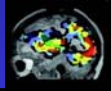




Reading, Spelling, & Writing

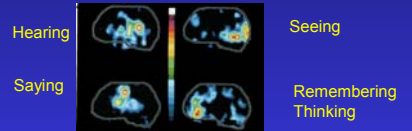
Fernette Eide, M.D. & Brock Eide, M.D., M.A.
www.neurolearning.com



The 4 Things We Need to Read & Spell

We got to the camp in the mountains and
saw a big brown bear coming right toward us!

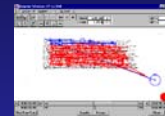
Seeing Hearing Saying Remembering



Donnan

The 4 Things to Read & Spell

- Seeing**
 - Seeing Clearly
 - Eyes Moving Together Well
 - Seeing Whole Word
- Hearing**
 - Hearing Sounds Correctly
- Saying**
 - Pronouncing Words Correctly
 - Being Able to Pronounce Seen Words
 - Being Able to Pronounce Heard Words
- Remembering**
 - Visual Letter Memory- What Letters Look Like
 - Visual Word Memory- What Words Look Like
 - Auditory Word Memory- Words and Meaning



Eye tracker

Seeing

- 10% All Children have Vision Difficulties
- 46% Our Learning Clinic have Vision Problems

- Head Tilt Rubbing Eyes Skipping Lines
- Losing things Clumsy Interrupting others

Seeing & Reading

We got to the camp in

Blurring

We got to the camp in

Double Vision

We got to the camp in

Dyslexia

We got to the camp in

'Visual' Dyslexia

It's more than 20/20



School Testing Does Not Evaluate How
The Eyes Work or Move Together

Children with ADHD
3X More Likely to have
Convergence Insufficiency (Garnet, UCSD)

To Read:

- Eyes Converge on Printed Word
- Sharp Image Relayed to Brain
- Eyes Move Smoothly Together
- Letters & Words are Recognized Quickly and Paired with Correct Sounds and Meanings
- Many Brain Based Difficulties in Vision are Hard to Detect in Children



Lazy Eye or Strabismus



- Intermittent Eye Turning Normal 6 mos Age
- Older Children Should Be Evaluated
- May Be Constant or Intermittent
- Can Cause Double Vision & Eye Fatigue

The Reading Problems in Dyslexia

- Seeing Words & Letters Clearly
- Hearing Words & Blends Clearly
- Remembering Words by Sight or Sound
- Saying Words Smoothly & Automatically

Could I Have Dyslexia?

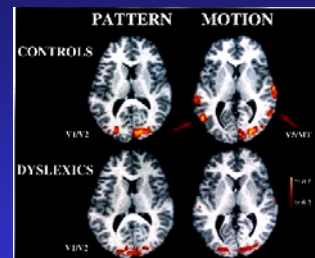
- Dyslexia is Very Common (1 in 5 People)
- Dyslexia is Often Mis-Diagnosed
- Most People with Dyslexia Have Normal or Above Average Intelligence
- Many Gifted Dyslexics Able to Read



Seeing Problems & Dyslexia

- Problems with Visual Movement
- Problems with Visual Crowding
- Problems with Visual Fixation
- Problems with Convergence & Scanning
- Problems with Contrast & Flickering Light
- Problems with Suppressing Visual Images...

Visual Movement Problems & Dyslexia



Problems Registering Moving Visual Pattern

' I can't read the long words. I can only see the first letter and the last letter, and I have to guess at what's in the middle...'

