Presentation Goals

1. Discuss literacy rates in the United States and the need for all schools to screen for developmental dyslexia.

2. Discuss the pitfalls of relying on either an aptitude-achievement discrepancy model, or a student’s Response to Intervention, as the sole basis for identifying reading disorders in young children.

3. Introduce a brain-based educational model to effectively identify and classify subtypes of reading disorders, and link specific interventions with each subtype.

4. Discuss four universal truths with respect to reading, and develop a neuropsychological framework for understanding how reading is organized in the brain.

5. Introduce the FAR, as a means to better identify and remediate reading disorders and dyslexia in children.

Further Reading Materials

www.schoolneuropsychpress.com
@schoolneuropsychpress

Why a Scientific Approach?

Brian Rosenhall of the Houston Chronicle named 2017 winner of George Polk award for journalism.

10 month investigation lead to a series of articles called “Denied” that exposed the Texas Educational Association rollback of special education services from 13% to 8.5%.

Purging the role after the Texas Independent School District was considered among leaders in providing a special education to many children, the district took unusual steps from reputable third party with special education. In the two years the district made numerous changes in the 2007-8 fiscal year, not including those who were among the 250,000 denied service, in 2008-9 conformed to ensuring laws. Illegible.

On average, educating a special ed child is twice as expensive, and the federal government pays only 1/5th of the extra costs, leaving the rest to states and local districts.

A cost that totaled $3 billion in Texas in 2002. (Conversely, a 504 plan just $2 per student.)

The concern grew in 2003, when lawmakers cut the TEA’s budget by $1.1 billion, thus laying off 15 percent of staffers.

An estimated 250,000 students DENIED services!

Science is needed to define a disability.....not dollars!
1. VAK Learning Styles
2. Dyslexia and Reversals
3. Mozart Effect
4. We use just 10% of our Brains
5. Sugar causes ADHD
6. Right vs Left Brain Learners

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

The National Center for Education Statistics includes students with disabilities and ELL students and administers reading comprehension measures every two years.

- 1992 - 28% proficient
- 2017 - 37% proficient

Students with LD earn lower grades and experience higher rates of course failure and retention.

- Two-thirds of LD students are males.
- 68% of LD students leave high school with a regular diploma compared to national average of 82% graduation rate.

- College completion rate of young adults with LD is
  - 41%, compared to 52% in the general population.

- Only 17% of young adults with LD received supports and accommodations in college.

- 32 million adults (14% of population) in the U.S. have significant reading deficits, with 21 percent of adults reading below a 5th grade level.

- Developmental dyslexia occurs in approximately 5-12% of the population (Lyon, et al. 2003).

- "Dyslexia is characterized by difficulties with accurate and/or fluent word recognition, decoding, spelling, with secondary effects on reading comprehension.

- IDA: - deficits in accurate and/or fluent word recognition, decoding, spelling, with secondary effects on reading comprehension.

- LD: - dyslexia is marked by reading achievement that falls substantially below that expected given the individual's chronological age, measured intelligence, and age-appropriate education.

- ADHD: - a neurodevelopmental disorder hindering the acquisition of reading that cannot otherwise be explained by IQ, academic opportunities, motivation, or specific sensory acuity.

- IDEA: - a learning disability is a basic disorder of a psychological process used in understanding oral, spoken, or written language, and may manifest in the imperfect ability to listen, think, speak, read, write, spell, or do math. It may include conditions such as dyslexia.

- IDA: - dropped the term and classified reading issues under the generic term of specific learning disorder.
DEVELOPMENTAL DYSLEXIA

Learning Disabilities
Reading Disorders
Dyslexias
Subtypes

School Neuropsychology

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

Reports based upon a brain-behavioral paradigm which attempts to describe how a child learns and processes information...not label.

Evidence based interventions require evidence based assessments!

Three Functional Units of the Brain

Alexander Luria (1902-1977)

*Unit #1: the unit for receiving, analyzing, and storing information. Neurons arranged in hierarchical zones:
  1) Primary zones are modality specific and receive input from sensory modalities (visual, auditory, tactile).
  2) Secondary zones are associative or intermodal areas that integrate two different modalities (i.e. visual/auditory)
  3) Tertiary zones are modality NONSPECIFIC and involved in higher order integration of organize human symbol systems. Posterior parietal regions.

