

# Dyslexia 101

**Oregon Statewide Teacher In-Service**

October 10, 2014

*Presented by:*

Barbara Steinberg, M.Ed.

*Dyslexia & Educational Consultant*

PDX Reading Specialist, LLC

5 Centerpointe Drive, Suite 400

Lake Oswego, OR 97035

503.747.3491

[www.pdxreadingspecialist.com](http://www.pdxreadingspecialist.com)

[steinberg@pdxreadingspecialist.com](mailto:steinberg@pdxreadingspecialist.com)

# Dyslexia 101

- How Do We Learn to Read?
- Our Amazing Brains
- Dyslexia Defined
- Myth Busters
- Signs & Symptoms
- Diagnosing Dyslexia
- Effective Instruction
- Accommodation
- Inspiration

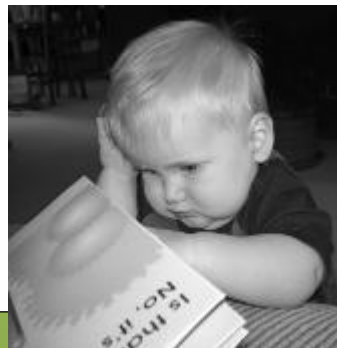
Learning to Read Is **Not** Natural!



# Spoken Language is “Hard-Wired”

- Reading is not a skill that can be picked up automatically, like spoken language.
- Humans have used spoken language for 50,000-100,000 years. Our brains have become pre-wired to acquire spoken language through exposure alone.
- Reading is different: humans have only been reading for about 5,000 years. Our brains are not yet pre-wired to pick up reading through exposure alone (being read to, or reading on our own).

(Wolf, 2008)

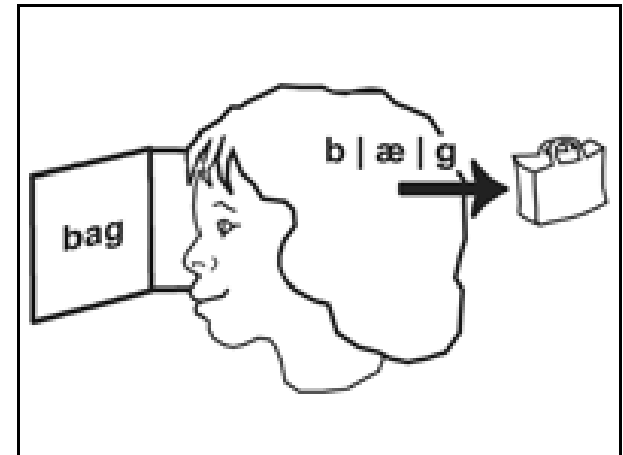


# So...how do we learn to read?

- To learn to read, one must master the Alphabetic Principle (words are not whole envelopes of sound)
- Lines and circles of print take on meaning when linked to spoken language
- Print links to sounds (phonology)

“Writing is a way of recording language by visible marks”  
(L. Bloomfield)

**Figure 2: The Alphabetic Principle**



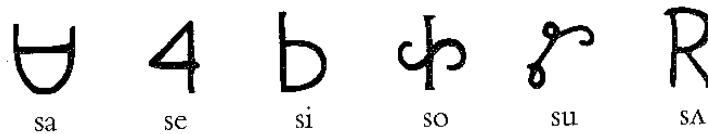
# A Little About The ABC's



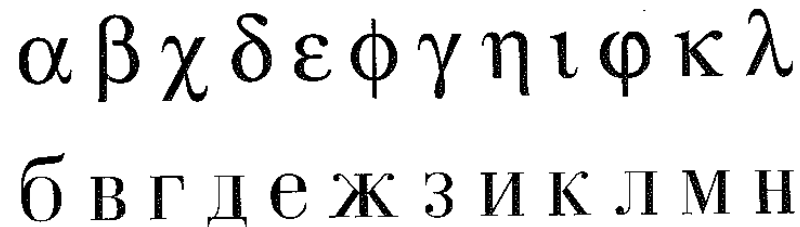
**Logographs** that abstractly represent meaning, not sound (Chinese radicals):



