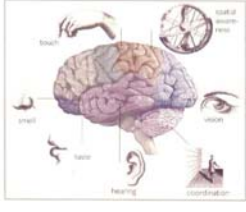



Integrating Rtl with Cognitive Neuropsychology: A Scientific Approach to Reading



Steven G. Feifer, D.Ed, NCSP, ABSNP
feifer@comcast.net


1



DEVELOPMENTAL DYSLEXIA

- ▶ The term refers to an inability to acquire functional reading skills despite the presence of **adequate** intelligence and exposure to educational opportunities.
- ▶ This term is often synonymous with the term "**learning disabled**," and is assumed to represent 5% to 10% of all children.
- ▶ Nearly 80% of children identified as LD have a reading disorder (Lyon, 1996).


5



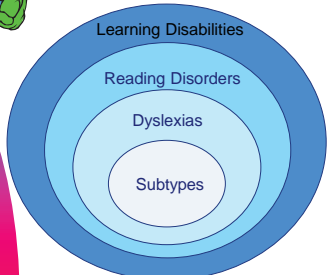
PRESENTATION GOALS

1. Discuss the pitfalls of relying on either an aptitude/achievement discrepancy model, or a student's **R**esponse **t**o **I**ntervention, as the sole basis for identifying reading disorders in young children.
2. Link brain functions to the reading process and introduce a **brain-based** educational model to effectively identify and classify **subtypes** of reading disorders.
3. Discuss four key brain concepts with respect to reading, and tie in appropriate remediation and educational strategies for each reading subtype.
4. Introduce the **90 minute dyslexia** evaluation to measure eight core constructs associated with reading disorders in children.

2



DEVELOPMENTAL DYSLEXIA




6

1


3

10/11/2013

10/11/2013




Further Reading Materials

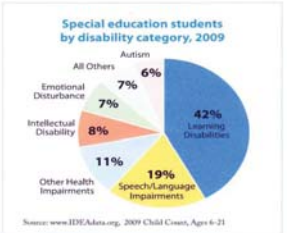


www.schoolneuropsychpress.com

3




Disability Categories (2009)



Source: www.IDEAdms.org, 2009 Child Count, Ages 6-21
National Center for Learning Disabilities

7

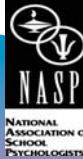


Basic Literacy Facts National Literacy Council (2008)

The educational careers of 25 to 40 percent of American children are imperiled because they don't read well enough, quickly enough, or easily enough.


- ▶ SLD are twice as likely to suffer from mental health issues specifically related to their disability (O'Brien, 2004). Their emotional challenges further contribute to elevated dropout rates, poorer graduation rates, and meager employment options (National Center for Learning Disabilities, 2011).
- ▶ Over one million children drop out of school each year. In fact, the graduation rate of students with SLD is just **64%**, well below that of non SLD students.
- ▶ Children who have not developed some basic literacy skills by the time they enter school are 3 - 4 times more likely to drop out in later years.

4



NASP 2011 LD POSITION STATEMENT

- ▶ Specific learning disabilities are endogenous in nature and are characterized by **neurologically** based deficits in **cognitive processes**.
- ▶ These deficits are specific; that is, they impact particular cognitive processes that interfere with the acquisition of academic skills.
- ▶ Specific learning disabilities are heterogeneous—there are various **types** of learning disabilities, and there is no single defining academic or cognitive deficit or characteristic common to all types of specific learning disabilities.
- ▶ It is best practice to look at multiple sources of data, including how students respond to scientifically based instruction, including environmental and instructional conditions. Relying upon an **ability-achievement discrepancy** as the sole means of identifying children with specific learning disabilities is at odds with scientific research and with best practice (Gresham & Vellutino, 2010).




MAIN PITFALLS OF DISCREPANCY MODEL

1. There is no universal agreement on what the discrepancy should be.
2. A discrepancy model of reading disabilities precludes early identification.
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.

Side note: Do you really think human intellectual functioning can be captured by one unitary value?

9

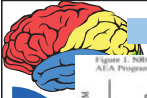


School Neuropsychological Assessment

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.