Lurian Model and Reading

Comprehension
Word Recognition/Fluency
Text Perception

Unit 3: Text Comprehension
Unit 2: Alphabet Knowledge, Decoding, Rapid Orthography
Unit 1: Phonemic Awareness, Visual Perception

MAIN PITFALLS OF DISCREPANCY MODEL

There is no universal agreement on what the discrepancy should be.


3. Intelligence is more a predictor of school success, and not necessarily a predictor of successful reading.

4. A discrepancy model promotes a 'wait and fail' policy, forcing interventions to come after the fact.

Conclusion: "The use of IQ scores, which is an amalgam of different cognitive tests compiled into a single score lacks the specificity and sensitivity for capturing the exact cognitive deficits associated with different clinical disorders (Decker, Hale, & Flanagan, 2013)."

Reduced activation seen among 57 (8-12yo) students from Carnegie Mellon and 74 students from Stanford (7-16yo) in discrepant AND non-discrepant readers in left parietal and visual word form area.

IQ is not a factor in phonological processing!!

(Tanaka, H. et al. (2011). The Brain Basis of the Phonological Deficit in Dyslexia is Independent of IQ. Psychological Sciences, 22(11): 1442-1451.)
1. In all word languages studied to date, children with developmental reading disorders (dyslexia) primarily have difficulties in both recognizing and manipulating phonological units at all linguistic levels (Goswami, 2007).

### Four Universal Truths of Reading

<table>
<thead>
<tr>
<th>Lowest Incidence</th>
<th>Highest Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slovakia 1-2%</td>
<td>China 5-8%</td>
</tr>
<tr>
<td>Italy 1-5%</td>
<td>United States 5-10%</td>
</tr>
<tr>
<td>Czech Republic 2-3%</td>
<td>Russia 10%</td>
</tr>
<tr>
<td>Britain 4%</td>
<td>Israel 10%</td>
</tr>
<tr>
<td>Poland 4%</td>
<td>Finland 10%</td>
</tr>
<tr>
<td>Belgium 5%</td>
<td>Nigeria 11%</td>
</tr>
<tr>
<td>Greece 5%</td>
<td>Australia 16%</td>
</tr>
<tr>
<td>Japan 6%</td>
<td>India 20%</td>
</tr>
</tbody>
</table>

(Smith, Everatt, & Salter, 2004)

2. The English language is not a purely phonological language. In fact, one letter may map to as many as five distinct phonemes or sounds. English speaking children tend to develop phonemic processing more slowly (Goswami, 2007).

- The English language includes over 1,100 ways of representing 44 sounds (phonemes) using a series of different letter combinations (Uhry & Clark, 2005). By contrast, in Italian there is no such ambiguity as just 33 graphemes are sufficient to represent the 25 phonemes.

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

**Summary**: We need to develop orthography!!

3. Specific neuroimaging techniques have demonstrated that phonological processing and orthographic processing are by-products of the functional integrity of the temporal-parietal junctions in the left hemisphere of the brain (Pugh et al., 2000, McCandliss & Noble, 2003; Shaywitz, 2004; Sandak et al., 2004).

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

4. According to the National Reading Panel (2000), and modified by Grizzle et al. (2009), the 5 big ideas of the reading process include:

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

### Four Universal Truths of Reading

<table>
<thead>
<tr>
<th>5 Big Ideas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comprehension</td>
</tr>
<tr>
<td>Language</td>
</tr>
<tr>
<td>Fluency</td>
</tr>
<tr>
<td>Phonics</td>
</tr>
<tr>
<td>Phonemic Awareness</td>
</tr>
</tbody>
</table>

### The Reading Brain: How Words are Assembled

- **Heschl’s Gyrus** (Phonemic Awareness)
- **Supramarginal Gyrus** (Decoding)
- **Angular Gyrus** (Orthography)
- **Superior Temporal Gyrus** (Phonics)
- **Inferior Frontal Gyrus** (Inner Articulation System)
**Neural Circuitry of Dyslexia** (Shaywitz, 2003)

- Nonimpaired readers activate primarily posterior portions of left hemisphere.
- Impaired readers under-activate posterior regions and activate primarily frontal areas.

