reading and writing English as a result of ineffective teaching methodologies. Educators often have not been equipped with the knowledge and skills to effectively teach reading, resorting to practices that yield suboptimal outcomes. As a result, nearly two-thirds of U.S. fourth graders are not profiecent readers.

RESOURCES	STRATEGIES & ACTIVITIES	OUTPUTS
What resources are or could be available?	*What will the activities, events, and such be?*	*What are the initial products of these activities?*
• EBLI Classroom Training • EBLI Student Lessons • Materials to teach students directly • Access to internet and video/projection equipment • Teacher Support • Whiteboards and Markers for each student • EBLI apps • EBLI YouTube lessons	• Teacher learning immediately applied to Student Instruction • Teacher coaching • Student instruction videos will be utilized to build strong foundations for students • The materials provide an activity for students to practice. • Individualized instruction • Reading and spelling taught simultaneously. • Consistent skills, concepts, activities, and info for all students in Tier 1, 2, and 3 (whole class, small group, or 1:1)	• Teachers provide evidence based literacy solutions • Teachers teach, correct errors, and differentiate in whole class instruction. • Teachers spend less time planning and more time teaching • Students gain exposure to speech first based reading technique which supports effective reading and spelling • Teacher training and student instruction, including lessons and materials, are intertwined and teacher support is ongoing

143

LINKING ASSESSMENT RESULTS TO INTERVENTION

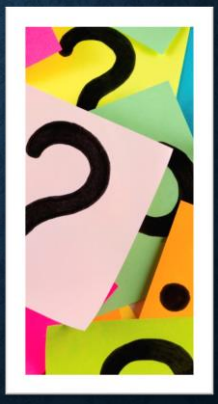
- **Most critical piece**
- Often missing from reports
- **Why?**
  - Lack of training/knowledge
  - Administrative concerns



144

WHY DO PRACTITIONERS HAVE DIFFICULTY FINDING AND SELECTING INTERVENTIONS FOR STUDENTS WITH LEARNING NEEDS?

- It's a complex process that is often not taught in training programs
- Lack of knowledge on how cognitive abilities and processes are related to learning and achievement
- Lack of knowledge about how cognitive deficits manifest in real-world performances (e.g., in the classroom)
- Insufficient understanding of what a teacher or parent can and cannot do
- Not enough time to do the research necessary to find appropriate interventions, strategies, and resources



145

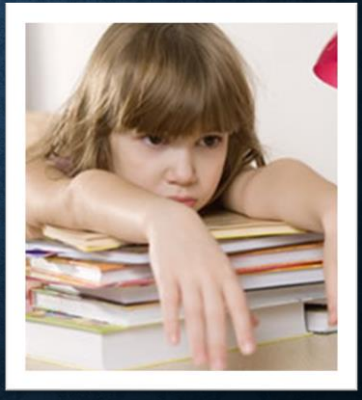
THE RESULT?
RECOMMENDATIONS IN REPORTS AND IEPS

- Are often too broad or generic
- Are insufficiently tailored (i.e., "one size fits all")
- Lack guidance on implementation
- Do not match the student's instructional level
- Are not readily accessible
- Do not specify the intervention method (e.g., individual, small group)
- Do not include the range of resources and intervention types available to improve the student's ability to access the curriculum and instruction (e.g., instructional, environmental, curricular, remedial, skill-building, compensatory)

146

WHEN RECOMMENDATIONS ARE INAPPROPRIATE, VAGUE, OR UNUSABLE…

- No one benefits, including the student, parents, and teachers
- The practice of *assessment for intervention* is called into question
- Adds fuel to the anti-cognitive assessment movement



147

NARROWING THE GAP BETWEEN ASSESSMENT FINDINGS AND INTERVENTION

- Understand how to address academic skill weaknesses and minimize the effects of specific cognitive weaknesses in ways that allow the student ***greater access to instruction and the curriculum***
- Continue to conduct ***comprehensive evaluations***, particularly for students who do not respond to scientifically-based instruction and intervention
- ***Make connections*** between cognitive data and academic performance that are supported by research
- Identify ways in which cognitive weaknesses manifest in general and more specifically in reading, writing, and math – ***ecological validity***
- **Use *IL:FIRST®* to drill down and find the interventions that meet the unique learning needs of students**

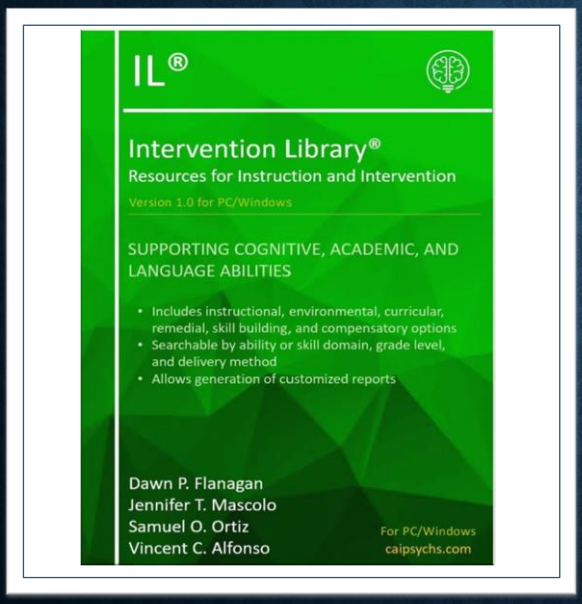
148

INTERVENTION LIBRARY (IL)®

A *MULTIDISCIPLINARY* RESOURCE

School Psychologists	Educational Diagnosticians/Educational Evaluators/LDTC	Speech Language Pathologists
Special Education Teachers	General Education Teachers	Other Related Service Providers

149

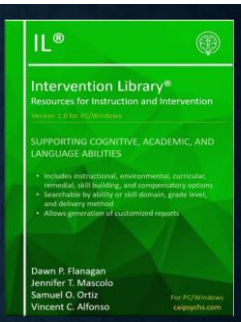


- Includes more than 1,000 interventions across six intervention types
- Selection criteria are used to find interventions quickly
- From a pool of interventions that match selection criteria, the user selects the ones that best match the student's learning needs

150

Ten Cognitive Domains

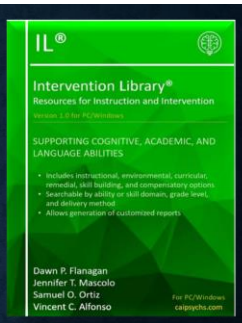
(Text in green indicates most important for **Dyslexia Evaluation**)



- Gf – Fluid Reasoning
- Gc – Crystallized Knowledge (e.g., Vocabulary, Listening, and Communication Abilities)
- Gl – Learning Efficiency
- Gr – Retrieval Fluency (Rapid Naming, Speed of Lexical access)
- Gwm – Working Memory Capacity
- Gv – Visual Processing
- Ga:General – Auditory Processing
- Ga:PA – Phonemic Awareness and Phonological Awareness (also includes Phonological Memory)
- Gv – Visual Processing
- Gs – Speed of Processing (e.g., with *orthographic* units)
- OP – Orthographic Processing

151

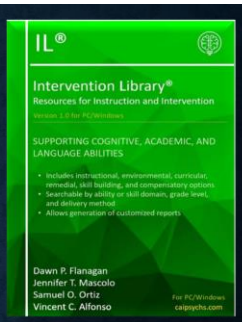
INTERVENTION TYPES



- **Instructional**
  - Teaching procedures and techniques used to support learning and assist in minimizing the impact of cognitive or academic weaknesses; many of these procedures and techniques are meant to be used by general and special education teachers, or related service providers, before, during, or after direct, explicit instruction
- **Environmental**
  - Physical resources in a student's learning setting that may be used or adapted to increase access to, or support understanding of, instructional content
- **Curricular**
  - Printed, digital, and other educational resources that may be used to support and reinforce initial learning in a manner that responds to a student's unique needs
- **Remedial Programs**
  - Remediation programs are intended to ameliorate academic weaknesses and train specific cognitive processing weaknesses
- **Skill-Building Techniques**
  - Skill-Building Techniques assist in acquiring, practicing, and developing academic and cognitive skills
- **Compensatory Strategies and Supports**
  - Strategies used by the student to support learning and assist in compensating for or minimizing the impact of cognitive or academic weaknesses
- Skill-building techniques Skill-building techniques

