

The Neuropsychology of Learning Disabilities:
Developing Evidenced-Based Reading, Writing, and Math Interventions


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

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

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Course Outline: Module #2

- Six part webinar series on reading, writing, & math disabilities sponsored by Jack Hirose & Associates.
- Introduce a brain-based educational model of dyslexia, dysgraphia, and dyscalculia and classify each disability into distinct subtypes.
- Discuss targeted interventions for all students with academic learning issues.
- Questions and Comments?



- **Steven G. Feifer, D.Ed., ABSNP**
 - ❑ 2008 MD School Psych of Year
 - ❑ 2009 NASP School Psych of Year
 - ❑ Authored 7 books
 - ❑ Authored 2 tests: FAR & FAM
 - ❑ feifer@comcast.net


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Four Subtypes of Reading Disorders

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

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SUBTYPES OF DYSPLEXIA

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

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

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


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REMEDATION STRATEGIES FOR DYSPHONETIC DYSPLEXIA

<p>Over Age 12:</p> <p>(Top- Down)</p>	<p>Wilson Reading System SRA Corrective Reading & REACH System Read 180 HOSTS Kaplan Spell/Read LEXIA Strategies for Older Students</p>
<p>Ages 7 - 12:</p> <p>(Bottom-Up)</p>	<p>Alphabetic Phonics (Orton-Gillingham) SRA Corrective Reading Earobics II LiPS LEXIA Primary Reading Horizons</p>
<p>Under Age 7:</p>	<p>Fast Forward II (Tallal) Earobics I Phono-Graphix Saxon Phonics Program Success for All Ladders to Literacy Foundations Road to the Code SIPPS Scott Foresman Early Intervention Reading</p>

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HORIZONS FAST TRACK A-B

- ▶ 150 Lessons - 50 minutes per lesson
- ▶ Highly scripted....designed for Grades 2 and above
- ▶ Letter sounds taught in two families:
 - 1) **F,L,M,N,R,S,X,Y** - last part of sound makes letter.
 - 2) **B,D,J,K,P,T,V,Z** - initial sound is the letter.
- ▶ After consonants are learned, orthographic prompts color code blends. For instance, the blue letter makes no sound and the black letter says its name:

ay
ea
- ▶ Word attack activities emphasizing decoding and critical vocabulary prepare students for upcoming stories

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The Morphological Connection ("Top-Down") (Senechal & Kearnan, 2007)

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

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

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

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Wilson Reading System

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

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

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

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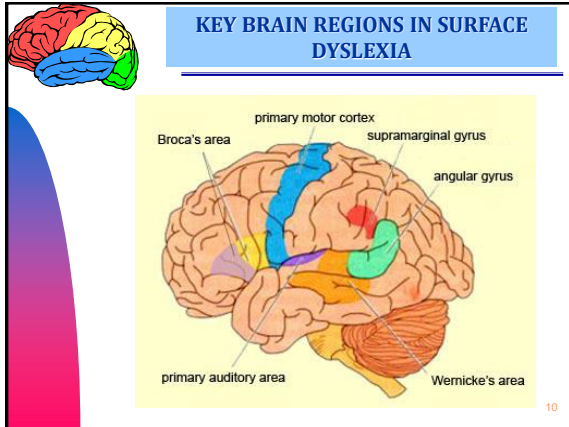
SUBTYPES OF DYSLEXIA

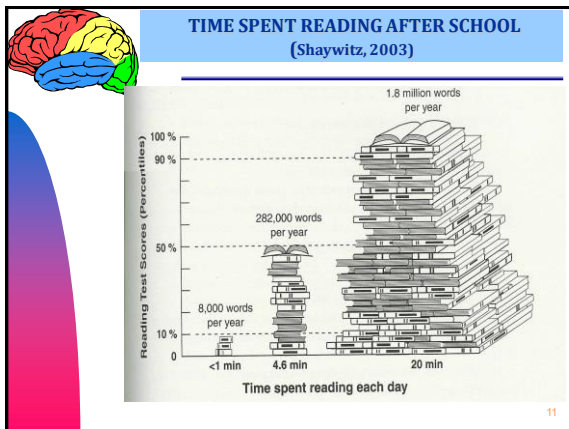
2. **Surface dyslexia** - an over-reliance on sound symbol relationships as the process of reading never becomes automatic. These children break every word down to its phonetic base, and read slowly due to poor **orthographic processing**.