**Do Interventions Change the Brain?**

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

  1. Hemispheric "normalization" – the left hemisphere begins to assert dominance after just four weeks of intervention.

**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.

**Multiple Cueing System of Reading**

- Recognizes that both phonological and orthographic and semantic cues can facilitate word recognition.

**Subtypes of Dyslexia**

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

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

<table>
<thead>
<tr>
<th>Target Word</th>
<th>Read As</th>
</tr>
</thead>
<tbody>
<tr>
<td>cut</td>
<td>couch</td>
</tr>
<tr>
<td>balloon</td>
<td>ball</td>
</tr>
<tr>
<td>jump</td>
<td>gym</td>
</tr>
<tr>
<td>ghost</td>
<td>goot</td>
</tr>
</tbody>
</table>
REMEDIATION STRATEGIES FOR DYSPHONETIC DYSLEXIA

Over Age 12:
- Wilson Reading System
- SRA Corrective Reading & REACH System
- Read 180
- FAST
- Kaplan Spell-Read
- LEXIA Strategies for Older Students

Ages 7 - 12:
- Alphabetic Phonics (Orton-Gillingham)
- SRA Corrective Reading
- Earobics
- LiPS
- LEXIA Primary Reading

Under Age 7:
- Fast Forward (Tallal)
- Earobics I
- Phonographic
- Success for All
- Fundations
- Read to the Code
- SIPPS
- Scott Foresman Early Intervention Reading

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

Morpheme: the smallest meaningful component of a word that still conveys meaning. Examples include:
- Prefixes: ante, extra, mis, para, pro, retro, super
- Suffixes: able, tion, ment, ness, ship, tale, ward, ible
- Latin Roots: cent, extra, hemi, meta, thermo, 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.

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.

<table>
<thead>
<tr>
<th>WORD</th>
<th>READ AS</th>
</tr>
</thead>
<tbody>
<tr>
<td>island</td>
<td>island</td>
</tr>
<tr>
<td>grind</td>
<td>grunted</td>
</tr>
<tr>
<td>listen</td>
<td>listen</td>
</tr>
<tr>
<td>begin</td>
<td>beggin</td>
</tr>
<tr>
<td>lace</td>
<td>lake</td>
</tr>
</tbody>
</table>

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

TIME SPENT READING AFTER SCHOOL (Shaywitz, 2003)

REMEDIATION OF SURFACE DYSLEXIA

Over Age 12:
- Academy of Reading
- Wilson Reading System
- Laubach Reading Series
- Read 180

Ages 7 - 13:
- Read Naturally
- Great Leaps Reading
- Quick Read
- RAVE-O
- Fast Track Reading

Under Age 7:
- Destination Reading
- Reading Recovery
- Early Success
- Fluency Formula
Does Vision Therapy Work?

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.

WORD
READ AS:
Advice
Exvices
Correct
Corex
Violin
Vilen
Museum
Musune
Possession
Persusive
Material
Mitear

Multiple breakdowns along many pathways modulating the entire reading process.

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.

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.

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.

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).
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.

SOAR to SUCCESS

A comprehension program for grades 3-6.
1. 30-35 minute lessons...18 weeks.
2. 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.

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.
Research based (Johnson-Glenberg, 2000; Sadoski & Wilson, 2006).
Consideration for students with Autism, Hyperlexia, ELL, and students with lower verbal abilities.

Comprehensive Reading Evaluation

- 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

Comprehensive Reading Evaluation

1. Dyssynaptic Dyslexia:
   Phonemic Awareness Deficits
   Phonological Processing Deficits
   Orthographic 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
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