152

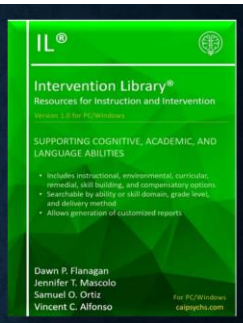
OTHER SELECTION CRITERIA



- **Grade Levels**
  - Early Elementary
  - Late Elementary
  - Middle School
  - High School
- **Instructional Delivery Method**
  - Individual
  - Small Group
  - Whole Class
  - All
- **Cost Option**
  - Free to Use
  - Pay to Use
  - Both

153

OTHER FEATURES



- **Contains Links to Websites**
  - -Description and benefits of Intervention
  - -How to Implement the Intervention
  - -Printables (e.g., templates, worksheets)
  - -Free educational games, programs, resources, etc.
  - -Free tools (e.g., graphic organizer maker, timers, checklists)
- **Allows the User to Customize a Report**
  - -Word document
  - -May edit the Word document for further customization

154

FOUNDATIONAL INFORMATION THAT INFORMS INTERPRETATION OF ASSESSMENT FINDINGS AND INTERVENTION SELECTION

- **Relations between cognitive abilities and processes, and academic skills are supported by research**

155

RELATIONS BETWEEN COGNITIVE ABILITIES AND PROCESSES, AND SPECIFIC READING SKILLS

SLD Specifier	Subskill	Associated Impairments/Cognitive Correlates	CHC Abilities and Processes
With Impairment in Reading	Word Reading Accuracy	**Phonological awareness** – primary cognitive correlate; the metacognitive understanding that words have internal structures based on phonemes (Fletcher et al., 2007; Kudo, Lussier, & Swanson, 2015; Melby-Lervåg, Lyster, & Hulme, 2012; Willcutt et al., 2013). When this awareness is impaired, word recognition is delayed and fluency and comprehension skills are consequently affected.	Ga:PC Phonetic Coding
		Rapid naming – some researchers have found that phonological awareness and rapid letter naming both uniquely predict word recognition skills (Schatschneider, Fletcher, Francis, Carlson, & Foorman, 2004; Wagner, Torgesen, & Rashotte, 1994; Wagner, Torgesen, Rashotte, & Hecht, 1997). However, a meta-analysis of studies examining the relationship between rapid naming and dyslexia found little evidence to support a central and persistent deficit in naming speed in individuals with the disorder (Vukovic & Siegel, 2006). On the other hand, there are findings to suggest that phonological awareness and rapid naming, although correlated, are distinct variables and contribute uniquely to word recognition (Petrill, Deater-Deckard, Thompson, DeThorne, & Schatschneider, 2006).	Gr:NA Naming Facility
		Phonological memory – working memory for verbal and sound-based information has also been found to be significantly related to word recognition, although it may not uniquely contribute when phonological processing is accounted for (Melby-Lervag, Lyster, & Hulme, 2012; Schatschneider et al., 2004; Wagner et al., 1997; Willcutt et al., 2013).	Ga:UM Memory for Sound Patterns

156

RELATIONS BETWEEN COGNITIVE ABILITIES AND PROCESSES, AND SPECIFIC READING SKILLS

SLD Specifier	Subskill	Associated Impairments/Cognitive Correlates	CHC Abilities and Processes
With Impairment in Reading	Reading Rate or Fluency	**Rapid automatized naming (RAN)** – while the exact relationship between RAN and reading remains unclear, RAN is believed to be one of the best predictors of reading fluency (Georgiou et al., 2008, Tan et al., 2005). The automaticity required to complete RAN tasks is related to the ability to synthesize and automatize letter sequences / words when reading (Norton & Wolf, 2012). There are also a variety of cognitive processes implicated in rapid naming. These include attention, executive functions (i.e., response inhibition, set shifting), lexical retrieval, and processing speed (Moll, Gobel, & Snowling, 2015).	Gr:NA Naming Facility
		Orthographic processing – processing of orthographic information (i.e., the ability to process units of words based on visual long-term memory representations) is considered critical in automatic word recognition and consequently plays a crucial role in fluency (O'Brien et al., 2011). This ability is often impaired or underdeveloped in some reading disabled individuals.	Gs:Pc With Orthographic Units as Stimuli

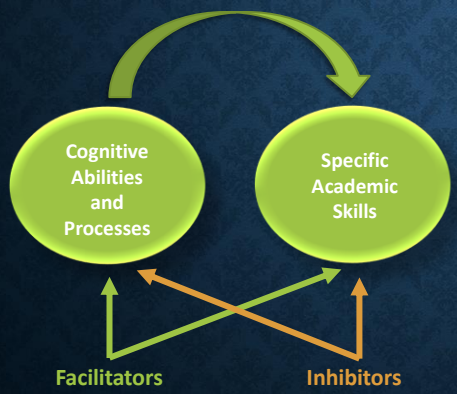
157

RELATIONS BETWEEN COGNITIVE ABILITIES AND PROCESSES, AND SPECIFIC READING SKILLS

SLD Specifier	Subskill	Associated Impairments/Cognitive Correlates	CHC Abilities and Processes	
With Impairment in Reading	Reading Comprehension	**Oral language** – difficulties in reading comprehension are frequently associated with deficits oral language in general, including areas such as vocabulary, morphology, and syntax (Catts et al., 1999; Cutting & Scarborough, 2006; Share & Leikin, 2004; Torgesen, 2000; Willcutt et al., 2013).	Gc:VL, MY, CM	Vocabulary Knowledge; Grammatical Sensitivity; Communication Ability
		Listening comprehension – several studies have demonstrated that a unique portion of the variance in reading comprehension can be explained by listening comprehension (Cutting & Scarborough, 2006; Kendeou, van den Broek, White, & Lynch, 2009).	Gc:LS	Listening Abilities
		Working memory – comprehension involves holding words and sentences in awareness, while integrating prior knowledge with incoming information (Carretti et al., 2009). Poor comprehenders may have particular difficulty updating / revising information already in working memory (Pelegrina et al., 2014; Peng et al., 2018; Peng & Fuchs, 2016).	Gwm	Working Memory Capacity
		Executive functioning – several executive functions are involved in reading comprehension, including planning, organization, and self-monitoring (Cutting et al., 2009; Locascio, et al., 2010; Sesma et al., 2008). Weaknesses in these executive functions result in difficulties with higher-order comprehension skills such as inferencing, integrating prior knowledge, monitoring comprehension, and adapting to text structure or genre (Fletcher et al., 2007; Kendeou, van den Broek, Helder & Karlsson, 2014).	Gf:I,RG	Inductive Reasoning; General Sequential (Deductive) Reasoning

158

INFORMATION THAT INFORMS INTERPRETATION OF ASSESSMENT FINDINGS AND INTERVENTION SELECTION



- Many factors can either facilitate or inhibit cognitive and academic performance and these factors need to be considered
- Facilitators should be used to support learning and intervention implementation
- One or more Inhibitors may be the primary reason for learning difficulty (e.g., exclusionary factors)

159

COGNITIVE WEAKNESSES MANIFEST IN CLASSROOM PERFORMANCE

Gwm

Weakness in Auditory Short-term Storage

How does this cognitive weakness manifest for this student in the classroom?

160

MANIFESTATIONS OF A WEAKNESS IN WORKING MEMORY

Working Memory Capacity (Gwm) (Check All that Apply) Print Gwm Only Clear All Gwm Selections

Refers to the ability to encode and maintain verbal or visual information in immediate awareness and then manipulate or transform it in some way within a few seconds, which requires focused attention. An example of Gwm is the ability to hold a string of numbers in one's mind (e.g., 4-7-3-6) and repeat the string back in reverse sequence (i.e., 6-3-7-4). A weakness in Gwm can interfere with learning and achievement in the following ways:

General Manifestations	Specific Manifestations: Reading	Specific Manifestations: Math	Specific Manifestations: Writing
Difficulties with	***Reading Difficulties***	***Math Difficulties***	***Writing Difficulties***
☐ Following multistep oral and written instructions	☑ Reading comprehension (i.e. remembering what is read)	☐ Rote memorization of math facts	☐ Spelling multisyllabic words
☑ Remembering information long enough to apply it	☐ Decoding multisyllabic words	☐ Remembering math procedures	☐ Redundancy in writing (word and conceptual levels) due to forgetting
☐ Remembering the sequence of information	☐ Orally retelling or paraphrasing what one has read	☐ Multi-step problems and regrouping	☐ Communicating main idea of a story in writing due to difficulty remembering what was read
☐ Rote memorization		☐ Extracting information to be used in word problems	☐ Maintaining and building upon the theme of assembly including relevant supporting details
☐ Maintaining one's place in a math problem or train of thought while writing		☑ Maintaining one's place while executing a series of steps in a computation or higher-level math problem	☑ Note-taking due to challenges with holding information in mind long enough to write it down

Other:

161

Why is it Important To Understand How Cognitive Weaknesses Manifest?

