Bridging the Gap Between the Science of Reading and Classroom Practices

Virginia Joint Coalition of Learning Disabilities and Literacy

Speaker:
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About your speaker, J. Richard Gentry, PhD

- Elementary education major, UNC-Chapel Hill
- Third, fourth, and fifth grade teacher
- PhD in Reading Education, University of Virginia
- Directed Reading Center at Western Carolina University for 16 years
- For three decades—a Researcher, Author, & Educational Consultant
- Author of 17 books and a spelling textbook series
- Over 1 million readers on Psychology Today blog
- A friend to all teachers, parents, and educators with a passion for teaching literacy
- Coauthor, Brain Words
In this session we rethink how we teach literacy through the lens of the **Science of Reading**. We will focus on integrated word study for teaching:

• Phonological Awareness  
• Spelling  
• Phonics  
• Morphology & Vocabulary  
• Handwriting

Prek through Grade 2 and beyond—and show how all of these elements are essential for reading comprehension and text composing at every grade level.
| SECTION 1 | The Science of Reading—What happened? What needs to change? |
| SECTION 2 | Beginning Literacy Development—PreK through 2—Then Grade 2 and Beyond |
| SECTION 3 | Understanding and Overcoming Dyslexia |
We want to understand both the **SCIENCE** and some **HISTORY** of how best to teach literacy along with **BEST CLASSROOM PRACTICES**!

- Learn what “Brain Words” are & How the reading brain works.
  
  I’ll make the architecture of the reading brain easier to understand!

- Discover the essential and foundational role of integrated spelling word study for reading.

- Leave with science-based practices from the latest cognitive science and neuroscience

You will learn how you can build a dictionary in the child’s brain—literally a gift to the child for a lifetime.

**In a moment well look at the science—but first here’s a history lesson about teaching reading.**
It’s not only science.

It’s also **history** that supports spelling-to-read methodology.

Spelling-to-read methodology has a long and successful history in America.
Noah Webster—Founding Father of American Education
1758-1843

Wrote the first American reading textbook.

His reading textbook started with the “Blue-backed Speller.”

It taught five generations of Americans to read, spell, and pronounce words.

By 1890 it had sold over 80 million copies.

Webster emphasized mapping pronunciation of words to syllable patterns.
Earnest Horn—Father of Spelling Research
1882-1967

He was a pioneer in Spelling – much of his research was conducted at his University of Iowa lab school.

Horn was the greatest expert on spelling in the early 20th Century.

Horn was a proponent of:
• Grade-by-grade explicit spelling instruction
• Spelling-to-read methodology
• Learning to spell by syllable types
• Spelling books
So here we are today—238 years later supporting the following:

- An *integrated* comprehensive word study approach
- An approach based on science
- A grade-by-grade developmental curriculum
- Streamlined and easy-to-follow lessons
- No boring worksheets; rather, engaging activities for students
- Not just memorizing words for a test, but brain words for long term retention and use
- Connections to all the foundational skills at every grade level
BUILDING YOUR KNOWLEDGE surrounding the Science of Reading

Facts According to Science (Self-testing)

1. At what grade level should the major brain circuitry for reading be in place?

2. What is the best differentiator between good and poor readers?
"The best differentiator between good and poor readers is repeatedly found to be their knowledge of spelling patterns and their proficiency with spelling–sound translations."
Key Point: Effective spelling instruction teaches children to read.

What about the neuroscience?
Facts from Neuroscience

“In neuroimaging studies, poor readers show atypically low activity in a part of the brain that processes the spelling of words.”
Seidenberg—Language at the Speed of Sight (2017)

• Good readers can spell.
• Poor readers don’t spell words very well.
• Most learning disabled readers struggle with spellings.
3. What’s the best predictor of reading proficiency?

Not Phonemic Awareness
Not Phonics Knowledge
The best predictor of reading proficiency? **Answer:**

Automatic Word Reading! & Automatic Spelling

Literally hundreds of studies support that Automatic Word Reading is the best predictor of reading proficiency.
If you want Skilled Reading

Automatic Word Recognition/Brain Words

Then Teach Spelling & Automatic Word Reading

Dr. Hollis Scarborough—creator of the Famous Reading Rope and senior scientist at Haskins Laboratories Supports The Simple View of Reading
As skilled readers, we are able to quickly and accurately recognize printed words without much effort. Indeed, you are most likely finding it no real chore to read this text now, and it has thus far taken only seconds of your time.

