**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

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

**Steven G. Feifer, D.Ed, ABSNP**
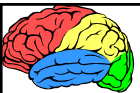feifer@comcast.net
www.schoolneuropsychpress.com

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**Course Outline**

➢ 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.
➢ Introduce the concept of diagnostic achievement tests versus traditional achievement tests.
➢ Questions and Comments: **feifer@comcast.net**

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**Integrating Models of Dyslexia**

Peterson, R. L., Pennington, B. F., & Olson R. K., (2014) Subtypes of developmental dyslexia: Testing the predictions of the dual-route and connectionist frameworks. *Cognition,* 126(1), 20-38.

1. **Simple Model of Reading** – reading decoding deficits lead to poor comprehension skills. Monolithic model leading to monolithic outcome.
2. **Dual Route Model of Reading** – Phonological and Orthographical pathways impact either lexical or sub-lexical systems.
3. **Connectionist Model of Reading** – All words are read via a single procedure, as phonological and orthographical systems become intertwined over time and with experience. The role of semantic processing is discussed as facilitating orthographic processing.
4. **Integrated Neuropsychological Model \***– (Feifer, 2015) integrates the role of phonology, orthography, and morphological processing to cue word recognition skills using a variety of psychological processes. The net result is 4 subtypes of reading disorders.

\* Type of imaging, age of child, type of reading task, smaller sample sizes lead to differing outcomes.

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## Four Subtypes of Reading Disorders

**(1) Dysphonetic Dyslexia** – difficulty sounding out words in a phonological manner.

**(2) Surface Dyslexia** – difficulty with the rapid and automatic recognition of words in print.

**(3) Mixed Dyslexia** – multiple reading deficits characterized by impaired phonological and orthographic processing skills. Most severe form of dyslexia.

**(4) Comprehension Deficits** – mechanical side of reading is fine but difficulty persists deriving meaning from print.

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## SUBTYPES OF DYSLEXIA

1. <u>Dysphonetic Subtype</u> - 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.

<u>Neuropsychological Significance:</u> Left temporal-parietal gradient *(supramarginal gyrus)*.

| Target Word: | Read As: |
|---|---|
| *cat* | *couch* |
| *balloon* | *ball* |
| *jump* | *gym* |
| *ghost* | *goat* |

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## REMEDIATION STRATEGIES FOR DYSPHONETIC DYSLEXIA

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

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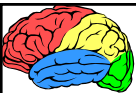
**Morpheme- the smallest meaningful component of a word that still conveys meaning. Examples include:**

*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._
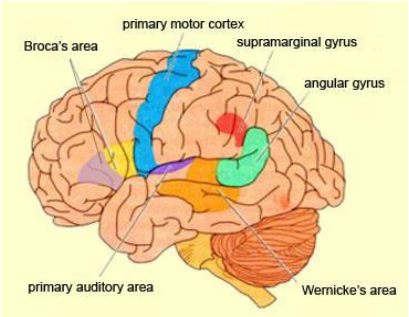
| WORD | | READ AS |
|------|---|---------|
| island | → | izland |
| grind | → | grinned |
| listen | → | liston |
| begin | → | beggin |
| lace | → | lake |

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

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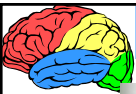
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### KEY BRAIN REGIONS IN SURFACE DYSLEXIA



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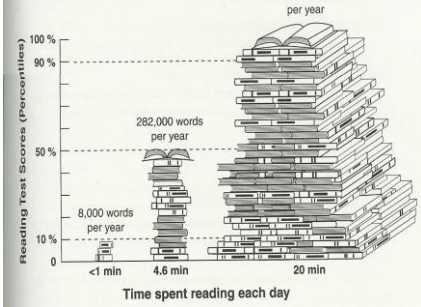
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### TIME SPENT READING AFTER SCHOOL
### (Shaywitz, 2003)



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## Skilled Readers Dominant Pathway

- Aoccdrnig to a rscheearch at an Elingsh uinervtisy, it deosn't mttaer in what oredr the ltteers in a word are, the olny iprmoetnt tihng is that frist and lsat ltteer is at the rghit pclae. The rset can be a toatl mses and you can still raed it wouthit porbelm. This is bcuseae we do not raed ervey lteter by it slef but the word as a wlohe.