Manifestations provide *ecological validity* for your test findings

Manifestations give you a *focus for intervention*

When you know how a weakness is interfering in the learning process, interventions can be selected that are *specific to the student*

162

COGNITIVE WEAKNESSES MANIFEST IN CLASSROOM PERFORMANCE

Reduce Working Memory Demands Using Guided Notes

Slope

- Slope is a measure of the steepness of a line on a graph. .
  - ☆ The rise divided by the run.
  - ☆ Rise is the vertical change when the slope of a line is expressed as the ratio rise/run, or "rise over run"
  - ☆ Run is the horizontal change when the slope of a line is expressed as the ratio rise/run, or "rise over run"
- Rate · a that compares the amount of change in a variable to the amount of change in an variable.

_____ = _____=_____=_____

Guided notes facilitate learning because they minimize the effects of the working memory weakness on the student's ability to access the curriculum

163

IL® IS A RESOURCE FOR TIERED INTERVENTION

- Recommendations across domains can be considered and implemented within and across multiple phases of support
  - Pre-referral phase
  - Formal evaluation
  - Intervention Planning/Implementation
  - Follow-up/Progress-Monitoring

164

CASE EXAMPLE

165

CASE OF TRINITY

- Third Grader
- Female student
- Normal attainment of developmental milestones
- Referred for reading difficulties and concerns about executive functions
- No prior evaluations

166

TRINITY'S TEST BATTERY

- WISC-V
- WJ- IV COG Letter Pattern Matching and Number Pattern Matching (for Orthographic Processing)
- WIAT-4
- WJ IV ACH Sentence Reading Fluency
- DKEFS
- CVLT-C
- Continuous Performance Test, Third Edition (CPT-3)
- Rating Scales

167

COGNITIVE RESULTS

Wechsler Intelligence Scales for Children, Fifth Edition (WISC-V)

Composite/Subtest	Standard/Scaled Scores	Percentile Rank	Description
Verbal Comprehension Index	**118**	**88th**	**High Average**
Similarities	14	91st	High Average
Vocabulary	13	84th	High Average
Visual Spatial Index	**111**	**77th**	**High Average**
Block Design	12	75th	Average
Visual Puzzles	12	75th	Average
Fluid Reasoning	**123**	**94th**	**Very High**
Matrix Reasoning	14	91st	High Average
Figure Weights	14	91st	High Average
Working Memory Index	**107**	**68th**	**Average**
Digit Span	11	63rd	Average
Digits Forward	*10*	*50th*	*Average*
Digits Backward	*9*	*37th*	*Average*
Digits Sequencing	*14*	*91st*	*High Average*
Picture Span	11	63rd	Average
Processing Speed Index	**98**	**45th**	**Average**
Coding	10	50th	Average
Symbol Search	9	37th	Average

168

COGNITIVE RESULTS

Naming Speed	**82**	**12th**	**Low Average**
Naming Speed Literacy	75	5th	Very Low
Naming Speed Quantity	94	34th	Average
Symbol Translation	**108**	**70th**	**Average**
Immediate Symbol Translation	111	77th	Average
Delayed Symbol Translation	106	66th	Average
Recognition Symbol Translation	106	66th	Average
Storage and Retrieval Index	**93**	**32nd**	**Average**
Nonverbal Index	**116**	**86th**	**High Average**
General Ability Index	**123**	**94th**	**Very High**
Cognitive Proficiency Index	**102**	**55th**	**Average**
Full Scale IQ	**119**	**90th**	**High Average**

Woodcock Johnson Tests of Cognitive Abilities, Fourth Edition (WJ -V COG)

Composite/Subtest	Standard Score	Percentile Rank	Classification	RPI	Proficiency
Perceptual Speed	**99**	**47th**	**Average**	**88/90**	**Average**
Letter-Pattern Matching	92	30th	Average	69/90	Limited to Average
Number-Pattern Matching	105	64th	Average	96/90	Average to Advanced

169

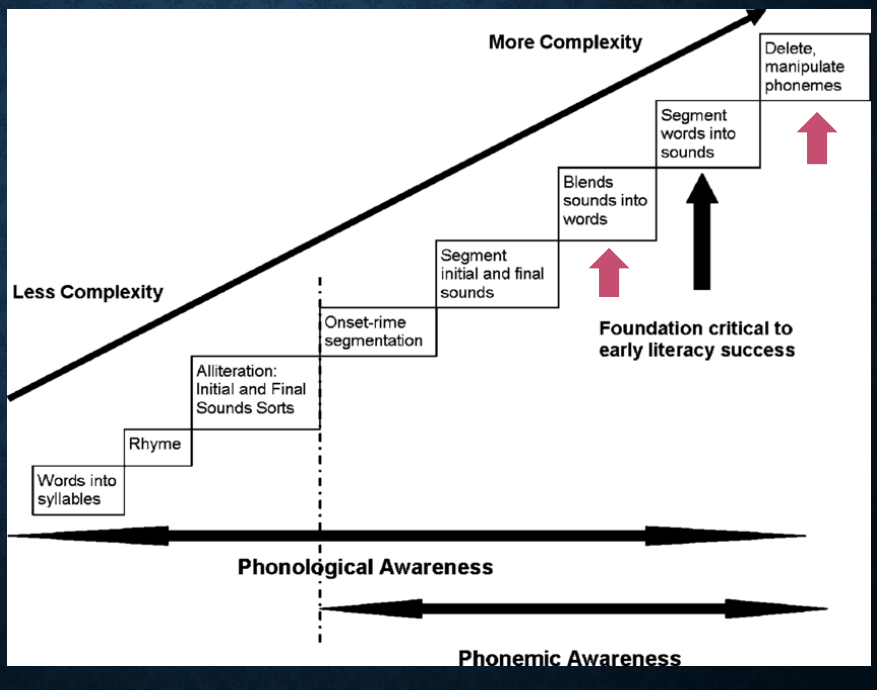
COGNITIVE RESULTS

Comprehensive Test of Phonological Processing, Second Edition (CTOPP-2)

Subtest	Scaled Score	Percentile Rank	Description
Elision (EL)	6	9th	Below Average
Blending Words (BW)	7	16th	Below Average
Phoneme Isolation (PI)	9	37th	Average
Memory for Digits (MD)	11	63rd	Average
Nonword Repetition (NR)	7	16th	Below Average
Rapid Digit Naming (RD)	8	25th	Average
Rapid Letter Naming (RL)	6	9th	Below Average
Blending Nonwords (BN)	9	37th	Average
Segmenting Nonwords (SN)	8	25th	Average
Composite	**Composite Score**	**Percentile Rank**	**Description**
Phonological Awareness	84	14th	Below Average
Phonological Memory	95	37th	Average
Rapid Symbolic Naming	82	12th	Below Average
Alt. Phonological Awareness	92	30th	Average

170

PHONOLOGICAL HIERARCHY



171

ACADEMIC RESULTS

Wechsler Individual Achievement Test, Fourth Edition (WIAT-4)

Composite/Subtest	Standard Score	Percentile Rank	Classification
Total Achievement	**97**	**42nd**	**Average**
Word Reading	86	18th	Low Average
Reading Comprehension	110	75th	High Average
Spelling	94	34th	Average
Sentence Composition	105	63rd	Average
Math Problem Solving	98	45th	Average
Numerical Operations	101	53rd	Average
Reading	**97**	**42nd**	**Average**
Word Reading	86	18th	Low Average
Reading Comprehension	110	75th	High Average
Basic Reading	**83**	**13th**	**Low Average**
Pseudoword Decoding	76	5th	Very Low
Phonemic Proficiency	95	37th	Average
Word Reading	86	18th	Low Average