- 10 yr old with Dyslexia

Seeing & Remembering

abcdefghijklmnopqrstuvwxyz

Letters

Different Symbols for Same Letter

a a a a

Mirror Reflections of Letters

p q n u b d

Mirror Reflections of Words

was saw

The Brain Stores a Picture of Letters and Words in a Mirror Reflection

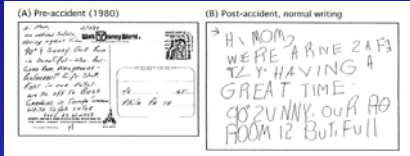
p q n u b d

was saw

Mirror writing is common in early childhood

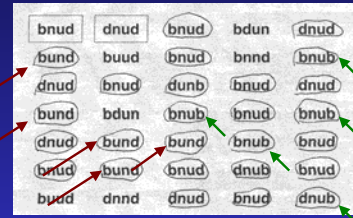
Lessons from Brain Injured Patients

Specific Brain Regions for Letter & Word Orientation



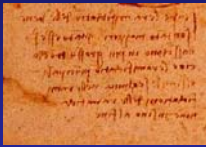
“...she came to realize that writing in reverse felt more natural and that these words (and numbers) were easier to read than normal words...”

Chatterjee, U Penn



Not Seeing All the Letters in a Word Automatically:

Missing the middle part of words, guessing at words by the first letter and context, inversions, reversals...

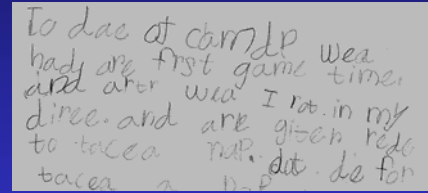


Leonardo Da Vinci's Mirror Writing

“When I get tired, I know I mirror write. It's funny to look at my notes, though, half of it might be written backwards...” - 12 yo girl with dyslexia

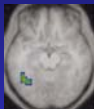
“I discovered a trick that helped me read better. I just look at the word backwards, and just remember to flip it...” - 10 yo boy with dyslexia

Impaired Visual Memory for Words



- Reversal Errors
- Problems Remembering What Letters or Words 'Look Like'

Visual Word Form Area in the Brain



- Specific Area for Visual Memory for Words
- Visual Dyslexics use Alternate Route
- The Alternative VWFA processes Letter-by-Letter (Sweep-sweep-spell)

Dehaene, INSERM Davis, Gift of Dyslexia

'Visual' or Surface Dyslexia

We got to the camp in the mountains and was a dia ddown deal comind night foward us!

- Reading can be Slow
- Reading & Spelling are Phonetic
- Sight Words are Most Difficult
- Writing to Dictation Very Difficult

Strategies to Overcome 'Visual' Dyslexia

- Treat Eye Tracking, Convergence Problems
- Address Lighting Issues, 'M variant of Dyslexia'
- Use MultiSensory Strategies, Picture Memory



Vision Therapy



Pictures



Color



Air Writing



Irlen Filters

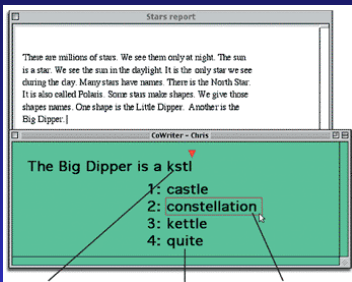
What About Spelling?



- More Repetitions to Have a 'Picture' of Word
- Make Language Print Rich at Home & School
- Close Captioning
- Read Along with Books on Tape
- MultiSensory
- Computer Software
- Sequential Spelling (avko.org)

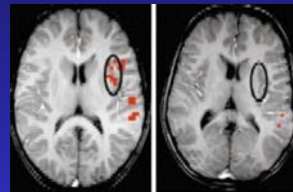
ldonline

Co-Writer, Write Outloud,



Write with Spellchecker, Word Prediction
Do Math with Math Facts Table

MisHearing in 80-90% of Dyslexics MisHearing Found in 76% of Our Patients



Controls

Dyslexics

Hearing Words
Rhyme

- Dyslexia
- CAPD
- Chronic Ear Inf

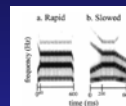
Brain Can't Hear....