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

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

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Skilled Readers Dominant Pathway

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

► <http://www.spritzinc.com>


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REMEDIATION OF SURFACE DYSLEXIA

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


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Read Naturally

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

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SUBTYPES OF DYSLEXIA

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

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

- ▶ Multiple breakdowns along many pathways modulating the entire reading process.


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4 REMEDIATION STRATEGIES FOR MIXED DYSLEXIA

- (1) **Balanced Literacy** - An eclectic and approach capitalizing on the particular strengths of the child. Consider using a multi-sensory type of Orton-Gillingham program, coupled with a fluency model such as Read Naturally, and the computerized models of Read 180.
- (2) **Top Down Strategies** - Often atypical development mapping individual sounds to the visual word form association areas (Temple, 2002; Shaywitz, et al, 2003; Noble & McCandliss, 2005).
- (3) **Socioeconomic Status** - According to Noble and McCandliss (2005), socioeconomic status (SES) is a very strong predictor of reading skills due primarily to the home literacy environment. Therefore, schools need to provide **more reading opportunities**.
- (4) **Motivation and Confidence** - Great Leaps, Read Naturally, etc. tend to give immediate feedback.


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Read 180 (Dr. Ted Hasselburg)

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


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4 Components of Reading Comprehension

- 1. **Content Affinity** - attitude and interest toward specific material.
- 2. **Working Memory** - the ability to temporarily suspend information while simultaneously learning new information. The amount of memory needed to execute a cognitive task.
- 3. **Executive Functioning** - the ability to self-monitor performance and organize information on a given problem solving task.
- 4. **Language Foundation** - most children enter kindergarten with 3000 – 5000 words, though graduate from high school with 60,000 words (Pinker, 1994).


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Reading Comprehension Interventions

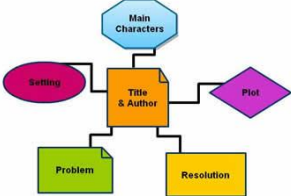
1. **Stop & Start Technique** – student reads a passage out loud and every 30 seconds “stop” to ask questions.
2. **Directional Questions** – ask questions at the beginning of the text instead of the end.
3. **Read Aloud** – reading out loud allows student to hear their own voices and facilitates working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

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Story Mapping Technique

Story Map




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SOAR to SUCCESS

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


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Lindamood Visualization and Verbalization for Language Comprehension and Thinking

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


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Assessment Issues in Dyslexia

- ▶ **Hypertension:** 140/90 is the definition of hypertension. (120-139/80-89 = prehypertension)
- ▶ **Diabetes:** blood glucose level of 126 milligrams per deciliter (mg/dL) or more after an overnight fast
- ▶ **Leukemia:** adult white blood cell count ranging from 3500-10,500 per microliter of blood.
- ▶ **Obesity:** a BMI of 30, and overweight is 25.
- ▶ **Key Learning Points:** Medical conditions have ranges to meet the criteria, and not necessarily strict cut points. Interventions put in place regardless. Same is true for Dyslexia.

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90 Minute Dyslexia Evaluation

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

*** INTEGRITY NOT DISCREPANCY**


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90 Minute Dyslexia Evaluation

- ▶ **Phonemic/Phonological Awareness:**
 - NEPSY II: Phonological Processing
 - PAL II: Phonological Coding
 - WIAT III: Pseudoword Decoding, Early Reading
 - CTOPP-2
 - KTEA III
 - WJIV
- ▶ **Rapid Naming:**
 - PAL II: RAN, NEPSY II: Speeded Naming, CTOPP-2 KTEA III, WJIV
- ▶ **Verbal Memory Tests:**
 - CVLT-C, NEPSYII: List Memory,
 - PAL II Verbal Working Memory, PAL II, WJ IV
- ▶ **Reading Fluency:**
 - GORT 5, CBM, WIAT III ORE, WJIV
 - WIAT III Word Reading
- ▶ **Orthographic Skills:** PAL II Receptive Coding, Orthographic Spelling, TOC
- ▶ **Attention:** NEPSY II Auditory Attn, Connors 3, TEACH, CAS-2
- ▶ **Executive Functioning:** BRIEF, NEPSY II Inhibition, WIAT III Reading Comp (Inferential vs. literal), DKEFS, CEFI

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90 Minute Dyslexia Evaluation