172

ACADEMIC RESULTS

Reading Fluency	**87**	**19th**	**Low Average**
Oral Reading Fluency	93	32nd	Average
Orthographic Fluency	95	37th	Average
Decoding Fluency	81	10th	Low Average
Decoding	**80**	**9th**	**Low Average**
Pseudoword Decoding	76	5th	Very Low
Word Reading	86	18th	Low Average
Phonological Processing	**84**	**14th**	**Low Average**
Pseudoword Decoding	76	5th	Very Low
Phonemic Proficiency	95	37th	Average
Orthographic Processing	**90**	**25th**	**Average**
Orthographic Fluency	95	37th	Average
Spelling	94	34th	Average
Orthographic Choice	87	19th	Low Average
Dyslexia Index	**90**	**25th**	**Average**
Word Reading	86	18th	Low Average
Phonemic Proficiency	95	37th	Average

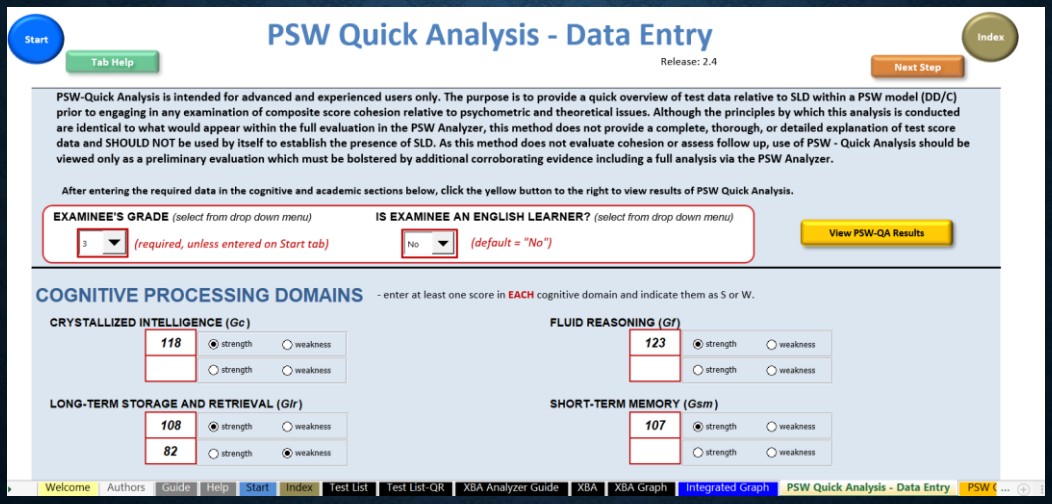
173

ACADEMIC RESULTS – WIAT-4

Written Expression	**98**	**45th**	**Average**
Spelling	94	34th	Average
Sentence Composition	105	63rd	Average
Sentence Building	*114*	*82nd*	*High Average*
Sentence Combining	*96*	*39th*	*Average*
Writing Fluency	**111**	**77th**	**High Average**
Alphabet Writing Fluency	116	86th	High Average
Sentence Writing Fluency	103	58th	Average
Mathematics	**99**	**47th**	**Average**
Math Problem Solving	98	45th	Average
Numerical Operations	101	53rd	Average
Math Fluency	**100**	**50th**	**Average**
Math Fluency- Addition	98	45th	Average
Math Fluency- Subtraction	97	42nd	Average
Math Fluency- Multiplication	105	63rd	Average