<table>
<thead>
<tr>
<th>Index</th>
<th>Grade range</th>
<th>Approximate administration time in minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phonological Index (PI)</td>
<td>PK to college</td>
<td>5 to 10</td>
</tr>
<tr>
<td>Nonsense Word Decoding (NWD)</td>
<td>PK to college</td>
<td>2</td>
</tr>
<tr>
<td>Oral Reading Fluency (ORF)</td>
<td>PK to college</td>
<td>2 to 3</td>
</tr>
<tr>
<td>Visual Perception (VP)</td>
<td>PK to college</td>
<td>1</td>
</tr>
<tr>
<td>Nonsense Word Decoding (NWD)</td>
<td>PK to college</td>
<td>7 to 9</td>
</tr>
<tr>
<td>Oral Reading Fluency (ORF)</td>
<td>PK to college</td>
<td>2 to 5</td>
</tr>
<tr>
<td>Isolated Word Reading Fluency (ISO)</td>
<td>PK to college</td>
<td>1</td>
</tr>
<tr>
<td>Rapid Automatic Naming (RAN)</td>
<td>PK to college</td>
<td>2</td>
</tr>
<tr>
<td>Verbal Fluency (VF)</td>
<td>PK to college</td>
<td>2</td>
</tr>
<tr>
<td>Phonological Index (PI)</td>
<td>PK to college</td>
<td>5 to 8</td>
</tr>
<tr>
<td>Orthographical Processing (OP)</td>
<td>PK to Grade 1</td>
<td>8</td>
</tr>
<tr>
<td>Irregular Word Reading Fluency (IRR)</td>
<td>Grade 2 to college</td>
<td>1</td>
</tr>
</tbody>
</table>

Comprehension Index (CI)

<table>
<thead>
<tr>
<th>Subtest</th>
<th>Grade range</th>
<th>Approximate administration time in minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semantic Concepts (SC)</td>
<td>PK to college</td>
<td>5 to 8</td>
</tr>
<tr>
<td>Word Recall (WR)</td>
<td>PK to college</td>
<td>4</td>
</tr>
<tr>
<td>Print Knowledge (PK)</td>
<td>PK to Grade 1</td>
<td>4</td>
</tr>
<tr>
<td>Morphological Processing (MP)</td>
<td>Grade 2 to college</td>
<td>7</td>
</tr>
<tr>
<td>Silent Reading Fluency (SRF)</td>
<td>Grade 2 to college</td>
<td>8</td>
</tr>
</tbody>
</table>

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.

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
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 (3rd+): Advantage

<table>
<thead>
<tr>
<th>Item</th>
<th>Correct response</th>
<th># of syllables</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>ad: van: age</td>
<td>advantage</td>
<td>3</td>
<td>0 1</td>
</tr>
</tbody>
</table>

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.”

<table>
<thead>
<tr>
<th>Item</th>
<th>Correct response</th>
<th>Correct # of taps</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>toothpaste</td>
<td>tooth: paste</td>
<td>2 0 1</td>
<td></td>
</tr>
<tr>
<td>wagon</td>
<td>wa: gen</td>
<td>2 0 1</td>
<td></td>
</tr>
</tbody>
</table>

Phonemic Awareness: Manipulation

“All grades
“I am going to say a word and then take of its sounds away.”

<table>
<thead>
<tr>
<th>Say “sent” when he’s said</th>
<th>end</th>
<th>0 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Say “sent” when he’s said</td>
<td>one</td>
<td>0 1</td>
</tr>
</tbody>
</table>

Positioning Sounds Sample Item

“All grades
“I’m going to say a word. I want you to tell me which sounds are missing in the word.”

Isolated Word Reading Fluency (60 sec)...

Nonsense Word Decoding

2nd + Only
“I want you to read each of these words out loud without skipping any. Ready? Begin.”

conving magip piibstat canians
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

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

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)

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
sh fashionable
read

Orthographical Processing

The student chooses which letters appeared in the presented word

Initial Presentation

epiphany

Response Options

eph phi pip iny

Irregular Word Reading Fluency (60 sec)