1. **Dysphonetic Dyslexia:**
 - Phonemic Awareness Deficits
 - Phonological Processing Deficits
 - Phonological Working Memory Deficits
 - Tendency to "guess" on words
2. **Surface Dyslexia:**
 - Orthographic Processing Deficits
 - Slower Rapid Naming Skills
 - Poor Reading Fluency
 - Inaccurate Reading of "Irregular Words"
3. **Mixed Dyslexia:**
 - Both Phonological and Orthographical Deficits
 - Significantly Below Grade Level
 - Failure to Respond to Interventions
4. **Comprehension Deficits:**
 - Poor Attention
 - Poor Executive Functioning
 - Limited Verbal Working Memory
 - Lower Verbal IQ


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Steven G. Feifer, D.Ed., ABSNP

- A neurodevelopmental assessment of reading
- Pre-K to College (Ages 4-21)
- Normative sample included 1,074 students
- 15 subtests in complete battery
- Diagnoses 4 subtypes of reading disorders
- Includes the FAR-S dyslexia screening battery
- Total Far index score and 4 Reading index scores



 Structure of the FAR			
Index	Subtest	Grade range	Approximate administration time in minutes
Phonological Index (PI)	Phonemic Awareness (PA)	PK to college	5 to 10
	Nonsense Word Decoding (NWD)	Grade 2 to college	2
	Isolated Word Reading Fluency (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




Gradiantal Model of Cortical Functioning




Elkhonon Goldberg, PhD, ABPP-CN
 Clinical Professor of Neurology
 NYU School of Medicine
 Luria Neuroscience Institute

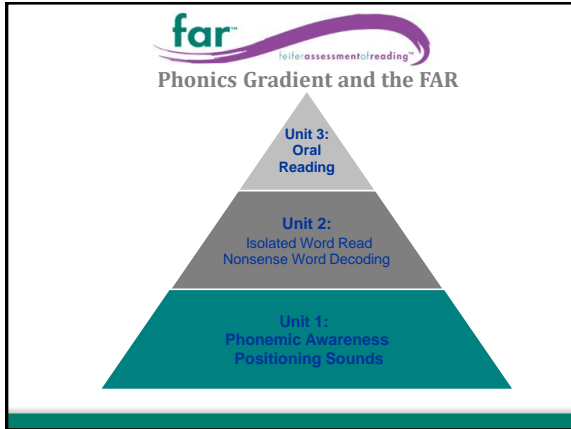
1. The brain is not modular. Instead, there are continuous interactions within gray matter, rather than white matter connecting distinct and distant structures.
2. Spatially related territories have similar functional properties.
3. Cognitive gradients are varied and organized around a hierarchical axis in the brain.



PHONOLOGICAL INDEX

- Phonemic Awareness (rhyming, blending, segmenting, and manipulation of sounds)
- Positioning Sounds
- Nonsense Word Decoding
- Isolated Word Fluency
- Oral Reading Fluency (accuracy)





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Phonemic Awareness: Rhyming

All grades

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

Rhyming (PK-2nd): Fish, dish

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Phonemic Awareness: Blending

All grades

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

Blending (9th+) : Advantage

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



Phonemic Awareness: Segmenting

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

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





Phonemic Awareness: Manipulation

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

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





Positioning Sounds Sample Item

"I'm going to say a word. I want you to tell me which sounds are missing in the word."

All grades



d		ll
---	--	----



Nonsense Word Decoding

2nd + Only

"I want you to read each of these words out loud without skipping any. Ready? Begin."

conving magip pibstat canians





Isolated Word Reading Fluency (60 sec)

Table 1.4 (continued)
Skills Analysis for Isolated Word Reading Fluency (ISOR)
Versus Oral Reading Fluency (ORF)

Story 1				Story 2				Story 3			
ISOR item number	Target word	Correct ISOR	Correct ORF	ISOR item number	Target word	Correct ISOR	Correct ORF	ISOR item number	Target word	Correct ISOR	Correct ORF
31	airplane	0	1	0	1	46	once	0	1	0	1
38	large	0	1	0	1	47	alligator	0	1	0	1
33	wings	0	1	0	1	44	morning	0	1	0	1
40	side	0	1	0	1	41	swim	0	1	0	1
35	new	0	1	0	1	52	pond	0	1	0	1
29	kitchen	0	1	0	1	45	weekend	0	1	0	1
27	inside	0	1	0	1	42	math	0	1	0	1
34	bed	0	1	0	1	31	truck	0	1	0	1
30	house	0	1	0	1	50	rose	0	1	0	1
37	black	0	1	0	1	43	blister	0	1	0	1
26	all	0	1	0	1	55	circle	0	1	0	1
38	grass	0	1	0	1	49	surprised	0	1	0	1
36	money	0	1	0	1	54	other	0	1	0	1
39	because	0	1	0	1	48	crossed	0	1	0	1
32	fast	0	1	0	1	33	snip	0	1	0	1
Number correct		/19	/13	Number correct		/19	/13	Number correct		/19	/13
% correct				% correct				% correct			