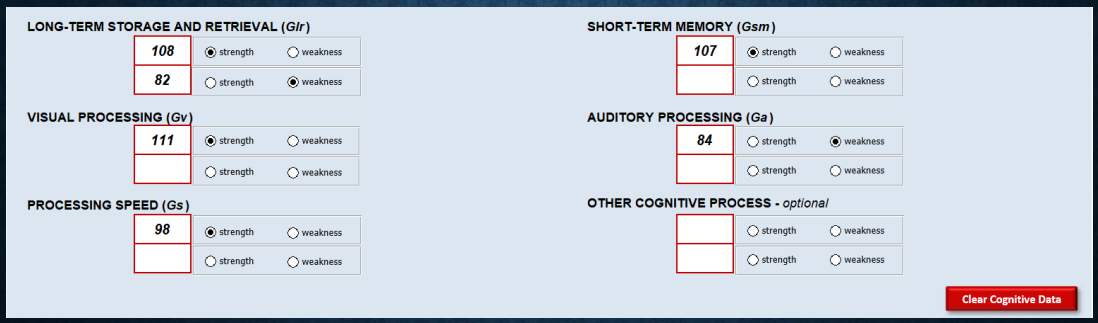
174

X-BASS QUICK ANALYSIS



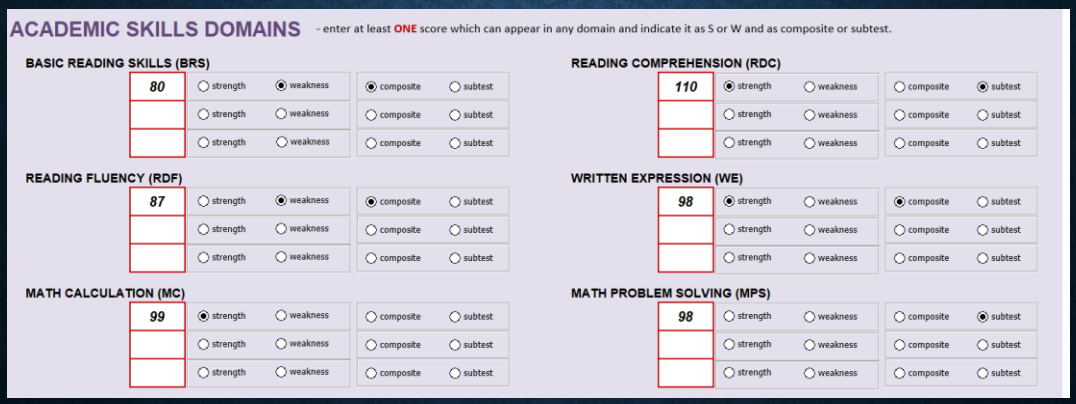
175

XBASS QUICK ANALYSIS

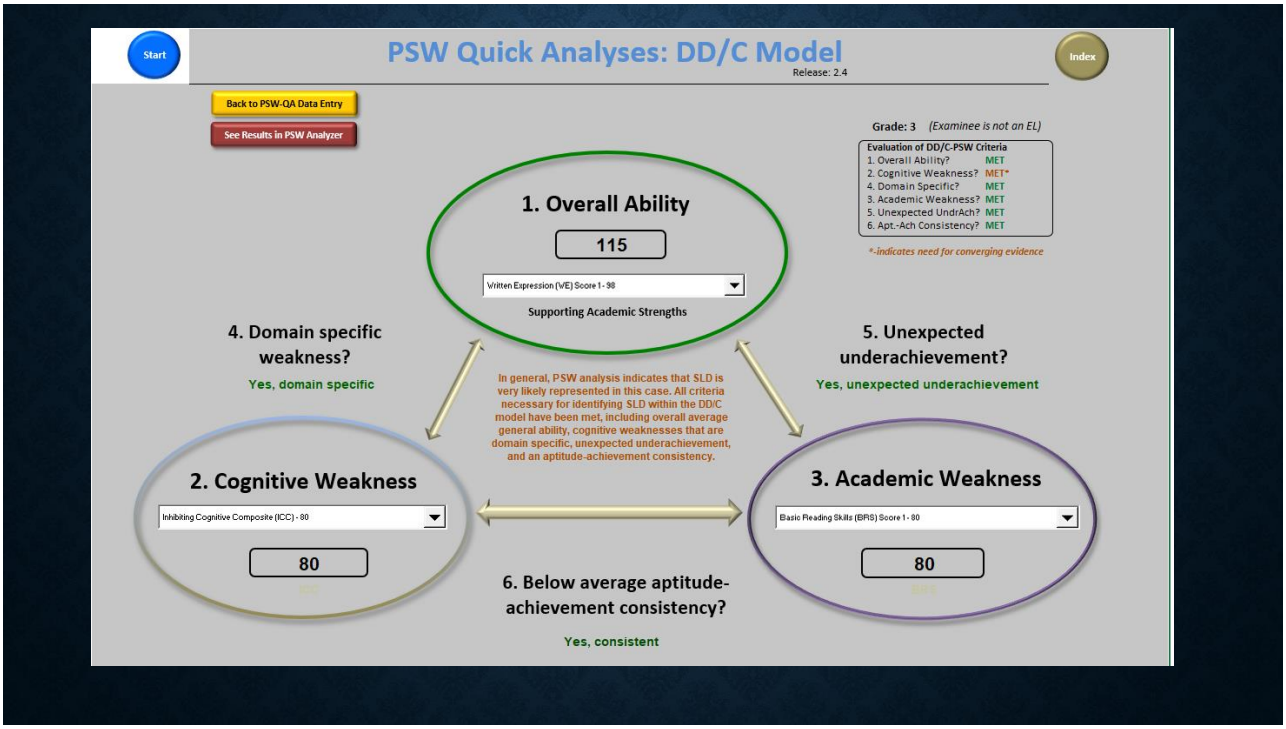


176

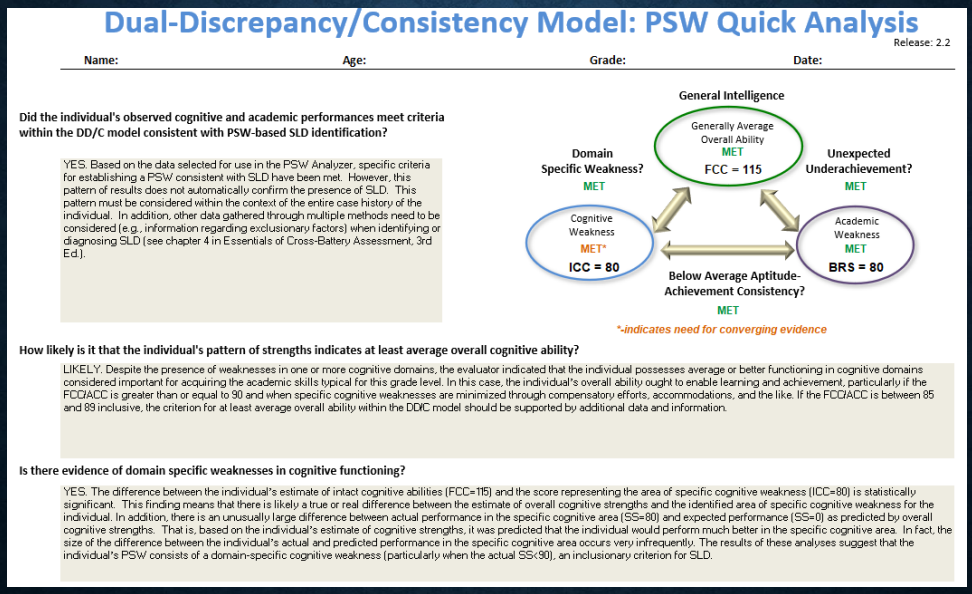
X-BASS QUICK ENTRY



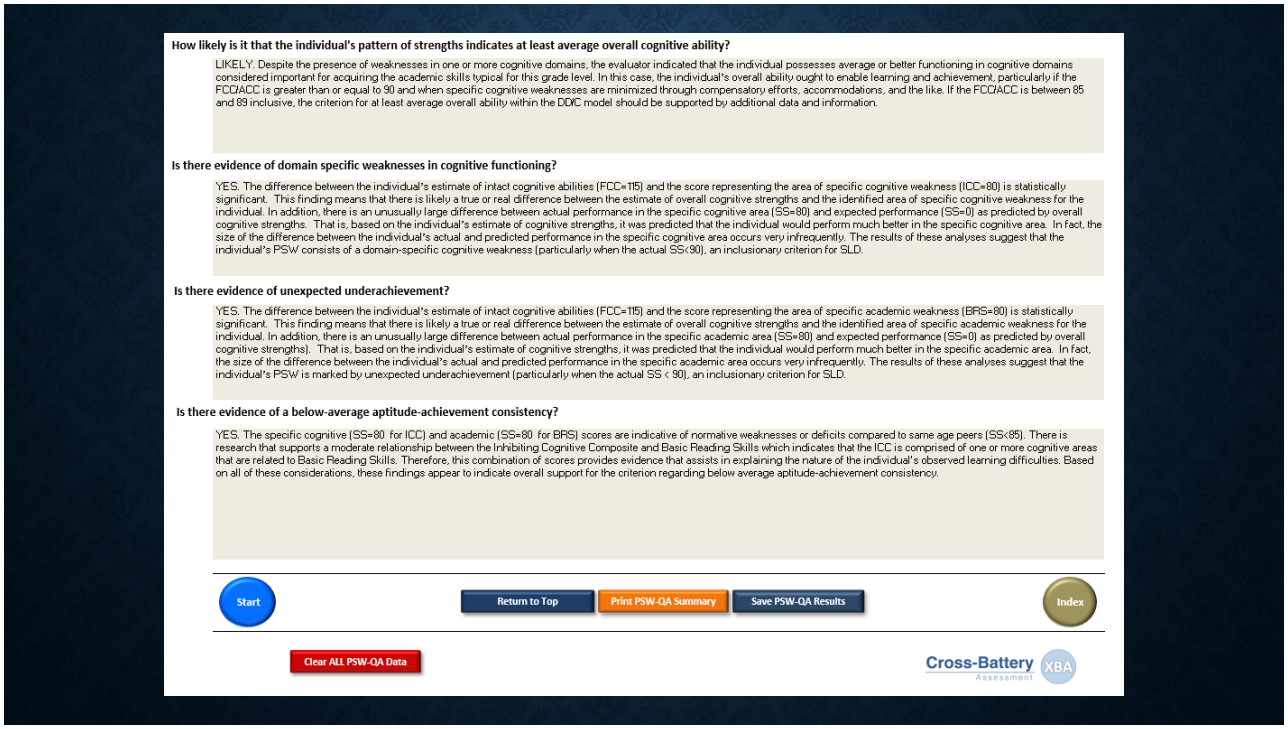
177


Start
PSW Quick Analyses: DD/C Model
Release: 2.4
Index
Back to PSW-QA Data Entry
See Results in PSW Analyzer
Grade: 3 (Examinee is not an EL)
Evaluation of DD/C-PSW Criteria
1. Overall Ability? MET
2. Cognitive Weakness? MET*
4. Domain Specific? MET
3. Academic Weakness? MET
5. Unexpected UndrAch? MET
6. Apt.-Ach Consistency? MET
*-indicates need for converging evidence
1. Overall Ability
115
Written Expression (WE) Score 1 - 98
Supporting Academic Strengths
4. Domain specific weakness?
Yes, domain specific
5. Unexpected underachievement?
Yes, unexpected underachievement
In general, PSW analysis indicates that SLD is very likely represented in this case. All criteria necessary for identifying SLD within the DD/C model have been met, including overall average general ability, cognitive weaknesses that are domain specific, unexpected underachievement, and an aptitude-achievement consistency.
2. Cognitive Weakness
Inhibiting Cognitive Composite (ICC) - 80
80
3. Academic Weakness
Basic Reading Skills (BRS) Score 1 - 80
80
6. Below average aptitude-achievement consistency?
Yes, consistent