**Syllabic symbols** that directly represent whole syllables (Cherokee):



**Alphabetic symbols** that represent consonants and vowels, or individual phonemes (Greek, Russian):

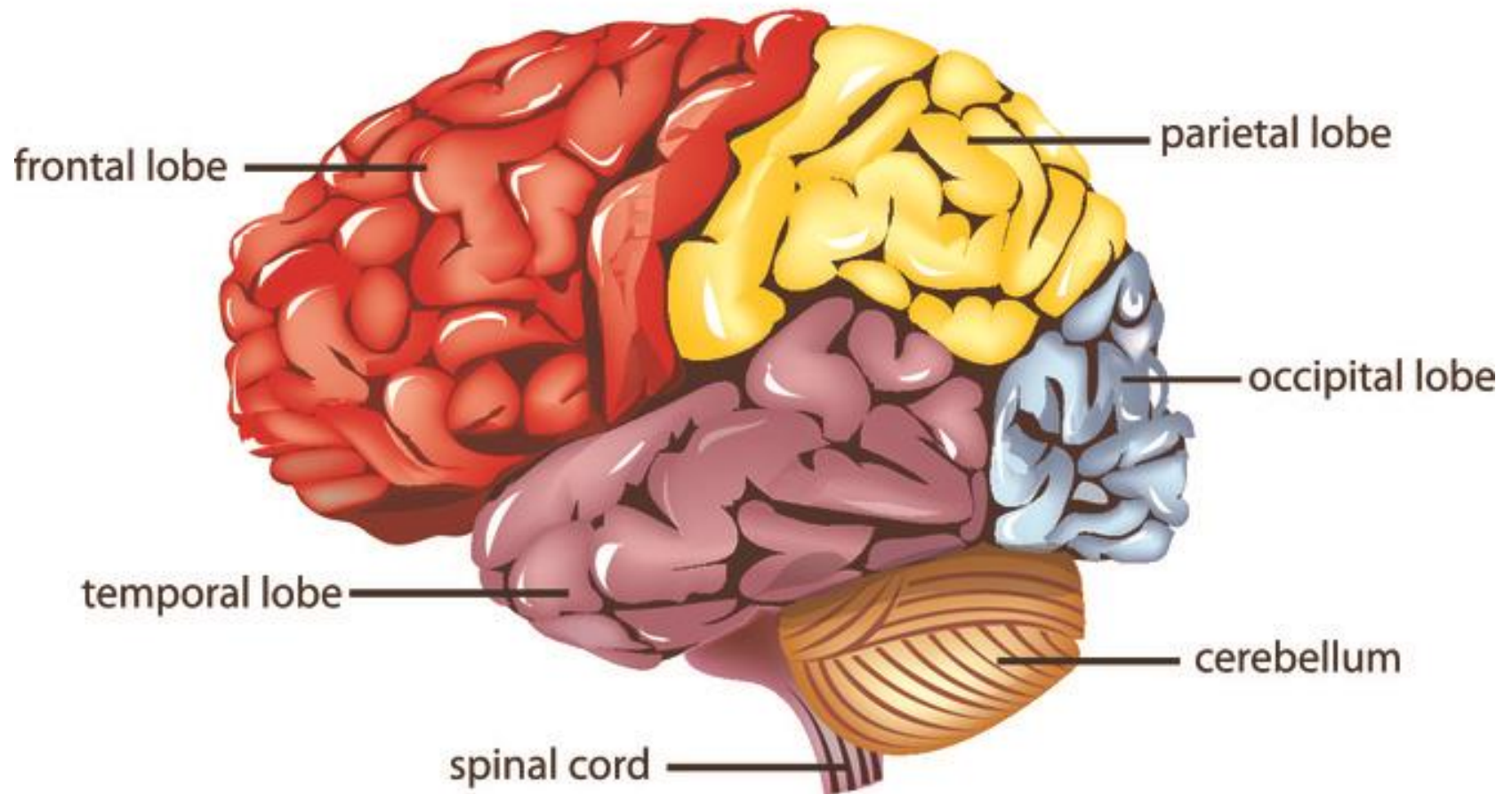


# Do YOU Know The Code?

- Any word can be read or written using a small set of symbols
- Language can be written down and read if you can match the symbols to the sounds they represent.
- The existence of the phoneme is not a natural or consciously accessible understanding for humans. People are “wired” instead to process speech for the meanings it conveys!



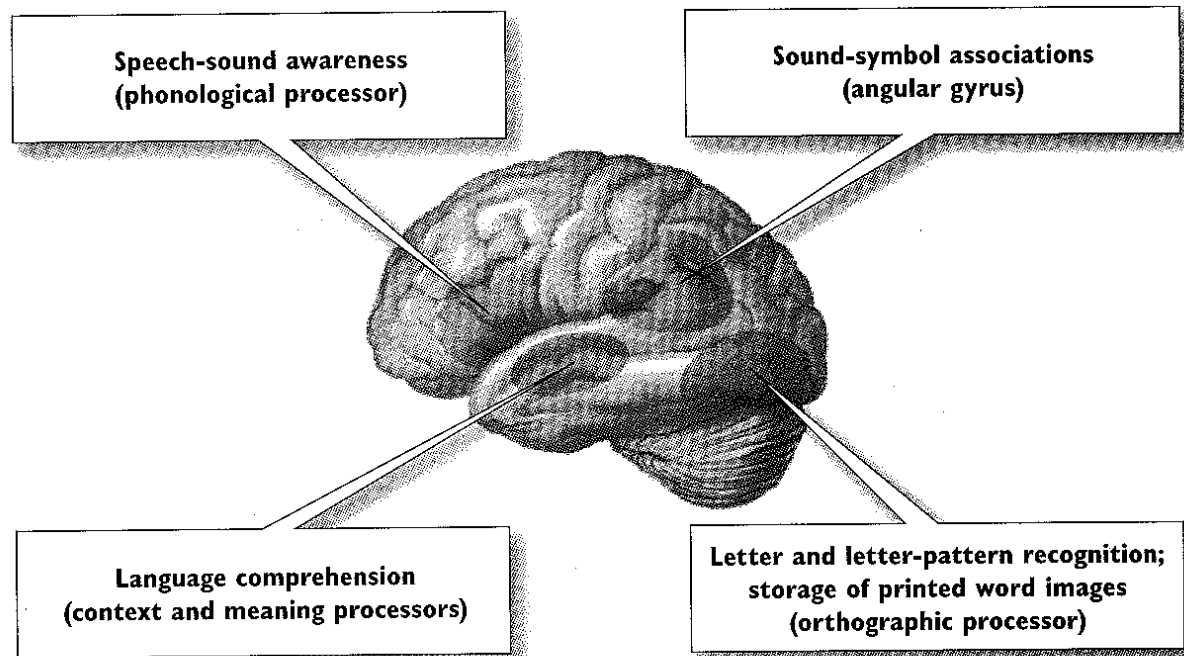
# Parts of the Human Brain



# Four Processing Systems

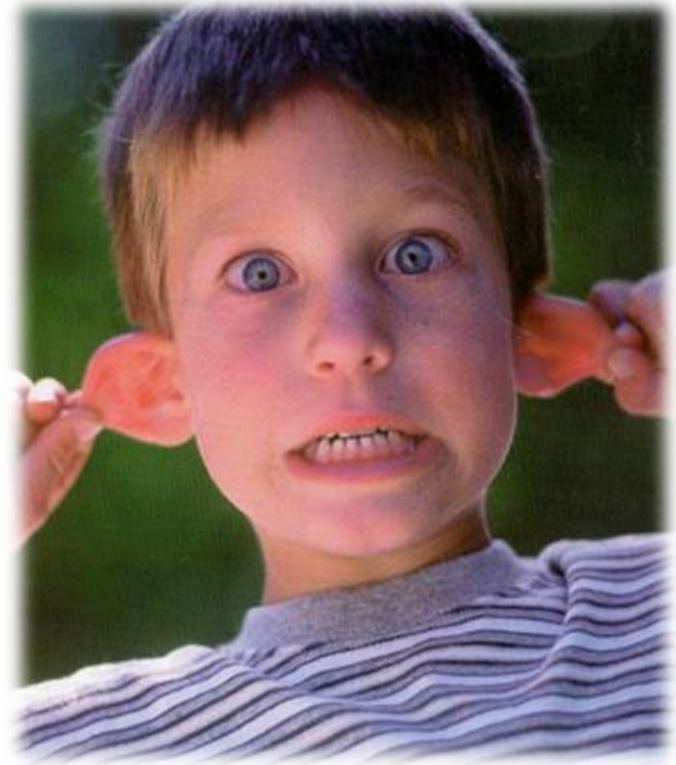
## Areas of the Brain Involved in Reading