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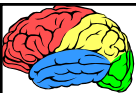
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## REMEDIATION OF SURFACE DYSLEXIA

**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 $2^{nd}$ (51wpm) though $8^{th}$ (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.
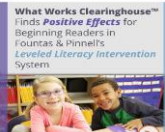
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## Does Vision Therapy Work?

American Academy of Pediatrics

FROM THE AMERICAN ACADEMY OF PEDIATRICS

Joint Statement—Learning Disabilities, Dyslexia, and Vision

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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.**

| WORD | READ AS: |
|------|----------|
| 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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## Developing a Balanced Literacy Model

➢ **Leveled Literacy Intervention** (LLI) is a short-term supplementary, small-group literacy intervention literacy intervention designed to help struggling readers achieve grade-level competency.

➢ The intervention provides explicit instruction in phonological awareness, phonics, fluency, vocabulary, reading comprehension, oral language skills, and writing.

➢ Approximately 25 studies supporting its effectiveness.

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

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## Read 180 (Dr. Ted Hasselburg)

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

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## 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 Engagement** – encourage active, not passive reading, by having children take notes or putting an asterisk next to important information. Also, multiple colors for highlighting.
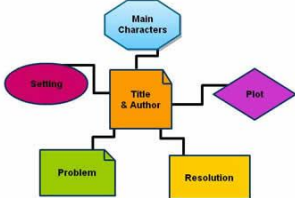
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### Story Mapping Technique

**Story Map**

Main Characters

Setting

Title & Author

Plot

Problem

Resolution

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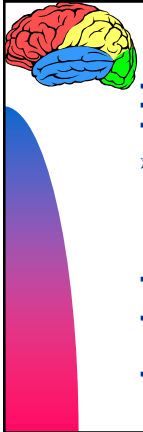
### SOAR to SUCCESS

- 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
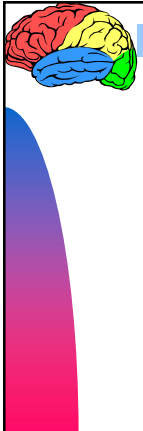
- Created by Nanci Bell
- Recommended 3-5 times per week for 60 minutes.
- 12 week program- whole class or individual.

➢ 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, ESL, and students with lower verbal abilities.

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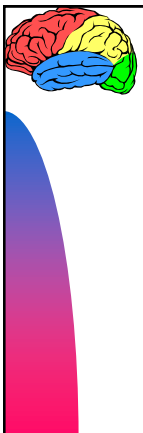
## Comprehensive Reading Evaluation

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

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## Comprehensive Reading Evaluation

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

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## Comprehensive Reading 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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**far** *feiferassessmentofreading*

### 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

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### Structure of the FAR

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

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**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 |

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**Phonemic Awareness: Segmenting**

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

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

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**Phonemic Awareness: Manipulation**

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

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

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**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 |
|---|---|---|

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## 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

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**37**

## Isolated Word Reading Fluency (60 sec)



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**38**

## 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.

**\* Recent studies have expanded the notion of decoding
to include whole word recognition** (de Oliveira et al., 2014).

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### 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)

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### Rapid Automatic Naming

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

READ

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### Visual Perception
**All Grades**

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

Letters

b i y w a v ɔ q
t q ƚ ə x n i o

Words

shady    tirəd    telephone    aasist    ɔalendar

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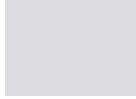
**Orthographical Processing**