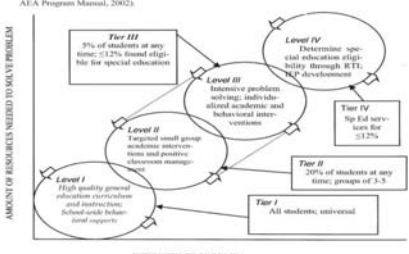
- ▶ Reports based upon a brain-behavioral paradigm which attempts to describe how a child learns and processes information...not label.
- ▶ More comprehensive!!
- ▶ Evidence based interventions require evidence based assessments!!

13



RESPONSE TO INTERVENTION MODEL

Figure 1-100C Multi-tiered Interventions (figure adapted from Horstland AEA Program Manual, 2002).



Intensity of Problem:


- Tier I:** All students, universal
- Tier II:** 20% of students at any time; groups of 3-5
- Tier III:** Targeted small group; academic interventions and positive behavior management
- Tier IV:** Intensive problem-solving; individualized academic and behavioral interventions
- Tier V:** Determine special education eligibility through RTI; NRP development

Amount of Resources Needed to Solve Problem:

- Level I:** High-quality general education curriculum and instruction; School-wide behavioral supports
- Level II:** Targeted small group; academic interventions and positive behavior management
- Level III:** Intensive problem-solving; individualized academic and behavioral interventions
- Level IV:** Determine special education eligibility through RTI; NRP development
- Level V:** 5% of students at any time; <12% identified eligible for special education

Reichle, R. J. (2003, December). What if I-100C? Implications for Research Findings? Paper presented at the National Research Center on Learning Disabilities Symposium on Intervention Symposium, Kansas City, MO.

10



Four Universal Truths of Reading

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).

Lowest Incidence:		Highest Incidence:	
Slovakia	1-2%	China	5-8%
Italy	1-5%	United States	5-10%
Czech Republic	2-3%	Russia	10%
Britain	4%	Israel	10%
Poland	4%	Finland	10%
Belgium	5%	Nigeria	11%
Greece	5%	Australia	16%
Japan	6%	India	20%

(Smith, Everatt, & Salter, 2004)


14

5

7

10/11/2013

10/11/2013




Curriculum-Based Measurement

2005 Hasbrouck & Tindal Oral Reading Fluency Data

Grade	Percentile	Fall WCPE*	Winter WCPE*	Spring WCPE*	Avg. Weekly Improvement**
1	90	60	81	111	2.9
	75	50	67	82	2.2
	50	37	51	71	1.5
	25	22	32	56	1.0
	10	8	15	36	0.6
2	90	106	125	142	1.1
	75	79	98	117	1.2
	50	53	73	89	1.2
	25	33	42	62	1.1
	10	11	18	31	0.6
3	90	128	146	162	1.1
	75	89	109	127	1.2
	50	71	92	107	1.1
	25	44	62	79	1.1
	10	21	36	58	0.8
4	90	147	166	180	1.1
	75	119	139	152	1.0
	50	94	112	125	0.9
	25	68	87	98	0.9
	10	47	61	72	0.8
5	90	166	182	194	0.9
	75	139	156	168	0.9
	50	110	127	139	0.9
	25	87	96	109	0.8
	10	61	74	83	0.7

11




Four Universal Truths of Reading

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!!

15



Summary of RtI Delivery Model


RtI strengths:

- ▶ allows for earlier intervention.
- ▶ non-categorical.
- ▶ excellent for progress monitoring.
- ▶ utilizes data to make decisions.
- ▶ systemic deployment of interventions.

RtI weaknesses: not sufficient to identify a learning disability! (National Joint Commission on Learning Disabilities, June 2005)

- ▶ Run the risk of delaying assessment and denying a student eligibility for services (OSEP memo, 2010).
- ▶ RtI is incapable of differential diagnosis and offers little in identifying other emotional conditions or attention factors hindering learning (Reynolds, 2008).
- ▶ RtI models often promote standard protocol interventions and assumes a "one size fits all" approach to remediation (Feifer & Della Toffalo, 2007).

12



Six Syllable Subtypes

The six types of syllables that compose English words must be directly taught. These syllable subtypes help to develop orthographical patterns in words and include:

- 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")

16

6

8

Four Universal Truths of Reading

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

Supramarginal Gyrus (phonics)
Angular Gyrus (orthography)
Superior Temporal Gyrus
Heschl's Gyrus

17

Brain Imaging and Dyslexia

9 year-old good readers
9 year-old dyslexics
Greater activity in good readers than in dyslexics for words for faces

Words

- Good readers show a well-developed visual word form area (shown in green).
- Dyslexics show no such specialization for written words, and also exhibit a much weaker activation to faces in the right hemisphere.
- Literacy involves a specialization of the visual word form area in the left hemisphere.