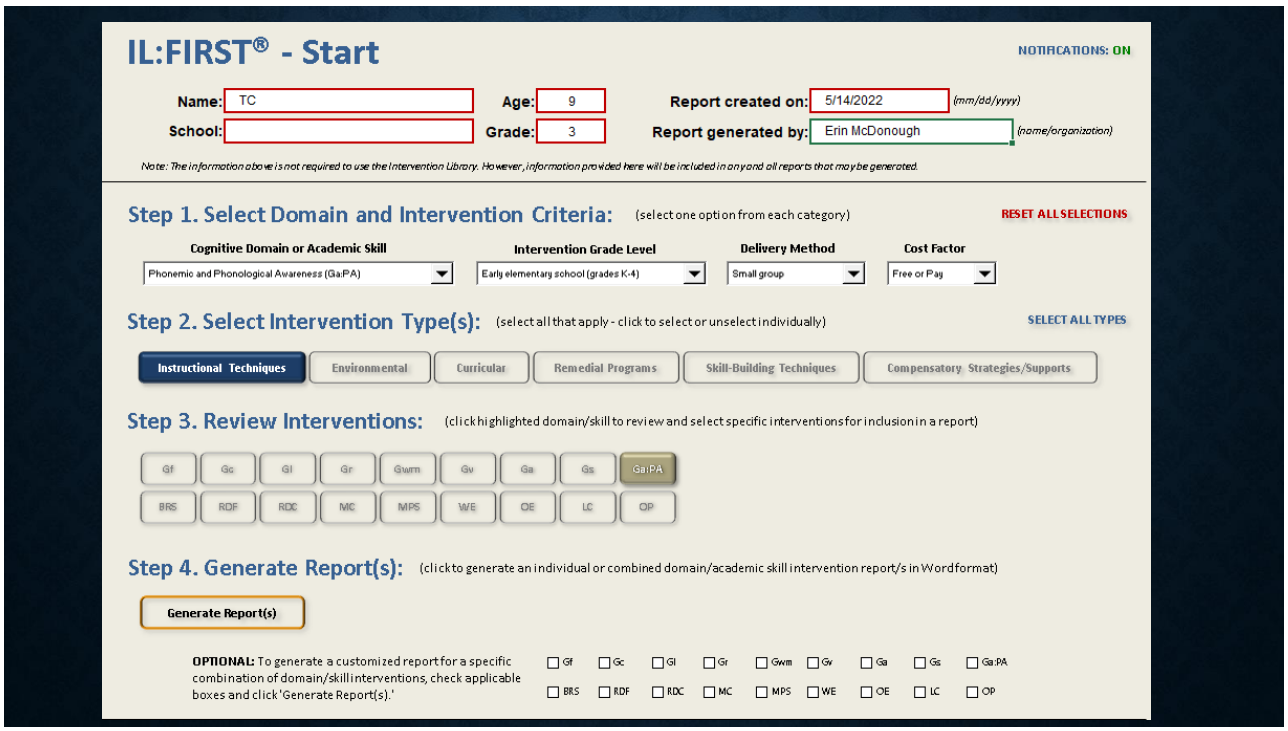
178


Dual-Discrepancy/Consistency Model: PSW Quick Analysis
Release: 2.2
Name:
Age:
Grade:
Date:
Did the individual's observed cognitive and academic performances meet criteria within the DD/C model consistent with PSW-based SLD identification?
YES. Based on the data selected for use in the PSW Analyzer, specific criteria for establishing a PSW consistent with SLD have been met. However, this pattern of results does not automatically confirm the presence of SLD. This pattern must be considered within the context of the entire case history of the individual. In addition, other data gathered through multiple methods need to be considered (e.g., information regarding exclusionary factors) when identifying or diagnosing SLD (see chapter 4 in Essentials of Cross-Battery Assessment, 3rd Ed.).
General Intelligence
Generally Average Overall Ability
MET
FCC = 115
Domain Specific Weakness?
MET
Unexpected Underachievement?
MET
Cognitive Weakness
MET*
ICC = 80
Academic Weakness
MET
BRS = 80
Below Average Aptitude-Achievement Consistency?
MET
*-indicates need for converging evidence
How likely is it that the individual's pattern of strengths indicates at least average overall cognitive ability?
LIKELY. Despite the presence of weaknesses in one or more cognitive domains, the evaluator indicated that the individual possesses average or better functioning in cognitive domains considered important for acquiring the academic skills typical for this grade level. In this case, the individual's overall ability ought to enable learning and achievement, particularly if the FCC/ACC is greater than or equal to 90 and when specific cognitive weaknesses are minimized through compensatory efforts, accommodations, and the like. If the FCC/ACC is between 85 and 89 inclusive, the criterion for at least average overall ability within the DD/C model should be supported by additional data and information.
Is there evidence of domain specific weaknesses in cognitive functioning?
YES. The difference between the individual's estimate of intact cognitive abilities (FCC=115) and the score representing the area of specific cognitive weakness (ICC=80) is statistically significant. This finding means that there is likely a true or real difference between the estimate of overall cognitive strengths and the identified area of specific cognitive weakness for the individual. In addition, there is an unusually large difference between actual performance in the specific cognitive area (SS=80) and expected performance (SS=0) as predicted by overall cognitive strengths. That is, based on the individual's estimate of cognitive strengths, it was predicted that the individual would perform much better in the specific cognitive area. In fact, the size of the difference between the individual's actual and predicted performance in the specific cognitive area occurs very infrequently. The results of these analyses suggest that the individual's PSW consists of a domain-specific cognitive weakness (particularly when the actual SS<90), an inclusionary criterion for SLD.