The student chooses which letters
appeared in presented word

Initial Presentation                    Response Options

epiphany          eph    phi    pip    iny

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**Irregular Word Reading Fluency (60 sec)**

| | Item | Pronunciation guide | Score | |
|---|---|---|---|---|
| 41. | ratatouille | ra- ta- 'tü-ē, ra- ta- 'twē | ⓪ | 1 |
| 42. | mesquite | mə- 'skēt | 0 | ① |
| 43. | heir | 'er | 0 | ① |
| 44. | malign | mə- 'līn | 0 | ① |
| 45. | rescind | ri- 'sind | 0 | ① |
| 46. | motif | mō- 'tēf | 0 | ① |
| 47. | subtle | 'sə-tal | 0 | ① |
| 48. | awry | ə- 'rī | 0 | ① |
| 49. | prerogative | pri- 'rä-gə-tiv | 0 | ① |
| 50. | conscience | 'kän(t)-shən(t)s | 0 | ① |
| 51. | corps | 'kōr | ⓪ | 1 |
| 52. | deign | 'dān | ⓪ | 1 |
| 53. | queue | 'kyü | ⓪ | 1 |
| 54. | mnemonic | ni- 'mä-nik | 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 | 45-60 seconds |
|---|---|---|---|
| | | | |
| No. novel words | No. novel words | No. novel words | No. novel words |

Trial 1 subtotals

Number correct    Number of errors

45

45

**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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**Limitations of Traditional Achievement Tests**

**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.*

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**Semantic Concepts**
**All Grades**

Synonyms Presentation

## error

earn   blunder   correct

chance   grasp

Antonyms Presentation

## divide

reject      deride      split

combine      hinder

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**FOUR LEVELS OF INTERPRETATION**

1. Determine the FAR **Total Index Score**

2. Determine the FAR **Phonological, Fluency, Mixed,** and **Comprehension Index Scores** and compare these scores to the FAR Total Index score.
   a) <u>Absolute</u> Strengths and Weaknesses
   b) <u>Relative</u> Strengths and Weaknesses
   c) Compare each Index Score to each other.

3. 9 Key Subtest Interpretations

4. Relevant behavioral observations

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**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** |

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**Jacob 4th grade:** Reading & Writing Issues

| WISCV Domains | COMPOSITE SCORE | RANGE | PERCENTILE RANK |
|---|---|---|---|
| Verbal Comprehension Index | 89 | Below Average | 23% |
| Visual Spatial Index | 84 | Below Average | 14% |
| Fluid Reasoning Index | 82 | Below Average | 12% |
| Working Memory Index | 72 | Very Low | 3% |
| Processing Speed Index | 76 | Very Low | 6% |
| FULL SCALE SCORE | 81 | Below Average | 10% |
| WIAT III Reading | 87 | Below Average | 19% |
| WIAT III Math | 90 | Average | 25% |
| WIAT III Writing | 94 | Average | 34% |

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| FAR index | Standard score (95% CI) | Percentile | Qualitative descriptor |
|---|---|---|---|
| Phonological Index | 75(+/-5) | 5% | Moderately Below Average |
| Fluency Index | 92 (+/-7) | 30% | Average |
| Mixed Index | 81 (+/-5) | 10% | Below Average |
| Comprehension Index | 97 (±8) | 42% | Average |
| **FAR Total Index** | **84 (±5)** | **14%** | **Below Average** |

| KEY SUBTEST INTERPRETATION | Score | Percentile | Descriptor |
|---|---|---|---|
| **Nonsense Word Decoding –** requires the student to decode a series of nonsense words presented in order of increasing difficulty . | 71 | 3% | Moderately Below Average |
| **Irregular Word Reading Fluency –** the student reads a list of phonologically irregular words arranged in order of increasing difficulty in 60 seconds. | 95 | 37% | Average |