Dehaene, S. (2013) Inside the letter box: How literacy transforms the human brain. Cerebrum

Four Universal Truths of Reading

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

5 Big Ideas
COMPREHENSION
LANGUAGE
FLUENCY
PHONICS
PHONEMIC AWARENESS

18

SUBTYPES OF DYSLEXIA

- 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 cortex (*supramarginal gyrus*).

22

9

11

10/11/2013

10/11/2013

NATIONAL READING PANEL CONCLUSIONS

- The younger the child, the better the outcome.
- The "at-risk" child responds best to small group instruction (3:1), with **phonological awareness** training being combined with **explicit phonics**.
- Highly trained teachers achieve the best results.
- Frequency of instruction (4-5 days per week) was more effective than sporadic instruction (2 days per week).
- For each successive year in school, more intensive phonological instruction is required.
- The following characteristics were associated with poor outcome:
 - attention or behavior concerns
 - low socioeconomic status
 - poor verbal skills
 - poor rapid naming skills

19

KEY BRAIN REGIONS IN DYSPHONETIC DYSLEXIA

Inferior Frontal Gyrus
Supramarginal Gyrus
Angular Gyrus
Heschl's Gyrus
Superior Temporal Gyrus

23

NEURAL CIRCUITRY OF DYSLEXIA (Shaywitz, 2003)

Nonimpaired
Dyslexic

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

20

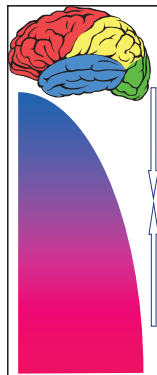
KEY BRAIN REGIONS IN DYSPHONETIC DYSLEXIA

Heschl's Gyrus – auditory perception and discrimination (phonemic awareness).
Superior Temporal Gyrus – modulating the 44 phonemes of the English language.
Angular Gyrus – cross modal association area underlying mapping symbols to sounds (orthography).
Supramarginal Gyrus – cross modal association area underlying the spatial appreciation and positioning of sounds.
Inferior Frontal Gyrus – end point for inner articulation region.
Insular Gyrus – automatic word recognition center of the brain.

24

10

12



REMEDIATION STRATEGIES FOR DYSPHONETIC DYSLLEXIA

Over Age 12:
(Top-Down)

- Wilson Reading System
- SRA Corrective Reading & REACH System
- Read 180
- HOTS
- Kaplan Spell/Read


Age 7-12:

- Alphabetic Phonics (Orton-Gillingham)
- Recipe for Reading
- SRA Corrective Reading
- Eurobics II
- SIPPS
- Lindamood Seeing Stars Program
- LEXIA
- Horizons
- Read Well
- DISTAR (Reading Mastery)

Under Age 7:
(Bottom-Up)

- Fast Forward II(Tallal)
- Eurobics I
- Phono-Graphix
- Saxon Phonics Program
- Success for All
- Ladders to Literacy
- Foundations
- Road to the Code
- Scott Foresman Early Intervention Reading

25



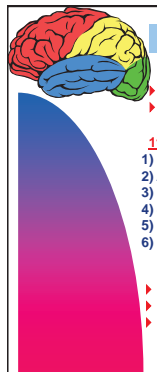
The Morphological Connection ("Top-Down") (Senechal & Kearns, 2007)

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.

29



Alphabetic Phonics


Orton-Gillingham multi-sensory program
 Synthetic..bottom-up approach...

11 activities:

1) Language building	7) Handwriting
2) Alphabet recognition	8) Spelling
3) Reading Decks	9) Verbal Expression
4) Spelling Decks	10) Reviews
5) New Learning	11) Reading Comp
6) Reading Practice	

- Highly scripted
- Up to 3yrs to complete
- Fast paced activities emphasizing automaticity

26



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**.