<table>
<thead>
<tr>
<th>Item</th>
<th>Pronunciation guide</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>41.</td>
<td>er-epiphany</td>
<td>1</td>
</tr>
<tr>
<td>42.</td>
<td>ir-epiphany</td>
<td>2</td>
</tr>
<tr>
<td>43.</td>
<td>rop-epiphany</td>
<td>3</td>
</tr>
<tr>
<td>44.</td>
<td>mal-epiphany</td>
<td>4</td>
</tr>
<tr>
<td>45.</td>
<td>ma-epiphany</td>
<td>5</td>
</tr>
<tr>
<td>46.</td>
<td>eph-epiphany</td>
<td>6</td>
</tr>
<tr>
<td>47.</td>
<td>phi-epiphany</td>
<td>7</td>
</tr>
<tr>
<td>48.</td>
<td>pip-epiphany</td>
<td>8</td>
</tr>
<tr>
<td>49.</td>
<td>iny-epiphany</td>
<td>9</td>
</tr>
<tr>
<td>50.</td>
<td>eny-epiphany</td>
<td>10</td>
</tr>
<tr>
<td>51.</td>
<td>y-epiphany</td>
<td>11</td>
</tr>
<tr>
<td>52.</td>
<td>er-epiphany</td>
<td>12</td>
</tr>
<tr>
<td>53.</td>
<td>phi-epiphany</td>
<td>13</td>
</tr>
<tr>
<td>54.</td>
<td>iny-epiphany</td>
<td>14</td>
</tr>
</tbody>
</table>
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.”

<table>
<thead>
<tr>
<th></th>
<th>30 sec</th>
<th>1 min 30 sec</th>
<th>2 min 30 sec</th>
<th>3 min 30 sec</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. correct</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. errors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Restriction: Number of errors

COMPREHENSION INDEX

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

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.

Semantic Concepts
All Grades

<table>
<thead>
<tr>
<th>Synonyms Presentation</th>
<th>Antonyms Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>error</td>
<td>divide</td>
</tr>
<tr>
<td>earn</td>
<td>reject</td>
</tr>
<tr>
<td>blunder</td>
<td>derive</td>
</tr>
<tr>
<td>correct</td>
<td>split</td>
</tr>
<tr>
<td>chance</td>
<td>combine</td>
</tr>
<tr>
<td>grasp</td>
<td>hinder</td>
</tr>
</tbody>
</table>

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

Word Recall
Silent Reading Fluency

2 passages and 8 questions

Grades 11+ Story 1

The legacy of these Hebrews goes back several hundred years to the birth of the father of the nation. In fact, the earliest known reference to the Hebrews is in the Book of Judges. The events described in the Book of Judges provide a glimpse into the life of the Hebrews and their struggles. The story of the Hebrews and their struggle for freedom is a source of inspiration to people around the world.

Grades 11+ Story 2 Questions

1. What year was the United States founded?
2. Who wrote the Declaration of Independence?
3. Why was the United States founded?
4. What is the capital of the United States?
5. What is the constitution of the United States?
6. What is the national anthem of the United States?
7. What is the official language of the United States?
8. What is the official currency of the United States?

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

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
16%

WIAT III Reading
87
Below Average
19%

WIAT III Math
90
Average
25%

WIAT III Writing
94
Average
54%

Planning: the ability to apply a strategy, and self-monitor and self-correct performance while working toward a solution.
92
Average
30%

Attention: the ability to selectively focus on a stimulus while inhibiting responses from competing stimuli.
98
Average
45%

Simultaneous Processing: the ability to reason and problem solve by integrating separate elements into a conceptual whole, and often requires strong visual-spatial problem solving skills.
90
Average
25%

Successive Processing: the ability to put information into a serial order or particular sequence.
72
Very Low
3%

CAS-2 COMPOSITE SCORE
86
Below Average
18%

Jacob 4th grade: Reading & Writing Issues

Planning:

Attention:

Simultaneous Processing:

Successive Processing:

CAS-2 COMPOSITE SCORE
86
Below Average
18%

<table>
<thead>
<tr>
<th>FAR index</th>
<th>Standard score (95% CI)</th>
<th>Percentile</th>
<th>Qualitative descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluency Index</td>
<td>92 (75-110)</td>
<td>100%</td>
<td>Average</td>
</tr>
<tr>
<td>Mixed Index</td>
<td>81 (64-98)</td>
<td>14%</td>
<td>Below Average</td>
</tr>
<tr>
<td>Comprehension Index</td>
<td>97 (84-110)</td>
<td>62%</td>
<td>Average</td>
</tr>
<tr>
<td>FAR Total Index</td>
<td>84 (69-99)</td>
<td>14%</td>
<td>Below Average</td>
</tr>
</tbody>
</table>

Discrepancy - Consistency for Jacob: (Dysphonetic Dyslexia)