Figure 3.3 Areas of the Brain That Support Reading



# The Phonological Processor

- Perceive, remember, interpret and produce the speech-sound system





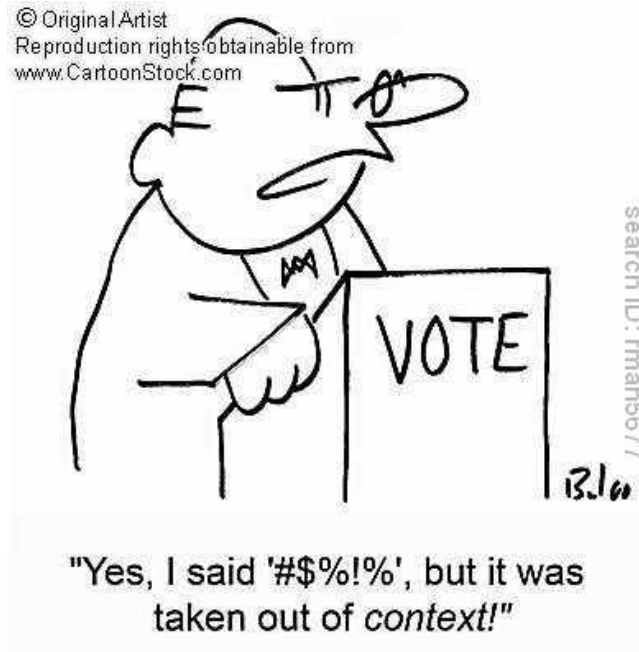
# The Meaning Processor (Semantic Processor)

- Recognizes words as meaningful entities.
- Requires communication among the phonological processor, orthographic processor and meaning processor.



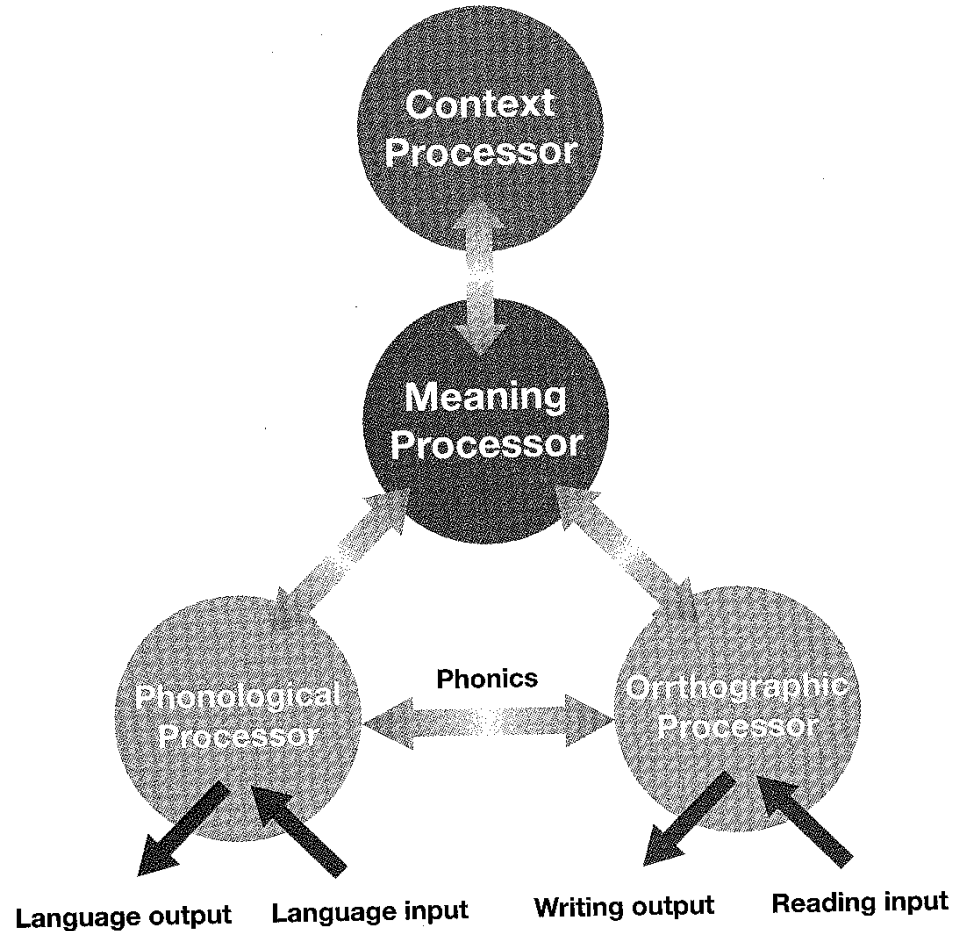
# The Context Processor

- Primary job is to interact with and provide support for the meaning processor.
- Passed or past?



# Jobs of the Four Processing Systems

Figure 3.4 The Four-Part Processing Model for Word Recognition



# The 4 Processors at Work

1. Decode and pronounce the nonsense word: **chimera**
2. Repeat the spoken phrase: "*Riki-tiki tembo no serembo*".
3. Orally give a synonym for the word **anthology**.
4. Read a passage to determine which meaning of the word **affirmative** is intended.
5. Determine whether the spoken words **does** and **rose** end with the same speech sound.
6. Underline all the words on a page in which the letter **c** is followed by **e, i, or y**.
7. Write this sentence: *My mental lexicon craves enrichment.*
8. Read and comprehend the next paragraph of this book.