30

13

15

10/11/2013


10/11/2013



SRA Corrective Reading

- Designed for students grades 4-12
- Recommended 4-5 days per week...45 min per day.
- Emphasis is on decoding and comprehension, but most research only examined decoding portion of program.
- Program is aligned with "Scientifically Based Reading Research" (SBRR) because it covers 5 pillars of reading as outlined by the National Reading Panel.
- The teacher models phonemic awareness using auditory activities which are then applied to decodable text. Vocabulary instruction is taught using morphological rules.
- Recommended for SPED kids reading one or more years behind. Scaffolded nature imposes structure to assist students with executive dysfunction as well.

27




SUBTYPES OF DYSLLEXIA

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

31



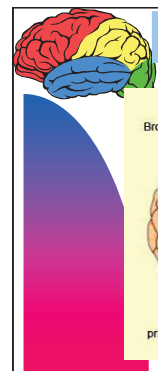
HORIZONS FAST TRACK A-B

150 Lessons – 50 minutes per lesson

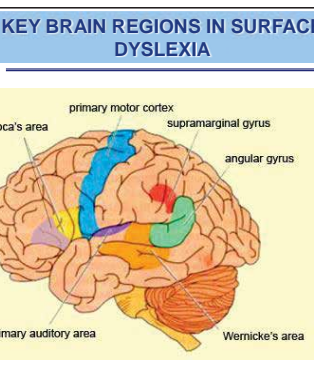
- Highly scripted....designed for Grades 2 and above
- Letter sounds taught in two families:
 - F,L,M,N,R,S,X,Y - last part of sound makes letter.
 - B,D,J,K,P,T,V,Z - initial sound is the letter.
- After consonants are learned, orthographic prompts color code blends. For instance, the blue letter makes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

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

28




KEY BRAIN REGIONS IN SURFACE DYSLLEXIA



32

14

16




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

33



4 REMEDIATION STRATEGIES FOR MIXED DYSLEXIA


(1) **Balanced Literacy** - An eclectic 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.

37




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) through 8th (133 wpm) grades.
- Each level of the program has 24 non-fiction stories.
 - Student placed in level and goal is set.
 - Cold read for one minute graphing wpm and identifying difficult words.
 - Read with tape three times consecutively.
 - Hot read is attempted.
 - Comprehension questions involve main idea, details, vocabulary, inferences, and short answers.

34



Read 180 (Dr. Ted Hasselburg)

A 90 minute per day balanced literacy program.

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


38

17

19

10/11/2013


10/11/2013



RAVE-O (Maryann Wolf, 2006)

- Reading fluency program released in 2006 after 10 years of extensive research.
- Grades 1-5 and ELL students...45 min/day..16weeks
- Reading, Automaticity, Vocabulary, Engagement, & Orthography.
- Main focus is to determine 80 percent accuracy on material, then focus upon speed and fluency.
- Each week, the student learns core words at the phonemic, orthographic, semantic, syntactic, and morphological levels. The premise is that the more the child knows about the word, the quicker it is retrieved and comprehended.
- Speed Wizard computer program assists with progress monitoring.
- Research based (Morris et al., 2007) to improve fluency and comprehension.


35



4 Components of Reading Comprehension

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

39




SUBTYPES OF DYSLEXIA

- 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	Persessive
Material	Mitear