Berninger, UW

Phonological Errors in Dyslexia

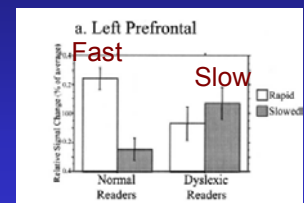
- 'mop' rhymes with 'hot'
- 'large' is heard as 'larch'
- 'brush' and 'blush' sound alike

Phonics is important: 75% of Words in English Are Phonetic



Dyslexics Respond Better To Slow Acoustic Changes

fMRI Changes



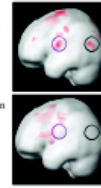
Software for Auditory Processing



Earobics
Fast Forward

A Children with no remediation

Normal reading children while rhyming



Dyslexic reading children while rhyming before remediation

B Dyslexic children increases after remediation



Correction of Brain Signals By Software Training

Gabrieli, Stanford

Auditory Memory in Dyslexia



- Auditory Word Memory may be affected
- Auditory Short Term Memory may be affected
- Visual Memory may be Strong (Use Strengths!)
- Visualizing & Verbalizing (Lindamood Bell)



Saying



- Reading Aloud Fluently & Automatically
- Letter / Word /Sound Recognition & Memory
- Mouth / Lips Positioning for Speech
- Dysfluency Can Interfere with Comprehension



LIPS



Reading Assistant



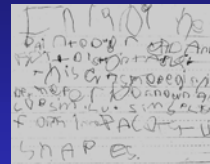
rfd.org

Writing



- Physical Process of Writing
- Ideational & Organizational Aspects of Writing

Dysgraphia



- Awkward or cramped grip
- Irregular sizes & shapes
- Uneven pressure on letters
- Missed letters, words, reversals
- Unusual position, uneven spacing
- Must watch hand while writing

'In 1909 he painted bread and fruit dish on table. This was the beginning of the period known as Cubism. Cubism splits forms into facet-like shapes.'

- Behavior problems
- 'Underachievement'
- Explosive Child
- Careless
- ADD

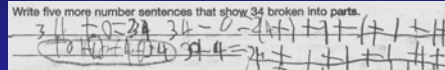
Dysgraphia

- **Dysgraphia 85% Our Learning Clinic**
- **Fine Motor Incoordination, Vision Problems, Poor Hand-Eye Coordination, Impaired Sensory Processing, Motor Planning Problems, Weakness, Dyslexia...**

“ His teacher lets him take work home, but it would take him 2 or 3 hours...”

“ I kept telling her, I didn't have time to finish my writing, but she just took my paper away...”

Dysgraphia & Math



- **'Careless Errors'**
- **Show your work**
- **Slow!**
- **Overwhelms Working Memory**

Dysgraphia & Language Arts

- **Writing by Hand: Unable to Write Past the Letter H...**

• **Narrated:**
“A beautiful wave of water and then a 'Flash!' The lightening turned green and slimy. A bat came from the sky...”

- **Allow Narration Frequently**
- **Utilize Computers & Software Programs**
- **Separate the Ideational Aspects of Writing from Physical Process of Writing**

Dysfunctional Hand Grasps



There are Many Many More!

- **Motor Weakness**
- **Motor Incoordination**
- **Sensory Problems**
- **Vision Problems**
- **Inattention**

Accommodations for Dysgraphia



- **Keyboard whenever possible**
- **Individualize writing goals**
- **Seek an Evaluation by an Occupational Therapist**
- **Scribe for Standardized Testing**
- **Extra time or Untimed conditions**
- **Computer programs for math, writing**
- **Allow Narration, Multiple Choice, Matching**

Planning & Organizing Writing

- **Word Retrieval**
- **Sentence Formulation**
- **Word Usage, Semantics**
- **Sequencing**
- **Memory, Attention**
- **Grammar Conventions**
- **Spelling**

Dyslexia

Apraxia

Visual Thinkers

Auditory Processing

Specific Brain Regions For Organizing Language

Table 1
Examples of the four experimental conditions with cohesive ties are provided in tables.

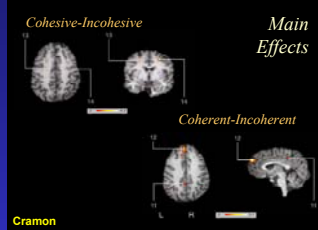
(1) Cohesive-Incohesive
Mary's cousin was absent on time. The palms were sweaty.
Laura got a lot of mail today. Some friends had remembered her birthday.