# Accurate and Fluent Readers...

- Scan the print effortlessly
- Extracting meaning and sifting through it
- Making connections
- Interpreting
- Figure out new words with minimal effort (because the sounds, syllables and meaningful parts of words are recognized automatically)
- Form a mental model (schema) for the meanings extracted, linking new information to background knowledge

# Scarborough's (2001) "Reading Rope"

Figure 4.7 The Many Strands That Are Woven Into Skilled Reading  
(Scarborough, 2001, p. 98)

## LANGUAGE COMPREHENSION

**BACKGROUND KNOWLEDGE**  
(facts, concepts, etc.)

**VOCABULARY**  
(breadth, precision, links, etc.)

**LANGUAGE STRUCTURES**  
(syntax, semantics, etc.)

**VERBAL REASONING**  
(inference, metaphor, etc.)

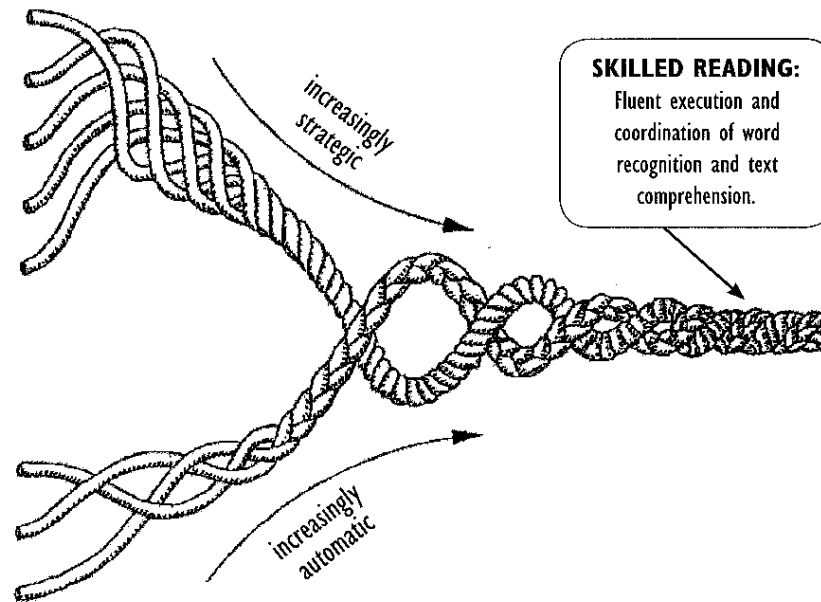
**LITERACY KNOWLEDGE**  
(print concepts, genres, etc.)

## WORD RECOGNITION

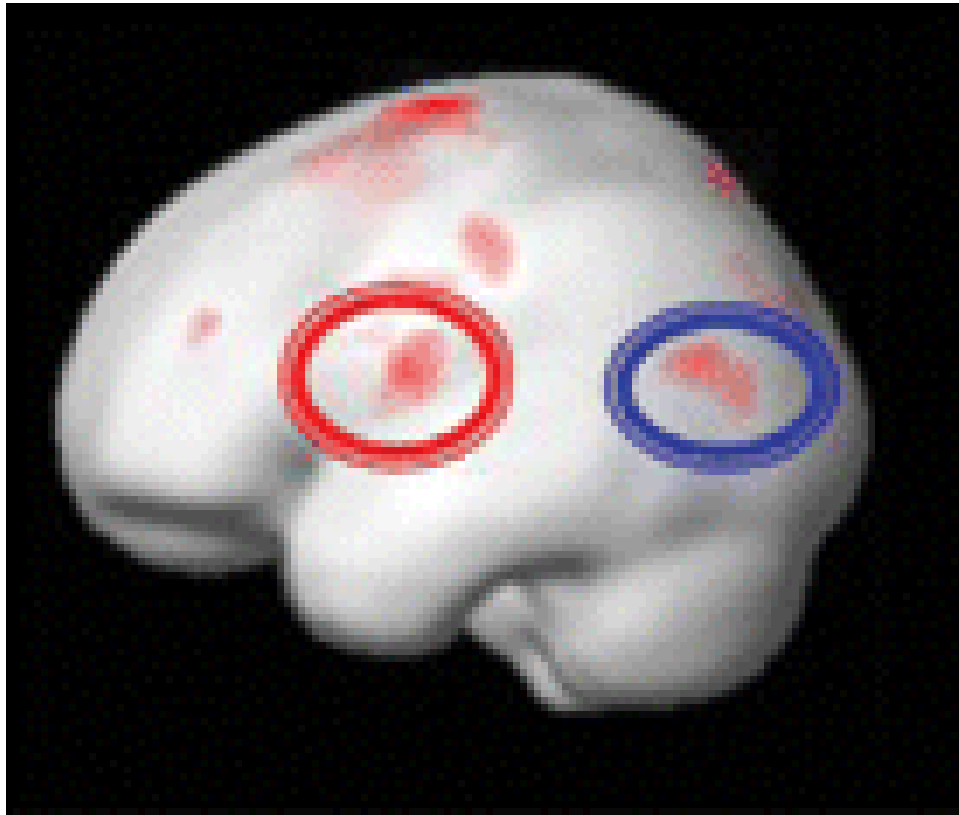
**PHONOLOGICAL AWARENESS**  
(syllables, phonemes, etc.)

**DECODING** (alphabetic principle,  
spelling-sound correspondences)

**SIGHT RECOGNITION**  
(of familiar words)

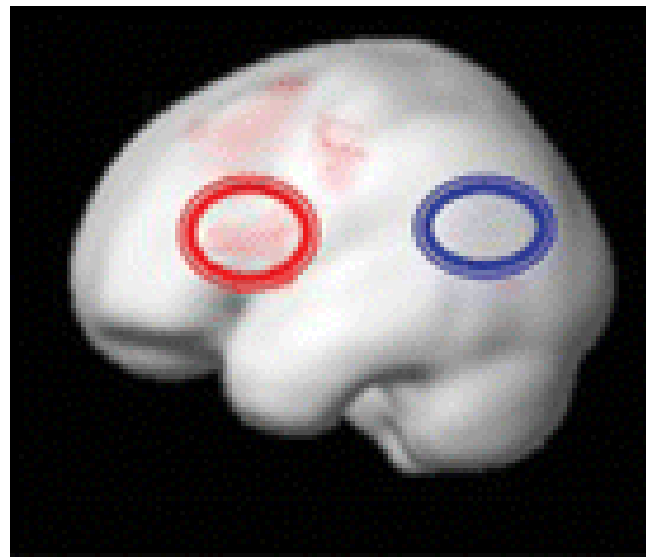


Used with permission of Hollis Scarborough.