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

36



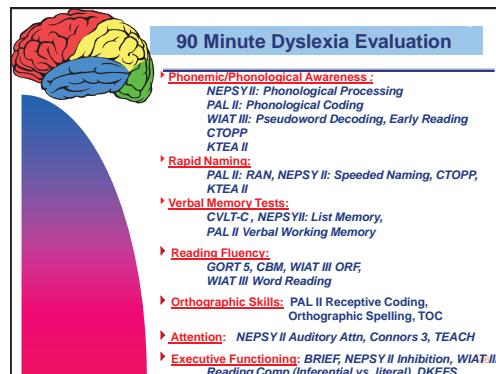
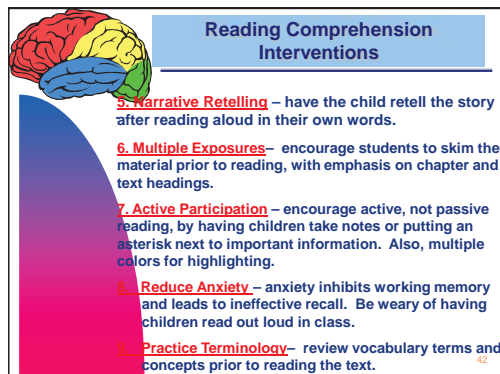
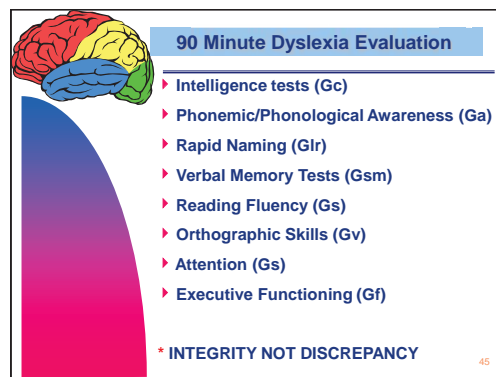
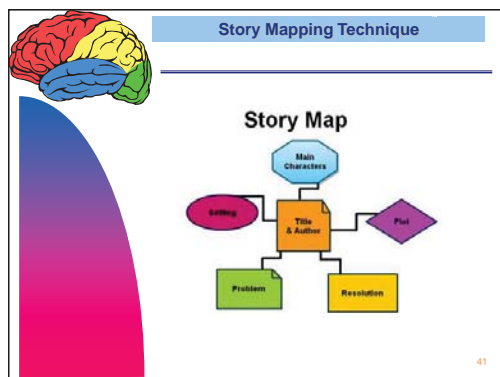
Reading Comprehension Interventions

- Stop & Start Technique** – student reads a passage out loud and every 30 seconds “stop” to ask questions.
- Directional Questions** – ask questions at the beginning of the text instead of the end.
- Read Aloud** – reading out loud allows student to hear their own voices and facilitates working memory.
- Story Maps** – pre-reading activity where graphic organizers are used to outline and organize the information.

40

18

20

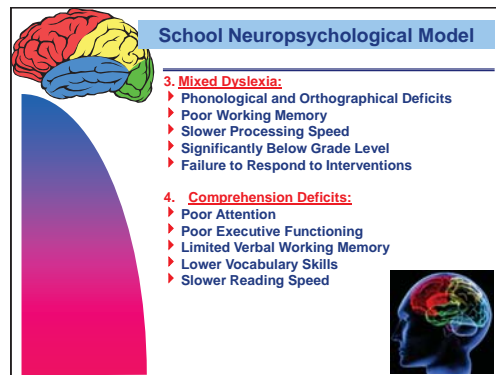
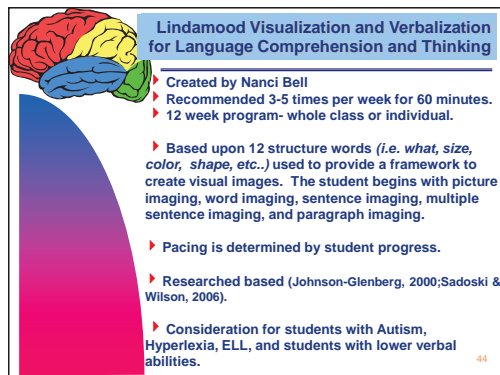
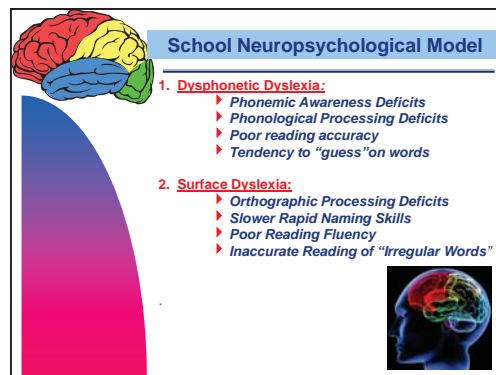
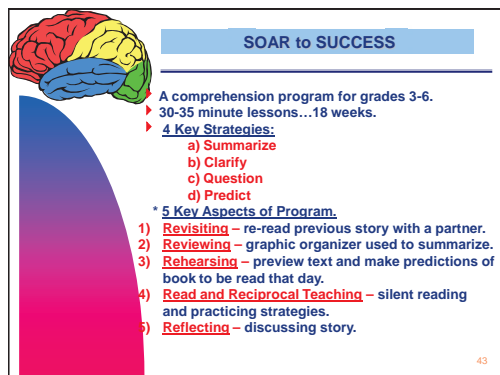


21

23

10/11/2013

10/11/2013



22

24