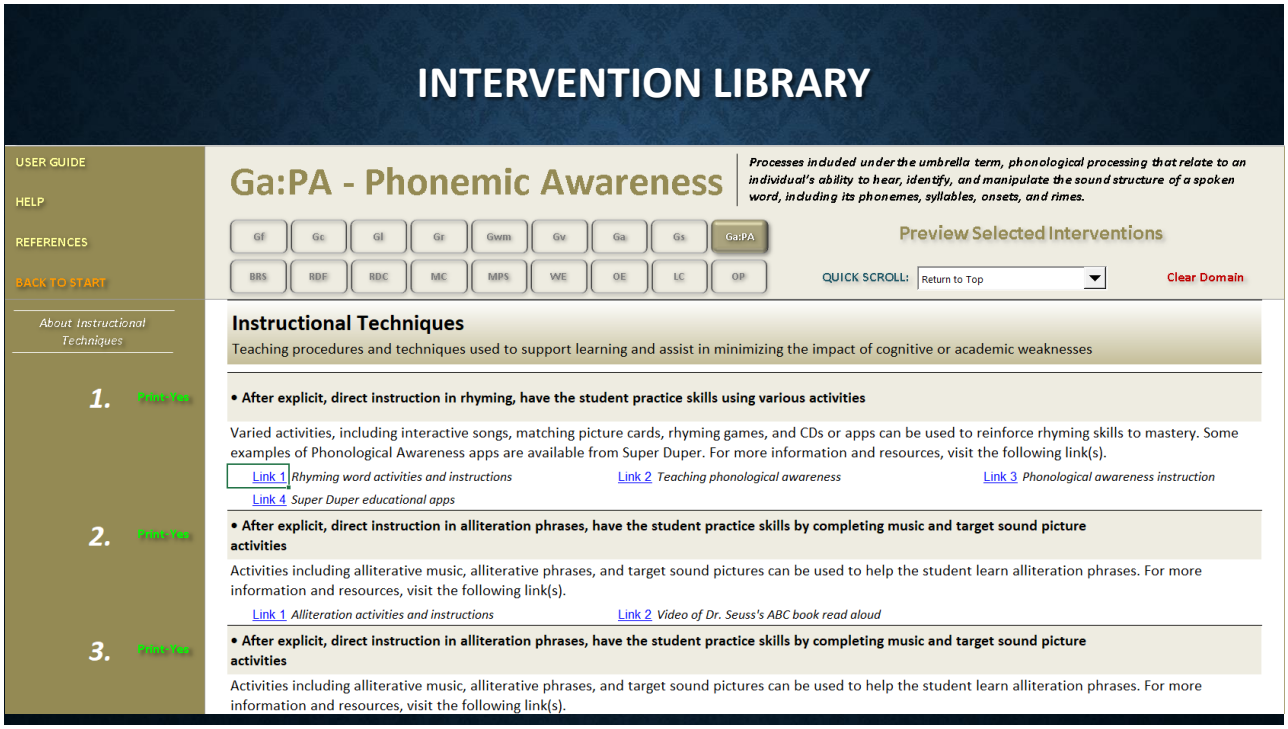
179


How likely is it that the individual's pattern of strengths indicates at least average overall cognitive ability?
LIKELY. Despite the presence of weaknesses in one or more cognitive domains, the evaluator indicated that the individual possesses average or better functioning in cognitive domains considered important for acquiring the academic skills typical for this grade level. In this case, the individual's overall ability ought to enable learning and achievement, particularly if the FCC/ACC is greater than or equal to 90 and when specific cognitive weaknesses are minimized through compensatory efforts, accommodations, and the like. If the FCC/ACC is between 85 and 89 inclusive, the criterion for at least average overall ability within the DDIC model should be supported by additional data and information.
Is there evidence of domain specific weaknesses in cognitive functioning?
YES. The difference between the individual's estimate of intact cognitive abilities (FCC=115) and the score representing the area of specific cognitive weakness (ICC=80) is statistically significant. This finding means that there is likely a true or real difference between the estimate of overall cognitive strengths and the identified area of specific cognitive weakness for the individual. In addition, there is an unusually large difference between actual performance in the specific cognitive area (SS=80) and expected performance (SS=0) as predicted by overall cognitive strengths. That is, based on the individual's estimate of cognitive strengths, it was predicted that the individual would perform much better in the specific cognitive area. In fact, the size of the difference between the individual's actual and predicted performance in the specific cognitive area occurs very infrequently. The results of these analyses suggest that the individual's PSW consists of a domain-specific cognitive weakness (particularly when the actual SS<90), an inclusionary criterion for SLD.
Is there evidence of unexpected underachievement?
YES. The difference between the individual's estimate of intact cognitive abilities (FCC=115) and the score representing the area of specific academic weakness (BRS=80) is statistically significant. This finding means that there is likely a true or real difference between the estimate of overall cognitive strengths and the identified area of specific academic weakness for the individual. In addition, there is an unusually large difference between actual performance in the specific academic area (SS=80) and expected performance (SS=0) as predicted by overall cognitive strengths). That is, based on the individual's estimate of cognitive strengths, it was predicted that the individual would perform much better in the specific academic area. In fact, the size of the difference between the individual's actual and predicted performance in the specific academic area occurs very infrequently. The results of these analyses suggest that the individual's PSW is marked by unexpected underachievement (particularly when the actual SS < 90), an inclusionary criterion for SLD.
Is there evidence of a below-average aptitude-achievement consistency?
YES. The specific cognitive (SS=80 for ICC) and academic (SS=80 for BRS) scores are indicative of normative weaknesses or deficits compared to same age peers (SS<85). There is research that supports a moderate relationship between the Inhibiting Cognitive Composite and Basic Reading Skills which indicates that the ICC is comprised of one or more cognitive areas that are related to Basic Reading Skills. Therefore, this combination of scores provides evidence that assists in explaining the nature of the individual's observed learning difficulties. Based on all of these considerations, these findings appear to indicate overall support for the criterion regarding below average aptitude-achievement consistency.
Start
Return to Top
Print PSW-QA Summary
Save PSW-QA Results
Index
Clear ALL PSW-QA Data
Cross-Battery XBA Assessment

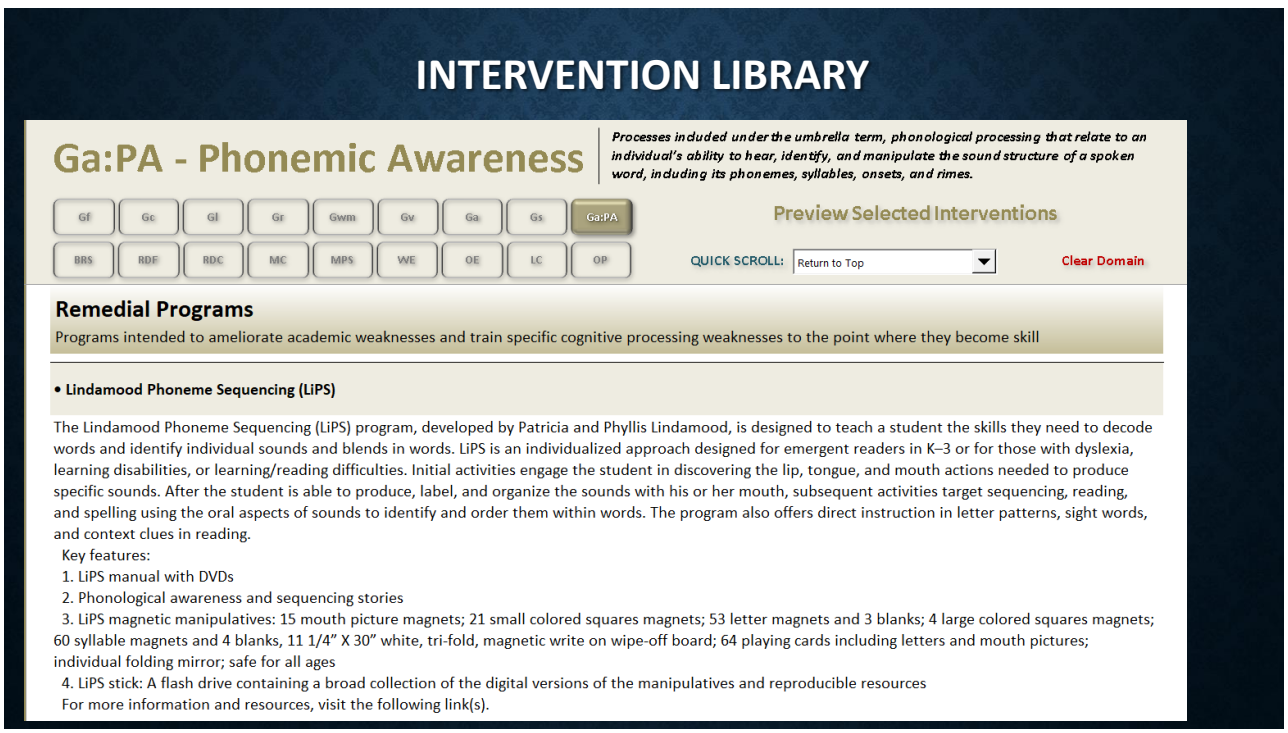
180


IL:FIRST® - Start
NOTIFICATIONS: ON
Name: TC
Age: 9
Report created on: 5/14/2022 (mm/dd/yyyy)
School:
Grade: 3
Report generated by: Erin McDonough (name/organization)
Note: The information above is not required to use the Intervention Library. However, information provided here will be included in any and all reports that may be generated.
Step 1. Select Domain and Intervention Criteria: (select one option from each category)
RESET ALL SELECTIONS
Cognitive Domain or Academic Skill
Phonemic and Phonological Awareness (Ga:PA)
Intervention Grade Level
Early elementary school (grades K-4)
Delivery Method
Small group
Cost Factor
Free or Pay
Step 2. Select Intervention Type(s): (select all that apply - click to select or unselect individually)
SELECT ALL TYPES
Instructional Techniques
Environmental
Curricular
Remedial Programs
Skill-Building Techniques
Compensatory Strategies/Supports
Step 3. Review Interventions: (click highlighted domain/skill to review and select specific interventions for inclusion in a report)
Gf
Gc
Gl
Gr
Gwm
Gv
Ga
Gs
Ga:PA
BRS
RDF
RDC
MC
MPS
WE
OE
LC
OP
Step 4. Generate Report(s): (click to generate an individual or combined domain/academic skill intervention report/s in Word format)
Generate Report(s)
OPTIONAL: To generate a customized report for a specific combination of domain/skill interventions, check applicable boxes and click 'Generate Report(s).'