(2) Cohesive-Cohesive
Mary's cousin was absent on time. She didn't get a job until recently.
Laura got a lot of mail today. Her friends had remembered her birthday.

(3) Incohesive-Incohesive
Laura got a lot of mail today. The palms were sweaty.
Mary's cousin was absent on time. Some friends had remembered her birthday.

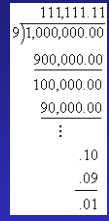
(4) Incohesive-Cohesive
Laura got a lot of mail today. She didn't get a job until recently.
Mary's cousin was absent on time. Her friends had remembered her birthday.

Table 1, p 128, Cognitive Brain Research



Laura got a lot of mail today. Her friends remembered her birthday.
Laura got a lot of mail today. The palms were sweaty.

Different Modes of Thinking & Organization

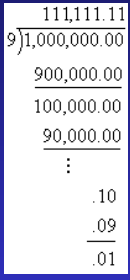


Sequential
(Frontal)



Picture
(Visual/Sensory/Associative)

Frontal / Sequential Learning



- Step-by-step, Linear, Black & White
- Trial-and-error
- Learn from example & mistakes
- Exacting, attending to details
- Attention to the whole may distract from solution
- Repetition increases speed and automaticity
- Convergent- processing arrives at a single answer
- Fact-Based

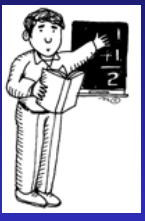
Silverman, GDC

Visual /Associative Thought & Processing



- Whole-to-Part Learner
- Visual, spatial, relational auditory, 'all senses'
- Emotional, Evocative
- Qualitative-not exacting
- Immersive, color
- Repetition-Layers of knowledge, not speed
- Divergent-many answers or relationships

Adult

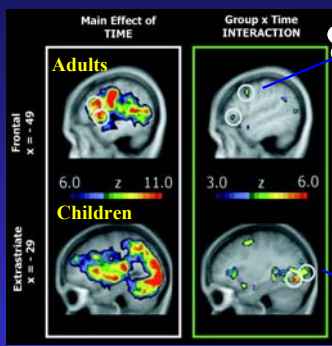


Linear/Sequential
Fact-rich
Verbal
Rational

Child



Non-Linear
Fact-poor
Visual / Non Verbal
Irrational



Frontal / Sequential

Adults & Children Use Different Brain Areas to Learn

Visual/ Associational

Schlaggar Wash Univ St Louis





"Can't You See It?"

- Lack of Words
- Out of Sequence
- Lack of Context, Personal
- All Details Important
- Transitions Like Film Maker

Gerald Grow

Visual/Associative Organization In Search of a Gestalt Whole



Einstein's Desk & Bookshelf

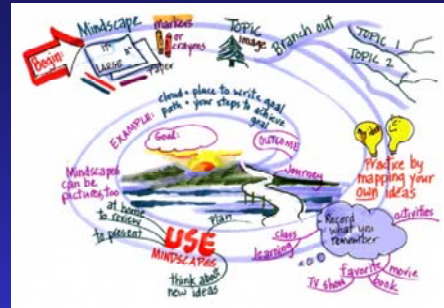
Too Much Data
How Do you Organize?



Bosch

Visual Organization

- Graphic Organizers, Web
- Translate Pictures to Words
- Imagery, Metaphors, Powerpoint



Color!

Specific Writing Recommendations

- Graphically Organize Ideas
- Specific Teaching in Semantics, Syntax, Word Choice (Imagery), Transitions
- Specific Teaching in Higher Order Language-Inference, Ambiguity, Generalization, Metaphor
- Allow Visual Presentations
- Write from Visual Outlines
- Allow More Time, Encourage Revisions

Writing Helps



Talking Dictionary
Talking Thesaurus



Co-Writer
Write Outloud
Dragon Dictate

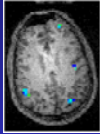


visualthesaurus.com

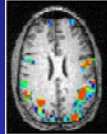


Different Ways We Think

Non-Musician



Musician



U Cincinnati