Typically Reading Children

Brain imaging studies show “markedly different brain activation patterns in dyslexic readers” (Shaywitz, 2003)



**Children with dyslexia  
before remediation**

## Normal and dyslexic brains differ during reading

Brain scan revealed underactivity in centers toward the rear of dyslexics' brains when they were challenged in reading test. A region toward the front of the brain was overactive but didn't perform well.

**NORMAL**



Center that matches letters with their sounds.

Centers that register visual information such as printed letters and words. In dyslexics, activity is less apparent in these regions.

**DYSLEXIC**

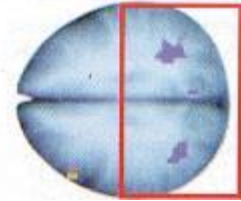


SOURCE: Dr. Sally Shaywitz

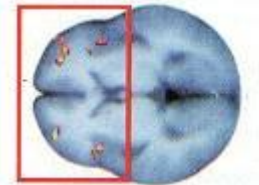
GLOBE STAFF GRAPHIC/RICHARD SANCHEZ

# The Brain of a Person With Dyslexia

Brain of a normal reader (or non-dyslexic)  
activates at the back



Brain of a dyslexic reader activates primarily  
in the front



Genetic Link:

- Chromosome 6 (Phonemic Awareness)
- Chromosome 15 (Rapid Naming)
- Chromosome 1 or 2 (Visual Memory for Words)

# The Power of Dyslexia

[http://www.youtube.com/watch?v=I\\_qGJ9svUbM](http://www.youtube.com/watch?v=I_qGJ9svUbM)

# The Faces of Dyslexia

[www.understood.org](http://www.understood.org)

Maya, 2<sup>nd</sup> grade

Lucy, 5th grade

Sam, 8th Grade

# What Is Dyslexia?

- Dyslexia is a specific learning disability that is neurological in origin.
- It is characterized by difficulties with accurate and / or fluent word recognition and by poor spelling and decoding abilities.
- These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction.

(International Dyslexia Association, 2002)

- Secondary consequences of dyslexia may include problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge.
- Dyslexia is referred to as a learning disability because dyslexia can make it very difficult for a student to succeed academically in the typical instructional environment.

(International Dyslexia Association, 2002)

# In Simpler Terms...

## Dys-lex-ia

- A word meaning “difficulty with language” or “difficulty with words”, from the Greek morphemes “dys” and “lex”
- Synonymous with “specific reading disability” – Difficulty in learning to read, write, or spell, despite regular instruction, adequate intelligence, and sociocultural opportunity.

(T.E.C. code 38.003)

# Other Terms for Dyslexia

- In the research literature, the following terms are often used interchangeably with the term “dyslexia”:
  - specific reading disability
  - reading disability
  - reading disorder

(American Academy of Pediatrics, 2011)

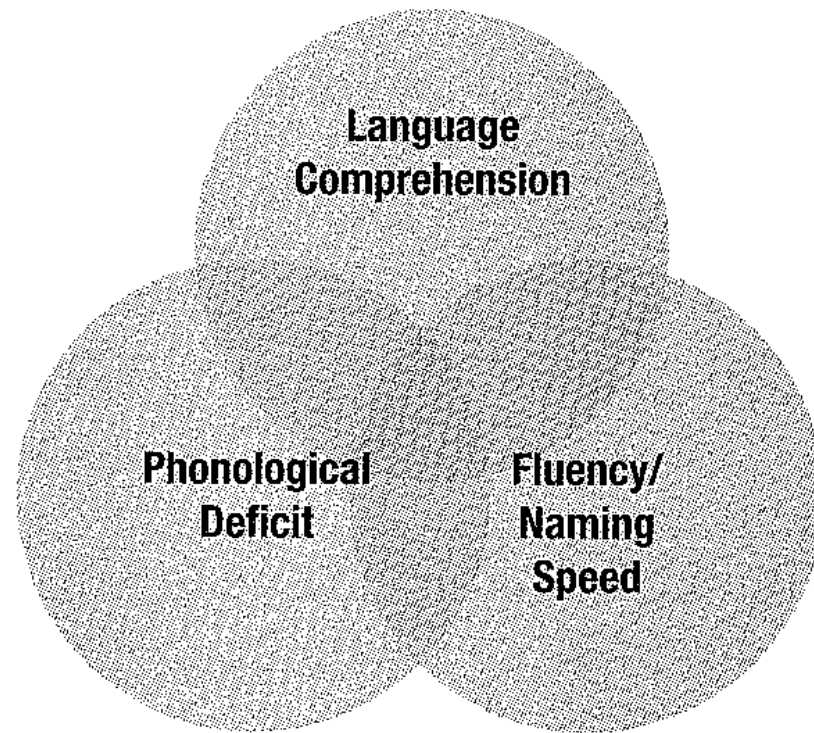
# TED-Ed Video

- What is Dyslexia?

Kelli Sandman-Hurley, Ed.D.

Dyslexia Training Institute

# Subtypes of Reading Disability



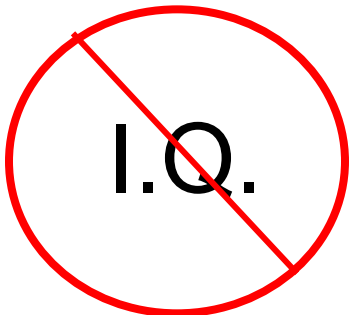
## A Common Problem?



Not dependent on socioeconomic status (SES)



Not dependent on intelligence  
(can be gifted and dyslexic)



Not dependent on parent's level of education

# Prevalence

“Approximately 80% of people with learning disabilities have dyslexia, which makes it the most common learning disability.”