Oral Reading Fluency

60 seconds per passage; incorporates Isolated Word Fluency words within each passage

Grades 4-5, Story 2


Stim Book view

Record Form view

Sam was very excited about the field trip to the aquarium. (He was so excited that he almost forgot to give his permission form to the school secretary!) After the students arrived, they were shown into a large room to view the fish. An invisible wall made of thick glass made it seem like the students were under water. Sam noticed an old barrel where jellyfish lived.


Sam was very excited about the field trip to the aquarium. (He was so excited that he almost forgot to give his permission form to the school secretary!) After the students arrived, they were shown into a large room to view the fish. An invisible wall made of thick glass made it seem like the students were under water. Sam noticed an old barrel where jellyfish lived.






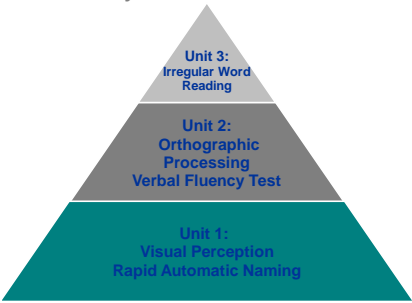
FLUENCY INDEX

- Rapid Automatic Naming (objects, letters, stencils)
- Visual Perception (letters, words)
- Orthographic Processing (words and nonwords)
- Irregular Word Reading Fluency
- Verbal Fluency (categories, letters)





Fluency Gradient and the FAR



Unit 3:
Irregular Word
Reading

Unit 2:
Orthographic
Processing
Verbal Fluency Test

Unit 1:
Visual Perception
Rapid Automatic Naming



Rapid Automatic Naming

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





Visual Perception

All Grades

One 30-second Trial; Letters (PK-2nd) or Words (3rd +)

Letters

b i y w a v o q
t q t e x n i o

Words

shady tired telephone assist calendar

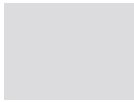


Orthographical Processing

The student chooses which letters
appeared in presented word

Initial Presentation

epiphany



Response Options

eph phi pip iny



Irregular Word Reading Fluency (60 sec)

Item	Pronunciation guide	Score
41. rotatouille	ra- ta- to- è, ra- ta- twè	0 1
42. mesquite	ma- skét	0 1
43. heir	er	0 1
44. malign	ma- lín	0 1
45. rescind	ri- sind	0 1
46. motif	mò- tíf	0 1
47. suble	sa- tel	0 1
48. awry	o- rí	0 1
49. prerogative	pri- rá- ge- tiv	0 1
50. conscience	'kán(t)-shán(t)is	0 1
51. corps	kòr	0 1
52. deign	dán	0 1
53. queue	kyú	0 1
54. mnemonic	ni- mà- nìk	0 1


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Verbal Fluency
 All Grades
 Two 60-second trials

"For this task, I would like you to tell me all the different foods you can think of without repeating any."

0-15 seconds	16-30 seconds	31-45 seconds	46-60 seconds
No. word words	No. word words	No. word words	No. word words


Trial 1 subtotal

Number correct	Number of errors
-------------------	---------------------

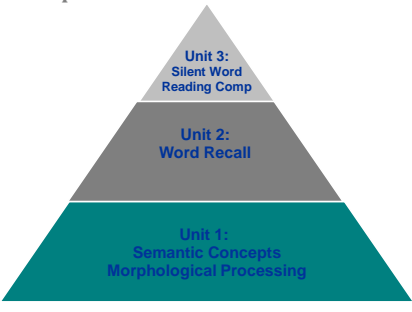


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COMPREHENSION INDEX

- Print Knowledge (grades PK-1)
- Semantic Concepts (synonyms, antonyms)
- Morphological Processing
- Word Recall
- Silent Reading Fluency (literal & inferential questions)



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Comprehension Gradient and the FAR



Unit 3:
Silent Word
Reading Comp

Unit 2:
Word Recall

Unit 1:
Semantic Concepts
Morphological Processing



Limitations of traditional achievement measures

WIAT III Reading Comprehension: Each passage read silently; story stays in front of student while answering free recall questions. *Examiner assumes an EF deficit.*