Significant Discrepancy between high and low processing scores

Significant Discrepancy between high processing and low achievement

Consistency between low processing and low achievement

Far PI Index = 75

Planning = 92

Attention = 98

Simultaneous = 90

Successive = 72

§ Discrepancy - Consistency for Jacob: (Dysphonetic Dyslexia)

Significant Discrepancy

Significant Discrepancy

Consistency
1. Six Syllable Subtypes—Explicit instruction on the 6 syllable subtype pattern in the English language, since 98% of words will adhere to this spelling pattern. These include:
   a. Closed syllables—just one vowel, such as "cat".
   b. Open syllables—ends in long vowel, such as "bat".
   c. Vowel-Consonant-Vowel—vowel "a" along with vowel, such as "take".
   d. Vowel-Consonant—vowel "a" along with vowel, such as "take".
   e. Vowel-Syllables—two vowels make one sound, such as "vacation".
   f. R-Controlled Syllables—vowel followed by "r", changes sound, such as "wreck".
   g. Consonant-e Syllables—end of word ending in "e", such as "articulate".
   h. Syllable Breaking—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 silent 'e' elongates vowel, such as "make".

2. Finger Tapping—Finger tapping to learn sound and syllable breaks in words, as well as to increase spelling speed and retention.

3. 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.

4. Phonological Index

5. System 44

6. Advanced Phonological Mapping—An intervention program that helps students with phonemic awareness, phonics and comprehension. This online program includes real-time student data and automatically notifies the teacher with individualized feedback and recommendations. A self-paced computer-based program identifies when students would benefit from additional support, and then affixes their drawn-on sentences to bond the spellings, pronunciations, and meanings of specific words in memory.

7. Morphemes—Morphemes are the smallest unit of language that convey meaning, and the English language is considered morphemic. Increased reading speed and comprehension can be gained using the following strategies:
   a. Morphology Suite—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.
   c. Draw a Morpheme—Have students draw pictures of morphemes, and then affix their drawings to words with similar morphological structures.
   d. Underline Morphemes—Have students identify and underline related morphemes when presented with a story or passage.
   e. Color Code Morphemes—Color code words with similar morphological roots in a text.

---

### RELIABILITY DIFFERENCES BETWEEN SCORES

**CAS-2: Nelson 5th Grade (Reading and Math Issues)**

<table>
<thead>
<tr>
<th>COMPETENCY</th>
<th>RANK</th>
<th>PERCENTILE</th>
<th>RANK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning</td>
<td>94</td>
<td>Average</td>
<td>35%</td>
</tr>
<tr>
<td>Attention</td>
<td>98</td>
<td>Average</td>
<td>45%</td>
</tr>
<tr>
<td>Simultaneous Processing</td>
<td>82</td>
<td>Below Average</td>
<td>12%</td>
</tr>
<tr>
<td>Successive Processing</td>
<td>90</td>
<td>Average</td>
<td>25%</td>
</tr>
<tr>
<td>CAS-2 Composite Score</td>
<td>89</td>
<td>Below Average</td>
<td>23%</td>
</tr>
</tbody>
</table>

**FAR Index**

<table>
<thead>
<tr>
<th>INDEX</th>
<th>STANDARD SCORE</th>
<th>PERCENTILE</th>
<th>QUALITATIVE DESCRIPTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phonological Index</td>
<td>90 (±5)</td>
<td>25%</td>
<td>Average</td>
</tr>
<tr>
<td>Fluency Index</td>
<td>73 (±7)</td>
<td>3%</td>
<td>Moderately Below Average</td>
</tr>
<tr>
<td>Mixed Index</td>
<td>81 (±5)</td>
<td>10%</td>
<td>Below Average</td>
</tr>
<tr>
<td>Comprehension Index</td>
<td>97 (±8)</td>
<td>42%</td>
<td>Average</td>
</tr>
<tr>
<td>FAR Total Index</td>
<td>84 (±5)</td>
<td>14%</td>
<td>Below Average</td>
</tr>
</tbody>
</table>

---
Discrepancy between high and low processing scores
- Discrepancy between high processing and low achievement
- Consistency between low processing and low achievement

Nelson 5th grade

<table>
<thead>
<tr>
<th>Discrepancy-Consistency for Nelson (Surface Dyslexia)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning = 94</td>
</tr>
<tr>
<td>Attention = 88</td>
</tr>
<tr>
<td>Phonological = 90</td>
</tr>
<tr>
<td>Comprehension = 97</td>
</tr>
</tbody>
</table>

Nelson struggles with both text perception, as well as orthographic processing, both of which are hindering his reading pace and fluency.