(American Academy of Pediatrics, 2011)

5% of students learn to read effortlessly

20%-30% learn to read easily with any kind of formal reading instruction

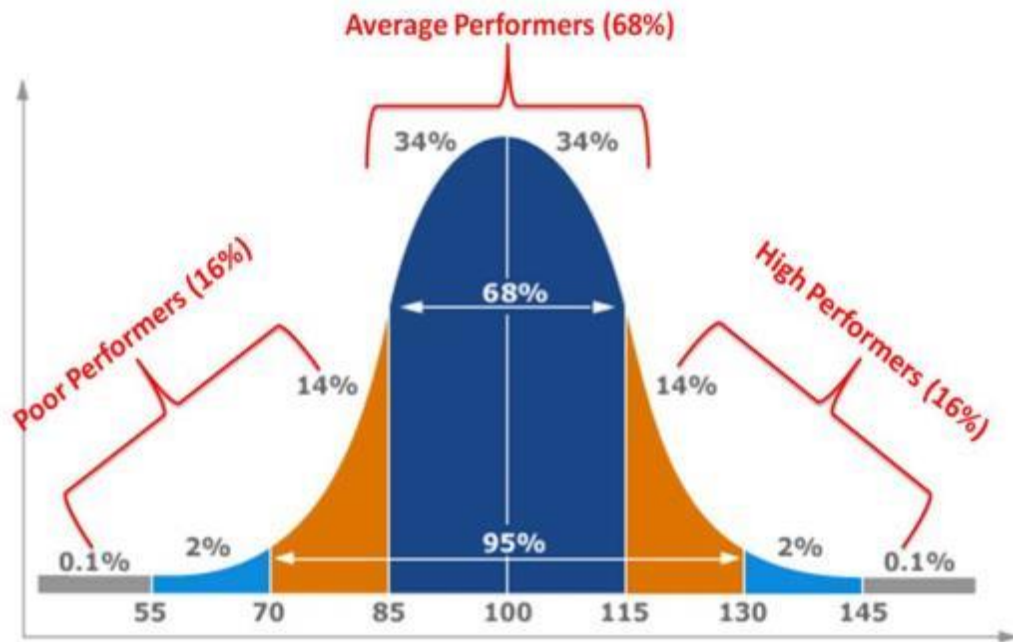
**60% find learning to read a challenge**

**12%-18% need intensive help from highly trained educators to learn how to read**

(Lyon, 1997)

# Degrees of Dyslexia

- “Dyslexia is not an all-or-none phenomenon, but like hypertension, occurs in degrees.” (Shaywitz, 1992)
- “Reading ability and reading disability occur along a continuum; reading disability is represented within the lower tail of a normal bell-shaped distribution of reading ability.” (American Academy of Pediatrics, 2011)



# Dyslexia Persists Over Time

- “Dyslexia occurs at all levels of intelligence and is a persistent problem that **does not represent a transient developmental lag.**” (American Academy of Pediatrics, 2011)
- “Dyslexia is persistent: A student who fails to read adequately in 1st grade has a 90% probability of reading poorly in 4th grade and a 75% probability of reading poorly in high school.” (Gabrieli, 2009)

# Myths & Truths...

# **Reading disabilities are caused by visual perception problems.**

TRUTH: Problem with language processing at the phoneme level...not a problem with visual processing.

(e.g., Lyon et al., 2003; Morris et al., 1998; Rayner et al., 2001; Wagner & Torgesen, 1987)

# **Dyslexia only affects people who speak English.**

TRUTH: Appears in all cultures and languages in the world with written language.

In English, the primary difficulty is accurate decoding of unknown words.

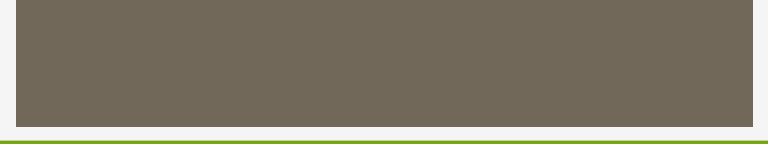
(Ziegler & Goswami, 2005).



**People with dyslexia will  
benefit from colored text  
overlays or lenses.**

TRUTH: NO strong research evidence.

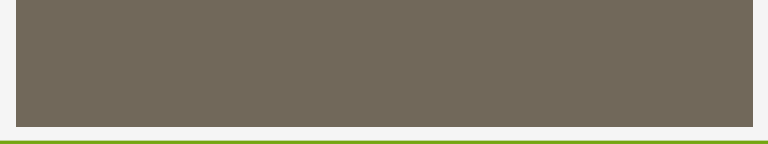
(American Optometric Association, 2004; Lovino, Fletcher, Breitmeyer,  
& Foorman, 1998).



# **Writing letters and words backwards are symptoms of dyslexia.**

TRUTH: Common among average and dyslexic children alike.

(Adams, 1990).



**If you just give them enough  
time, children will outgrow  
dyslexia.**

TRUTH: No evidence.

(Francis, Shaywitz, Stuebing, Shaywitz, & Fletcher, 1996).

# **More boys than girls have dyslexia.**

TRUTH: As many girls as boys are affected  
by dyslexia

(Shaywitz, Shaywitz, Fletcher, & Escobar, 1990).



**A person with dyslexia can  
never learn to read.**

**This is simply not true!**

(National Institute of Child Health and Human Development, 2000; Torgesen, 2002).

# Signs & Symptoms

No two dyslexics are alike!

We must consider...

- Severity
- Duration
- Responsiveness to remediation
- Relative difficulty with aspects of reading, spelling, writing, math or language learning
- Coexisting conditions (such as anxiety, attention, or word-retrieval difficulties)
- Coexisting strengths (such as visual-spatial, athletic, or intellectual gifts)

# The Cognitive Characteristics of a Poor Reader

- Specific weaknesses in phonological processing, letter knowledge, and alphabetic understanding predict reading outcomes, K-2
- “Lower level” processing difficulties with the alphabetic code:
  - phoneme awareness, phonological memory
  - letter naming speed
  - knowledge of sound-symbol correspondences
  - accuracy and fluency of word recognition

# Aspects of Phonological Processing

- Phonological awareness
- Phonological retrieval
- Phonological memory (encoding and storage of words, digits, and letters)
- Novel word repetition
- Speech production of single phonemes and phoneme sequences

# Grades K-2, Symptoms

- Trouble segmenting and blending sounds
- Poor letter-sound recall
- Poor application of phonics
- Inconsistent memory for words & lists
- Mispronouncing words
- Inability to spell phonetically