GORT V: Each passage is read out loud, and then the story is taken away. Questions are multiple choice. *Examiner assumes a Working Memory deficit.*

WJ IV Passage Comprehension: A closed procedure where the student reads a short passage and identifies a missing key word that makes sense in the context of the passage. *More a measure of semantic and syntactic knowledge than true comprehension.*

KTEA III: Can read silently or out loud. Student reads each question and story remains in view when answering. *Examiner is unsure of what strategy is implemented to derive a response.*



Semantic Concepts All Grades

Synonyms Presentation

error

earn blunder correct
chance grasp

Antonyms Presentation

divide

reject deride split
combine hinder



Morphological Processing 2nd + only

72 items

"I'm going to show you an incomplete word and then ask you to choose the group of letters that completes the word."

____ **antic**

ped sho tel com prod

[illegible]



BEHAVIORAL OBSERVATIONS

Effort	Subvocalizing
Eye blinking	Tentative Reading
Fatigue	Uneven Tempo
Frustration	Voice Modulation
Prosody	Speed vs. Accuracy
Rereading text	Systematic search strategy
Stammering	Error analysis
Self-corrections	Skipping Lines



CASE STUDY #1

► Maxwell is 7 yrs old and in the 2nd grade. He was referred for a comprehensive assessment due to his poor decoding skills, poor response to interventions, and limited educational progress.

FAR Index	Standard score	Percentile	Qualitative descriptor
(95% CI)			
Phonological Index	72 (±5)	3%	Moderately below average
Fluency Index	90 (±7)	25%	Average
Comprehension Index	97 (±8)	42%	Average
Mixed Index	78 (±5)	7%	Below average
FAR Total Index	83 (±5)	13%	Below average



CASE STUDY #1

Phonological Index: the Phonological Index score represents an absolute weakness: **72 ±5**, which is in the moderately below average range and at the **3rd** percentile compared to his peers. This score is also considered a relative weakness, as it is statistically discrepant from his FAR Total Index score (11 points; $p < .01$; <15% of standardization sample).

Key Analysis: Maxwell performed significantly better on the Irregular Word Reading Fluency subtest (**standard score = 95**), a test which required him to read isolated words with phonologically inconsistent spellings, than on the Nonsense Word Decoding subtest. This suggests that he primarily memorizes whole words and does not yet possess the skills to decode and blend individual words by sounds.

* Maxwell presents with **Dysphonetic Dyslexia**



CASE STUDY #2

Adam is 12 yrs old and in the 7th grade. He was referred for a comprehensive assessment due to his poor reading comprehension skills. His oral reading fluency is adequate, though very monotone.

FAR index	Standard score	Percentile	qualitative descriptor
(95% CI)			
Phonological Index	112 (±5)	79%	Above average
Fluency Index	103 (±7)	58%	Average
Comprehension Index	81 (±8)	10%	Below average
Mixed Index	109 (±5)	73%	Average
FAR Total Index	100 (±5)	50%	Average



CASE STUDY #2

Phonological Index: Adam's Phonological Index is an absolute strength: his score is **112 ±5**, is in the *Above Average* range and at the **79th** percentile compared to his peers. This score is also considered a relative strength, since it is 12 points higher than his FAR Total Index score ($p < .01$; <10% of standardization sample).

Comprehension Index: An absolute weakness as he scored **81 ±8**, which was in the *Below Average* range and at the **10th** percentile compared to his peers. This score is significantly discrepant from his FAR Total Index score of **100** (19 points) and represents a relative weakness ($p < .01$; <5% of standardization sample) as well. His overall knowledge of word meanings was weak (**Semantic Concepts ss = 75**), and he struggled when answering inferential questions as opposed to literal questions



CASE STUDY #2

Key Analysis: The significant difference between Adam's overall Phonological Index score (**ss=112**), which was in the *Above Average* range, and his Comprehension Index score (**ss=81**), which was in the *Below Average* range, suggests he has good decoding and phonological processing skills but has difficulty deriving meaning from print.

This was consistent with a diagnosis of hyperlexia, and was consistent with Adam's educational diagnosis of **Autism Spectrum Disorder**.



THE FAR ADVANTAGE

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



Let's Stay Connected!



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Tests: FAR- 2015 FAM- 2016 FAW - 2019
Psychological Assessment Resources

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