### FAR Interpretive Report Writer: Strategies

1. **Repeated Readings**—Read short passages multiple times over a short period of time helps develop more consistency with orthographic representations and greater overall speed. Practice over-learning material on relatively easy texts.

2. **Computer Pacing**—Use computer programs such as Accelerated Reader, LightSail, and SRA Flex Literacy to build up stamina, fluency, and motivation. Caution is given toward over-relying on computer programs, but instead using them to facilitate on-going literacy instruction.

3. **Spells**—Practice developing text orthography skills by utilizing programs that allow words to be flashed in a rapid fashion at triple the reading speed of a typical reader.

4. **Partner Reading**—Take turns with a partner rereading the same passage provide opportunities to develop automatic word recognition skills as well as greater confidence to read out loud in front of others.

5. **Neurological Impress Method**—Read along with an instructor pointing to each word and reading at a slightly faster pace than typically managed. It is important the instructor remain synchronized and always have a finger underneath the actual word being read.

6. **Closed Caption**—Have Nelson watch some of his favorite television shows with the closed caption box turned on, so he can practice reading the dialogue while listening as well.

### FAR Interpretive Report Writer

- **Comprehension (97)**
- **Phonological (90)**
- **Planning (94)**
- **Attention (88)**

Discrepancy between high and low processing scores

- Discrepancy between high processing and low achievement
- Consistency between low processing and low achievement

### KEY

- **Phonological Irregular Words**
- **Phonological Regular Words**
- **Word Reading Processing**
- **Text Perception**

### INTERPRETATION

- **Word Reading**
- **Phonemic Awareness**
- **Phonics**
- **Fluency**
- **Vocabulary**

### Signatures

- **Nelson**
- **FAR Interpretive Report Writer**

### Scores

- **Comprehension = 97**
- **Phonological = 90**
- **Planning = 94**
- **Attention = 88**

### Percentiles

- **Attention = 88**
- **Phonological = 90**
- **Comprehension = 97**

### Consistency

- Nelson can apply decoding skills to familiar words, but lacks a effective strategy when reading phonologically regular words.

### Practice Poems

- Practice poems can greatly be enhanced by reading poems. The goal is not speed, but rather emotion expression, which in turn, enhances fluency.

### Feedback Graphs

- Feedback graphs can greatly be enhanced by reading poems. The goal is not speed, but rather emotion expression, which in turn, enhances fluency.

### Read Plays

- Engaging in dialogue while acting out the scenes of a play greatly facilitates the development of text prosody and passage comprehension skills.

### Phrasing and Automaticity

- Incorporates drills to enhance reading fluency and automaticity. For instance, begins with individual word cards, then progresses to phrases on cards, and finally decodable text. Practice timed drills to determine how many words a student can read in a minute under each condition.

### Activities

- **Audiobooks**
- **Priming**
- **Proponents**
- **Academy of Reading MindPlay School Fast Forword Great Leaps Reading Read Naturally Read 180 Accelerated Reader LightSail**

### Software

- **A computer monitoring.**
- **An intervention program that helps students with phonemic awareness, phonics, fluency, vocabulary, and comprehension.**

### Programs

- **Far FI Index = 73**
- **Simultaneous = 82**

### Reading, Writing, Math Fluency

- **Score**
- **Percentile**
- **Descriptor**

### Nelson's Progress

- **Score**
- **Percentile**
- **Descriptor**

### Nelson's Performance

- **Score**
- **Percentile**
- **Descriptor**

### Nelson's Weaknesses

- **Score**
- **Percentile**
- **Descriptor**
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!

Steven G. Feifer, D.Ed., ABSNP
Licensed Psychologist

Workshops: feifer@comcast.net

Books: www.schoolneuropsychpress.com
        @schoolneuropsychpress

Tests: FAR-2015  FAM-2016  FAW-2020

Psychological Assessment Resources