To comprehend these two sentences you activated 42 brain words. You read each of the 42 words automatically using the spelling!
Here’s what happened:

You see each word as your eyes move from left to right.

As you see each word on the page, the brain “lights up” a visual image of the word’s spelling in the “dictionary” in your brain. It’s automatic (because the word’s correct spelling is in your longterm memory) so you don’t even recognize that you are using the spelling.

Your brain connects to the already existing sounds and meaning of each word—in your spoken language—and you comprehend.
Brain words are internal visual neural representations of *spelling* in the reading brain’s *word form area*. Metaphorically, the word form area is the dictionary in the brain critical for proficient reading and writing.
Build a Spelling Dictionary in the Brain

Slide from “Brain Imaging and Reading” presentation by neuroscientist Dr. Guinevere Eden—Georgetown University

Occipito-Temporal Region
- Word identification

- Visual Word Form System
Here’s how it works!

In the words of Linnea Ehri, a thought leader in the science of reading whose supports the simple view of reading:

“Spelling knowledge is essential to the brain’s reading architecture.

To connect the alphabet code on the page to circuitry enabling reading comprehension, the reader must use spelling.”
What is the result of not doing explicit Word Study for Spelling & Automatic Word Reading in many of our schools? Over three decades of horrible reading scores—especially for

- Children in low socially-economic schools
- Children of color
- ELs
- Children in Special Education
- Children at risk for learning disability—including dyslexia

If we have been missing facts based on science, we want guidance from the best scientific minds to tell us the facts, that’s instruction.
I became an expert on “Brain Words” when I met a renowned Canadian developmental psychologist and reading scientist from Mount Allison University in New Brunswick. We became a reading scientist and veteran educator author team.
Gene has a gift as a scientist...

Spends time in the classroom — Interprets science for teachers

Invented Spelling in Kindergarten as a Predictor of Reading and Spelling in Grade 1 (Ouellette & Sénéchal, 2017)

[http://dx.doi.org/10.1037/dev0000179](http://dx.doi.org/10.1037/dev0000179)

*Psychology Today* blog

J. Richard Gentry Ph.D.
Raising Readers, Writers, and Spellers

Landmark Study Finds Better Path to Reading Success

In a longitudinal study they tracked over 160 kindergartners for a year to near the end of first grade and assessed oral vocabulary, alphabet knowledge, phonological awareness, phonics, and invented spelling.

Posted Mar 30, 2017
In the **Landmark Study**, word study and thinking when inventing spellings enabled kids to better understand:

- what a word is
- that words in their spoken language are made up of **sounds**
- that these sounds can be represented by **letters**
- that sounds and letters in words go from **beginning to ending** and **left to right**
- that they can decode and **read** with **letter-to-sound mappings**
- that they can **spell** and write messages with **sound-to-letter mappings**
Gene’s landmark study demonstrated...

When kids followed the Dr. Linnea Ehri word reading and Gentry developmental spelling phase trajectory:
• Better with alphabet knowledge!
• Better with phonemic awareness!
• Better readers!
• Better conventional spellers!

Analyzing words and inventing spelling was a key building block to reading and spelling!
Here’s what **Invented Spelling** and the **Spelling-to-Read Method** are all about: (Moller, 2022)

➢ Inventing spelling **stimulates the development of phoneme awareness and letter knowledge** — two of the most important prerequisites of reading development (Hume et al, 2012).

➢ “Inventing spelling involves both an internal analysis of words into their sounds and mapping appropriate letters or chunks of letters to sounds.

➢ At the same time invented spelling goes beyond phonemic awareness and letter knowledge in that invented spelling requires active USE of the orthographic code.

Adapted from: Effects of Integrated Spelling in Phonics Instruction for At-Risk Children in Kindergarten, a Danish study by Moller et al, published in RWQ. (2022)
What should end of First Grade invented spelling look like?

37 Brain Words
+ 7 Invented Spellings
= 44 word story

WHAIR for wear
SIS for size
EVERYWHAIR for everywhere
CLIME for climb
BILLDINGS for buildings
SWIM for swim
TIYRED for tired

PHASE 4

❑ All of the invented spellings are Logical English spellings
❑ Easy to read
❑ Some dialect influence
Self-Testing: How many sight words (brain words) should a child be able to read and spell automatically by the end of first grade?
ANSWER: 300+ Brain Words

From a practical perspective, by the end of first grade children in a modern science-based spelling book:

Kids learn ten new words each week.