181

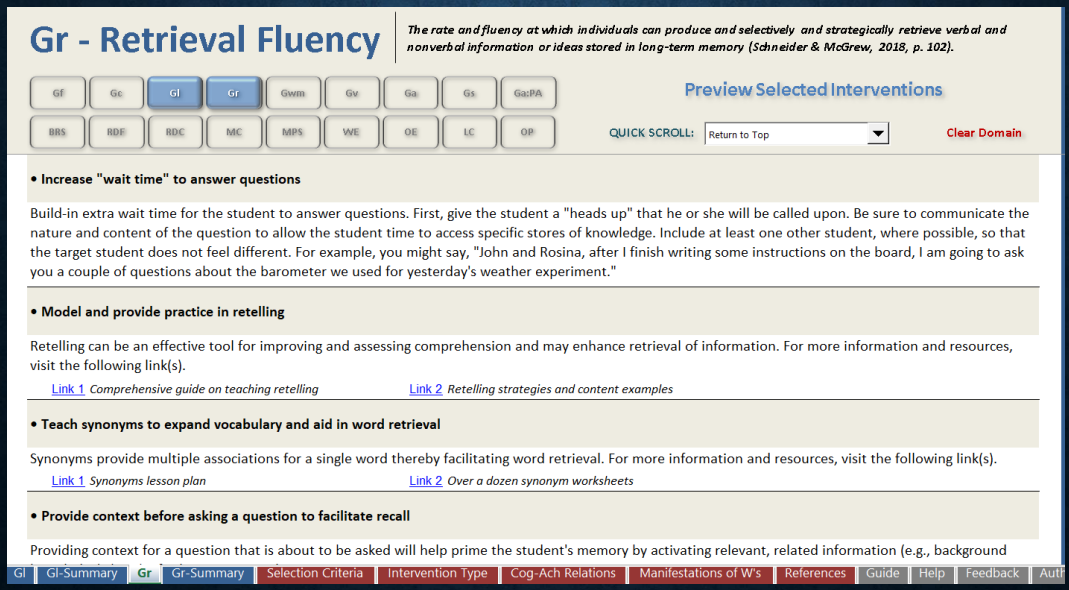

INTERVENTION LIBRARY
USER GUIDE
HELP
REFERENCES
BACK TO START
About Instructional Techniques
Ga:PA - Phonemic Awareness
Processes included under the umbrella term, phonological processing that relate to an individual's ability to hear, identify, and manipulate the sound structure of a spoken word, including its phonemes, syllables, onsets, and rimes.
Gf Gc Gl Gr Gwm Gv Ga Gs Ga:PA
BRS RDF RDC MC MPS WE OE LC OP
Preview Selected Interventions
QUICK SCROLL: Return to Top
Clear Domain
Instructional Techniques
Teaching procedures and techniques used to support learning and assist in minimizing the impact of cognitive or academic weaknesses
1. Print-Key
• After explicit, direct instruction in rhyming, have the student practice skills using various activities
Varied activities, including interactive songs, matching picture cards, rhyming games, and CDs or apps can be used to reinforce rhyming skills to mastery. Some examples of Phonological Awareness apps are available from Super Duper. For more information and resources, visit the following link(s).
Link 1 Rhyming word activities and instructions
Link 2 Teaching phonological awareness
Link 3 Phonological awareness instruction
Link 4 Super Duper educational apps
2. Print-Key
• After explicit, direct instruction in alliteration phrases, have the student practice skills by completing music and target sound picture activities
Activities including alliterative music, alliterative phrases, and target sound pictures can be used to help the student learn alliteration phrases. For more information and resources, visit the following link(s).
Link 1 Alliteration activities and instructions
Link 2 Video of Dr. Seuss's ABC book read aloud
3. Print-Key
• After explicit, direct instruction in alliteration phrases, have the student practice skills by completing music and target sound picture activities
Activities including alliterative music, alliterative phrases, and target sound pictures can be used to help the student learn alliteration phrases. For more information and resources, visit the following link(s).

182

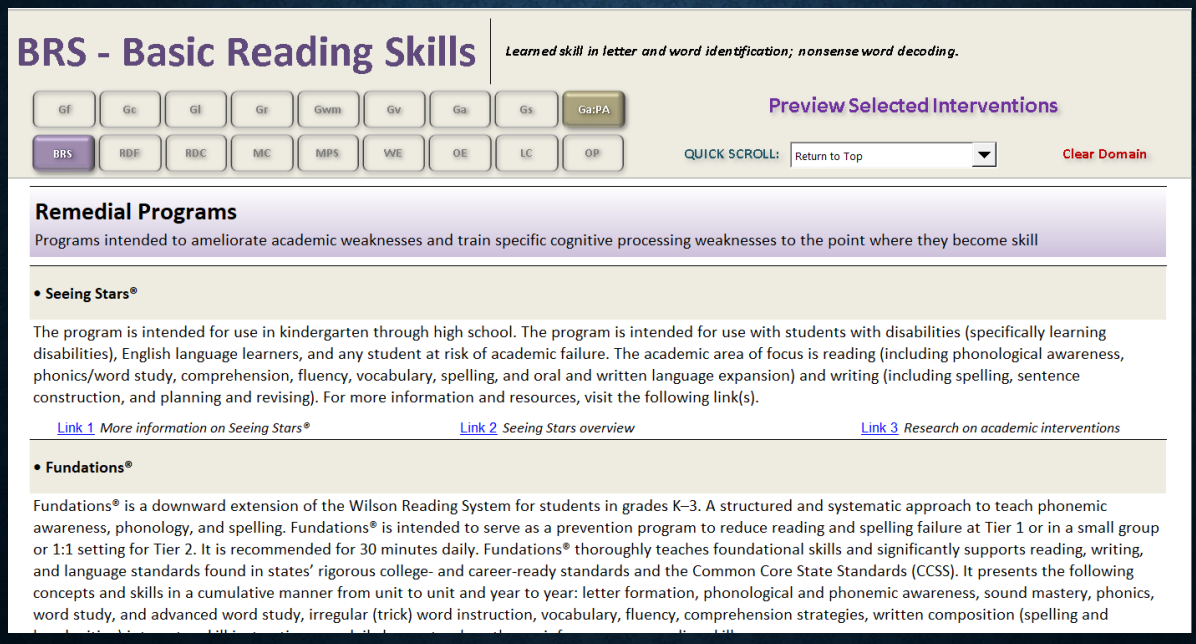

INTERVENTION LIBRARY
Ga:PA - Phonemic Awareness
Processes included under the umbrella term, phonological processing that relate to an individual's ability to hear, identify, and manipulate the sound structure of a spoken word, including its phonemes, syllables, onsets, and rimes.
Gf Gc Gl Gr Gwm Gv Ga Gs Ga:PA
BRS RDF RDC MC MPS WE OE LC OP
Preview Selected Interventions
QUICK SCROLL: Return to Top
Clear Domain
Remedial Programs
Programs intended to ameliorate academic weaknesses and train specific cognitive processing weaknesses to the point where they become skill
• Lindamood Phoneme Sequencing (LiPS)
The Lindamood Phoneme Sequencing (LiPS) program, developed by Patricia and Phyllis Lindamood, is designed to teach a student the skills they need to decode words and identify individual sounds and blends in words. LiPS is an individualized approach designed for emergent readers in K–3 or for those with dyslexia, learning disabilities, or learning/reading difficulties. Initial activities engage the student in discovering the lip, tongue, and mouth actions needed to produce specific sounds. After the student is able to produce, label, and organize the sounds with his or her mouth, subsequent activities target sequencing, reading, and spelling using the oral aspects of sounds to identify and order them within words. The program also offers direct instruction in letter patterns, sight words, and context clues in reading.
Key features:
1. LiPS manual with DVDs
2. Phonological awareness and sequencing stories
3. LiPS magnetic manipulatives: 15 mouth picture magnets; 21 small colored squares magnets; 53 letter magnets and 3 blanks; 4 large colored squares magnets; 60 syllable magnets and 4 blanks, 11 1/4" X 30" white, tri-fold, magnetic write on wipe-off board; 64 playing cards including letters and mouth pictures; individual folding mirror; safe for all ages
4. LiPS stick: A flash drive containing a broad collection of the digital versions of the manipulatives and reproducible resources
For more information and resources, visit the following link(s).

183

INTERVENTION LIBRARY



184



185

SUMMARY AND CONCLUSIONS

- Screening for dyslexia in K-2 is not cumbersome or tedious
- Teaching at-risk students how to read must be done by well-trained teachers
- Professional Development for teachers needs to be intense
- Several screening tools were described
- Use the C-LIM and the Ortiz PVAT to make better-informed decisions about English learners
- Advocate for PD training in evidence-based instruction for teachers K-3

186

" Tests do not think for themselves, nor do they directly communicate with patients. Like a stethoscope, a blood pressure gauge, or an MRI scan, a psychological test is a dumb tool, and the worth of the tool cannot be separated from the sophistication of the clinician who draws inferences from it and then communicates with patients and professionals"

Meyer et al. (2001). Psychological testing and psychological assessment. *American Psychologist*, February

187