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| DYSPHONETIC DYSLEXIA INTERVENTIONS | FAR INTERPRETIVE REPORT WRITER: Targeted Reading Programs |
|---|---|
| **Alphabetic Phonics** | A multisensory phonological approach to reading that is an extension of the traditional Orton-Gillingham model. There are 11 fast-paced activities embedded within each lesson to develop automaticity with phonics skills. |
| **Read Well** | A top-down reading and language arts solution that emphasizes a mixture of instruction to the class as a whole, smaller groups, and individual student practice. |
| **Lexia Primary Reading** | A self-paced computer-based program that helps students develop reading skills. The program identifies when students would benefit from additional support, and automatically notifies the teacher with individualized feedback and recommendations. |
| **Fast Forword Language to Reading** | A scientifically-based 8-12 week reading intervention that encompasses students' reading levels by one or two grades. Focuses on phonemic awareness, phonics, fluency, comprehension, and vocabulary. |
| **Voyager Time Warp Plus** | A summer reading intervention that encompasses 80 hours-worth of material. Phonemic awareness, phonics and word analysis, fluency, vocabulary, and comprehension are covered thoroughly through daily practice. |
| **System 44** | Teaches foundational reading skills to students Grades 3+. This computer-based platform encourages students to think critically and interact with the text as they learn phonics and comprehension. |
| **Academy of Reading** | An intervention program that helps students with phonemic awareness, phonics, fluency, vocabulary, and comprehension. This online program includes real-time reading assessments and progress monitoring. |
| **Words Their Way** | A developmental spelling, phonics, and vocabulary program with numerous activities geared toward developing orthographic knowledge. Sorting, constructing a word wall, and creating a word study notebook are essential components of the program. |

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### FAR Interpretive Report Writer: Strategies

1. **Six Syllable Subtypes**—Explicit instruction on the 6 syllable subtype pattern in the English language, since 90% of words will adhere to this spelling pattern. These include:
   a) Closed syllables—just one vowel, such as "c**a**t"
   b) Open syllables—ends in long vowel, such as "bab**y**"
   c) Vowel-Consonant E Syllables—silent 'e' elongates vowel, such as "mak**e**"
   d) Vowel-Team Syllables—two vowels make one sound, such as "c**au**tion"
   e) R-Controlled Syllables—vowel followed by 'r' changes sound, such as "hu**r**t"
   f) Consonant-le Syllables—end of word ending in 'le', such as "turt**le**"
2. **Color Code Markers**—Allow Jacob to create his own diacritical markers or use color coding to facilitate the recognition of vowel patterns. Traditional diacritical markers often consist of abstract symbols that over-burden working memory systems for students with learning disabilities, and lead to poor retention of information.
3. **Finger Tapping**—Use finger tapping to learn sound and syllable breaks in words, as well as to facilitate spelling rules and boundaries.
4. **Decodable Text**—Incorporate reading **decodable text** silently in every lesson in order to develop a better feel for applying phonological processing skills to words in context and not just in isolation.

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5. **Teach Vocabulary**—Children with dyslexia often lack the ability to recognize words due to a combination of poor phonological strategies, and limited word knowledge. Deepen word knowledge by teaching large concepts first, then linking new vocabulary words to already known words that comprise the concept. For example, introduce the concept of "*liberty*", then ask if specific words such as "*emancipation*" or "*independence*" fit their conceptual schema of "*liberty*".

6. **Write to Read**—Incorporating writing exercises (encoding) to targeted lessons can support reading and phonological development. Written language develops a motor pattern or engram that helps reinforce the sequence of letter sounds when reading. Practice having the student write sounds, phrases, and words from dictation.

7. **Advanced Phonological Mapping**—Research shows (Ehri, 2014) that traditional phonemic awareness is more beneficial at earlier ages, and more advanced phonological mapping is necessary for older children. This involves the formation of letter-sound connections to bond the spellings, pronunciations, and meanings of specific words in memory.

8. **Morpheme Mapping**—Morphemes are the smallest unit of language that convey meaning, and the English language is considered morphophonemic. Increased reading speed and comprehension can be gained using the following strategies:

a) **Morphology Sorts**—Order and arrange words by common prefix and suffix roots.

b) **Morpheme Maps**—Have students develop a graphic organizer or semantic map that groups and arranges words by meaning

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### THE FAR ADVANTAGE

•Based upon a cognitive 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**!!!

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### Let's Stay Connected!

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**Books:** www.schoolneuropsychpress.com
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**Tests:** FAR- 2015   FAM- 2016   FAW - 2020
**Psychological Assessment Resources**

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