# Grades 3-4, Symptoms

- Phonic decoding is a struggle
- Inconsistent word recognition
- Poor spelling, dysphonetic
- Over-reliance on context and guessing
- Trouble learning new words (spoken)
- Confusion about other symbols

## Grades 5-6, Symptoms

- Poor spelling, poor punctuation
- Reverts to manuscript from cursive
- Organization of writing is difficult
- Decodes laboriously, skips unknown words
- Avoids reading, vocabulary declines

# Grades 7-8, Symptoms

- Slow reading, loses the meaning
- Persistent phonological weaknesses, less obvious
- Poor spelling and writing
- Confusions of similar words
- Does better with structured, explicit teaching of language

## Grades 9+, Symptoms

- Trouble with foreign language study
- Writing and spelling problems persist
- Reading is slow and labored, can't sustain
- Longer writing assignments very difficult
- Can cope when given extra time, study strategies, and structured language teaching

# Strengths

- The maintenance of strengths noted in the school-age period
- A high **learning capability**
- A noticeable improvement when given additional **time** on multiple-choice examinations
- Noticeable excellence when focused on a highly specialized area such as medicine, law, public policy, finance, architecture, or basic science
- **Excellence in writing** if content and not spelling is important
- A noticeable articulateness in the expression of ideas and feelings
- Exceptional empathy and warmth, and feeling for others
- Success in areas not dependent on rote memory
- A talent for high-level conceptualization and the ability to come up with original insights
- **Big-picture** thinking
- Inclination to think **outside of the box**
- A noticeable resilience and ability to adapt

Source: *Overcoming Dyslexia* by Sally Shaywitz, M.D.

# How is Dyslexia Diagnosed?

- “There is no single standardized test used to make the diagnosis of dyslexia.”
- “A comprehensive evaluation is necessary.”
- “The testing can be conducted by trained school [specialists] or outside specialists.”
- “Dyslexia is not ...determined solely by medical screening or psychological/IQ testing alone.”

(American Academy of Pediatrics, 2011)

# Comprehensive Assessment

- Language (Receptive/Expressive)
- Phonological awareness
- Rapid naming/word fluency
- Reading fluency
- Reading comprehension
- Spelling
- Writing

Dyslexia Help at University of Michigan

# Informal Assessment

1.	bed	siup	daf	bed ship drive
2.	bap			bump
3.	wine			when
4.	teran			train
5.	clost			closet
6.	cane			chase
7.	flot			float
8.	begs			beaches
9.	peroejo			preparing
10.	pare			peppering
11.	cart			cattle

goo

(go)

ann

(and)

yel

(will)

hme

(him)

coc

(cook)

lot

(light)

jrs

(dress)

reh

(reach)

ntr

(enter)

I make Baked egg Cheese

I use Cheese Surp Baked

eggs. I will ~~Bern~~ the eggs.

I put the ques into pan

then put the Baked in the pan.

I put the Beter in the pan

and Chop the egg

# Treatment for Dyslexia

*“Expert teaching is the treatment.  
Dyslexia treatment is educational.”*

-Moats

- While dyslexia is a neurologically based condition, the treatment is not medical but educational.
- “Well-controlled studies...consistently show that instruction yields substantial improvement in reading accuracy for many, but not all, children if instruction is:
  - more intensive (for instance, 100 minutes per day for 8 weeks)
  - occurs in small groups (1 or 2 students per teacher)
  - includes explicit and systematic instruction in phonological awareness and decoding strategies” (Gabrielli, 2009)

# What About Core Curriculum?

<http://www.pbs.org/newshour/bb/one-students-dyslexia-changed-community-viewed-learning/>



# Elements of Effective Instruction

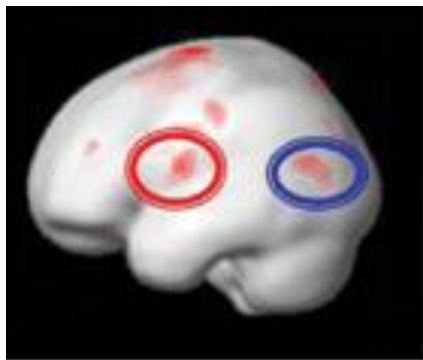
- “Most children with dyslexia need help from a teacher, tutor, or therapist who has been specially trained in using a multisensory, structured language approach. “
- “It is important for these children to be taught by a sequenced, systematic and explicit method that involves several senses (hearing, seeing, touching) at the same time.”
- “Remedial programs should include specific instruction in decoding, fluency training, vocabulary, and comprehension.”

(American Academy of Pediatrics, 2011)

# Reading Instruction Programs

- Classic Orton-Gillingham
- Alphabetic Phonics
- Lexia-Herman
- Project Read
- Language!
- Slingerland
- Writing Road to Reading (Spaulding)
- Wilson Reading System
- Barton System
- Lindamood-Bell
- Sonday
- Sounds in Syllables
- Spalding
- Starting Over

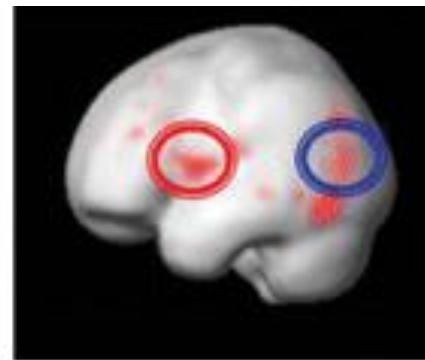
# Effective Instruction Changes Brain Function