30 weeks in the academic year.

30 weeks x 10 words = 300+ words/brain words in long term memory.

It requires explicit study 20 minutes a day.
My Grandma fell.
My mom screamed so loud my uncles and dad dropped their beer and ran in the house. When I looked at her I thought she was dead. But she wasn't. I was relieved.
Gene and I also began to investigate how spelling word study is a missing link to reading comprehension in grades 2 and beyond.

Cognitive science says spelling word study is essential for reading comprehension.

So why don’t we follow the science for teaching spelling?
Here’s why!
Many schools and published reading programs **STOPPED TEACHING SPELLING EXPLICITLY** over the last three decades due to the lingering Whole Language domination in Reading Education.

Our evidence that this is a problem comes from both

1) Cognitive Science and Neuroscience
2) Working with thousands of children and teachers in classrooms.
In the last three decades we’ve seen aspects of Whole Language Theory debunked by Cognitive Science and Neuroscience.

I can give you the history of WL because I’m was a part of it!
I studied with Ken and Yetta...

There were many WL Contributions!
✓ Respect for teachers
✓ Equity for children
✓ The call for good children’s literature
✓ The writing process
✓ Support for early use of invented spelling

See the call to stop teaching spelling explicitly in *What’s Whole in Whole Language* by the late Ken Goodman (1986).
Three Major WL Tenants Debunked!
by Cognitive Science and Neuroscience:

1) The very core of WL Theory is that learning to read is as easy as learning to speak.

2) The WL call for no spelling books

3) The WL call for no phonics—“No serial order of lexical units.”

See the call to stop teaching spelling explicitly in What’s Whole in Whole Language by the late Ken Goodman (1986).
Let’s consider three things that happened with the dominance of whole language.

1) We lost Spelling Instruction as an integrated word study curriculum.

Teachers were told: “We don’t have time for spelling.”

Often replaced with Test Prep
The notion that technology makes spelling obsolete.

*Sum won tolled me eye wood knot knead too learn two spell. Computers dew it four us!*  

Cognitive science says we need spelling in the brain for reading comprehension.
What else did we get with whole language?

2) Haphazard Spelling Instruction

- “Hit or miss”
- No specific grade-by-grade curriculum
- Random or disorderly—teachers desperately choosing their own words
- Pulling words from the internet
What did we get with whole language?

Haphazard Spelling Instruction

• Spelling components of mammoth reading programs—Too much stuff!

  Separate Lessons for the Components:
  ✓ Phonemic awareness
  ✓ Phonics
  ✓ Sight words
  ✓ Grammar
  ✓ Vocabulary
  ✓ Spelling
Haphazard whole language spelling included an almost three decades old program that’s still popular today.

Words Their Way

Word Sorting alone and Hypothesis Testing

Children don’t learn the complexities of English spelling by *discovering* how spelling works through playing games and word sorting alone: That’s *minimal* guidance.

These whole language and constructivists theories for teaching spelling have been debunked by cognitive science.
What else does whole language and minimal guidance for teaching spelling look like today?

3. In one popular so-called “reading workshop” program (HMH Into Reading) the spelling component is Syllable Word Sorting.

The reading program has teachers leading a syllable sort on Monday with an optional posttest on Friday. Teachers are expected to figure out what else to do with spelling on their own.

I’ve written that this program has the worst spelling component in a reading program I’ve seen in my 40+ year career. That program must be supplemented with explicit, systematic spelling instruction.
Key Point: many mammoth WL reading programs offer **minimal guidance** with spelling instruction as opposed to **explicit instruction**.
I’m speaking out today.

I believe cognitive science works.
I believe honesty works.
And I believe common sense works.

Something is wrong when so many end of first graders can’t read.

Something is wrong when 60% of fourth graders in America read below grade level.
The challenge today is not so much to dwell on who got it wrong—the challenge today is to get this right!
How do YOU use Brain Words?

Brain word activity with your own reading brain
Are you ready?

Take out a pad and pencil. I’m going to teach you a new vocabulary word, some phonics, and a spelling-for-reading technique!
You can take this science-based spelling pretest strategy back to your classrooms tomorrow!
This is science-based spelling pretest. I’m going to give you three words. For each word:

1) **Hear it** (Modelling phonological awareness; giving a sentence for it meaning.)

2) **Say it** (Checking phonemic awareness and activating your speech production centers.)

3) **Write it** (you Spell it)

4) **Read it** (Self-Correct; engage in word analysis)

5) **Use it** throughout a weekly unit of word study.