Typically reading children



Children with dyslexia before remediation



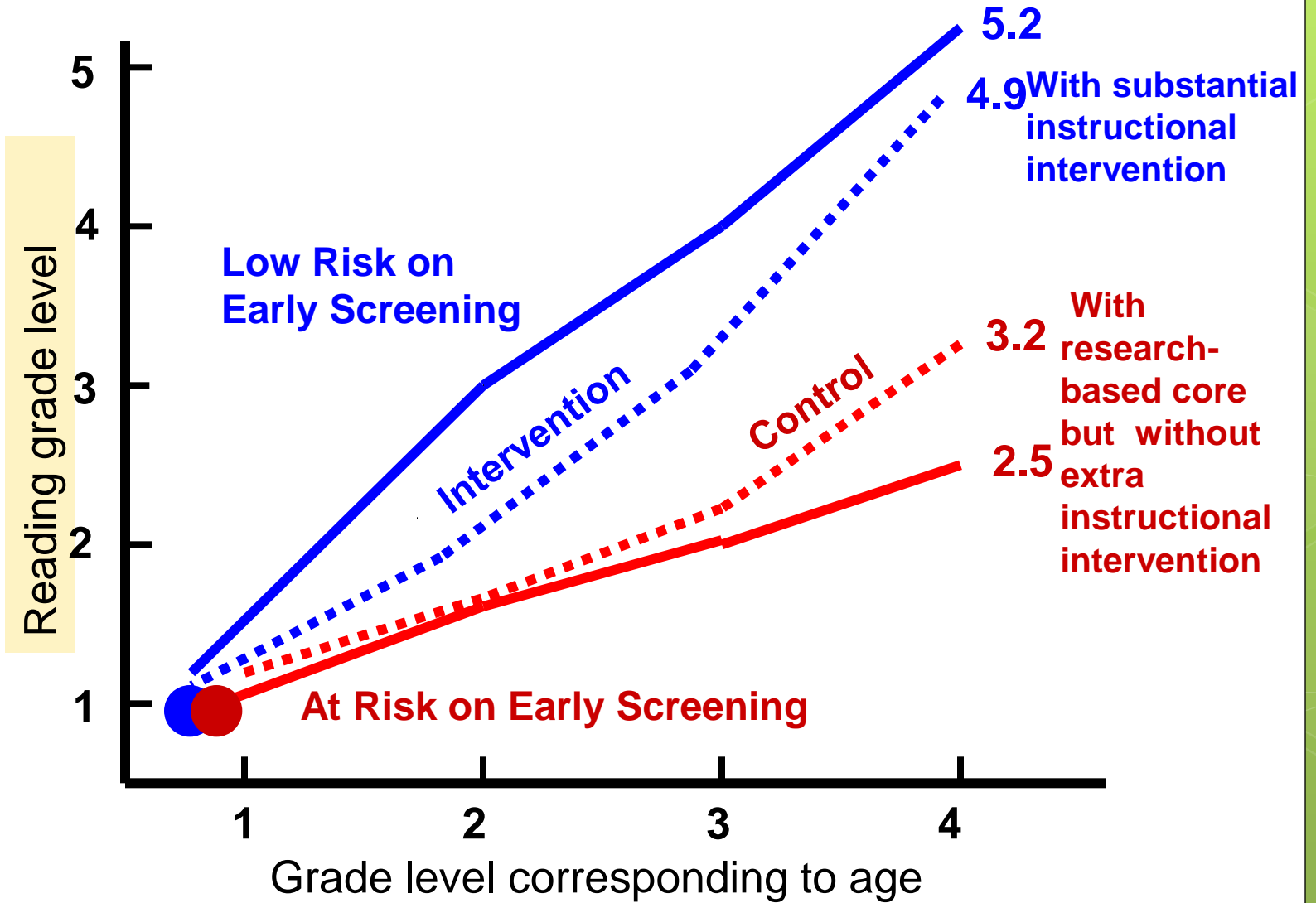
Children with dyslexia after remediation

**“Such improvements are much more likely to occur in children who are beginning to read (ages 6 to 8) than in older children...”** (Gabrielli, 2009)

# Children Don't Catch Up

- Once children fall behind, they are likely to stay behind and the gap is likely to widen.
  - C. Juel, 1994 (Harvard Graduate School of Education)
  - J. Torgesen, K. Stanovich, F. Vellutino (NICHD)
  - A. Biemiller (Toronto)
  - R. Good, E. Kame' enui, D. Simmons (U. of Oregon)
  - S. Shaywitz and J. Fletcher (Connecticut Longitudinal Study)

# Early Intervention Changes Reading Outcomes



# All Components of Language Must Be Addressed (ASHA & IDA)

**Phonological Processing:** awareness of speech sounds

**Orthographic processing:** attention to and memory for letters and letter patterns in printed words

**Morphology:** the meaningful parts of words and how they are typically spelled

**Semantic Processing:** word meanings

**Syntactic processing:** sentence sense

**Academic discourse:** paragraph organization and genre structures, figurative language, word choice and word use in formal contexts, inferential comprehension

Only 4% of  
English words  
are irregular

# What Happens In a Lesson?

- Speech sound awareness
- Sound-symbol links (see, say, write)
- Learning a new letter pattern in print
- Blending sounds in the printed word
- Increasing speed in word, phrase, sentence, and passage reading
- Writing words with the patterns learned
- Vocabulary – building word meanings
- Applying comprehension strategies

Let's Learn to Read!



FORE WITE POS,  
LIKE CARPING WATER,  
SHE DASHES THROU THE HAWES,  
BYONCING THE SPEED LIMIT,  
MY LITTLA KITTY

Accommodations level the playing field.



# There's an accommodation for everything...

- Most Common:
  - Extended time
  - Tests read aloud
  - Audio books
  - No spelling tests
  - Peer note taker
  - Avoid open ended questions
  - Separate place for testing

# Movie: Embracing Dyslexia

- Stories
- Fact vs. Fiction
- Remediation
- Accommodations
- Psychological Implications
- The Gift of Dyslexia
- Moving Forward

<https://www.youtube.com/watch?v=cBIK0XVPbXo>

# Resources & Bibliography

- *The Challenge of Learning to Read* Louisa Moats
- National Center for Learning Disabilities (NCLD)
- Yale Center for Dyslexia & Creativity
- *Overcoming Dyslexia* (Sally Shaywitz)
- *Understanding Dyslexia and Other Learning Disabilities* (Linda Siegel)
- *Essentials of Assessment and Intervention* by Nancy Mather & Barbara Wendling; John Wiley (2013)
- International Dyslexia Association
- [www.understood.org](http://www.understood.org)

# Gloria Clark

“My Secret Life”

[https://www.youtube.com/watch?v=TIRak\\_Zsl38#t=215](https://www.youtube.com/watch?v=TIRak_Zsl38#t=215)