Think about what you know about each word’s sound, pronunciation, spelling, and meaning in your own spoken language system.
Here’s your first word.

1) Hear it
2) Say it
3) Write it (Spell it)
4) Read It and Self-Correct.

dog

5) Use it for reading and text composing. The goal of spelling instruction is a brain word you can read and write automatically.
Here are spelling word study activities to use in the kindergarten phases.

Spelling Word Study includes developing **Phonological Awareness**.

**Finger Spelling**

Spelling Word Study reinforces **Phonics**. We might **use Elkonin Boxes** and map the sound to the letters.
Next word.

1) Hear it
This is a King Charles
__________ spaniel.

2) Say it

3) Write it (spell it)
Now you 4) Read it and check your spelling
4) Read It and Self-Correct.

cavalier

5) Use it for reading and text composing. The goal of spelling instruction is a brain word you can read and write automatically.
Spelling Word Study

Integrated Spelling Word Study includes developing **Phonological Awareness**.

Syllable Chin Drop
kæv əˈlɪər

Spelling Word Study reinforces **Phonics**.
cav-a-lier =
[closed syllable—schwa—vowel team spelling]
Spelling Word Study

Integrated Spelling Word Study includes developing Vocabulary & Meaning.

Noun
• a small spaniel
• a horseman, especially a mounted soldier

Adjective
• haughty, disdainful: an arrogant and cavalier attitude toward others
• offhand or unceremonious: The very dignified officials were confused by his cavalier manner.
Here’s your last word.

She was the ____________ of educational professionalism."

1) Hear it, 2) Say it, 3) Write it (Spell it)
4) Read It and Self-Correct.

quintessence

quint + essence
quint + essence

Spelling Word Study includes:
**Morphology, the study of meaningful word parts.** *(Root Words* such as Greek and Latin and *Base Words*: stand on their own)*

Did you think of the *quint* as in quintuplets?

Did you think of the base word *essence*?

It comes from French, Latin, and Greek and means the fifth essence or pure essence. *(water, earth, fire, air + essence)*
quintessence

Meaning

the most perfect or typical example of a quality or class.
The quintessence of brain word power is...

1) If you can spell the word
   and

2) if you already have its meaning in your spoken language system, then

3) you will be able to read and comprehend the word even when you see it in isolation and also retrieve the spelling to create meaning in writing.
Building Brain Words

The story of building brain words comes in two parts.

Part 1—Spelling to Read Methodology from No Reading to End-of-First Grade

Part 2—Spelling to Read Methodology from Grade 2 and Beyond
Every teacher should understand how the reading brain develops in kindergarten and first grade.

It impacts everything that happens in Grade 2 and beyond!
We’ll take a close look at how the brain changes from preschool to end of grade 1 and grade 2.

**Five Developmental Phases!**

(Based on two independent lines of research from Linnea Ehri in automatic word reading and Richard Gentry in developmental spelling)
Outcomes of Brain Development

Using invented spelling analysis tells us how the Reading Circuitry is developing!

Phase 0—**Non-alphabetic Spelling** (no alphabetic letters present)
Phase 1—**Pre-alphabetic Spelling** (letters but no sounds)
Phase 2—**Partial Alphabetic Spelling**
Phase 3—**Full Alphabetic Spelling**
Phase 4—**Consolidated/Automatic Alphabetic Spelling**

<table>
<thead>
<tr>
<th>Preschool</th>
<th>Kindergarten</th>
<th>Grade 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><img src="image1.png" alt="Preschool" /></td>
<td><img src="image2.png" alt="Kindergarten" /></td>
<td><img src="image3.png" alt="Grade 1" /></td>
</tr>
</tbody>
</table>

Example of spelling progression:
- **Grade 1:**
  - **tuth Fare**
  - **own hit I wish mi bed and the tuth Fare cam.**
Five Phases of Writing, Spelling and Reading

Phase 0: Non-alphabetic spelling
[No Letter Use]
No later than Preschool

- Wavy writing and loopy writing-scribbling
- Child cannot write his or her name

Example:
Phase 1
Pre-Alphabetic Spelling
Expected no later than the first half of kindergarten

Example

LEGOS
FISOS
MS00E
Phase 2: Partial Alphabetic Spelling

Expected in second half of kindergarten

• HMT for Humpty
• DPD for Dumpty

Example:
Phase 3: Full Alphabetic Spelling

No later than the first half of First Grade

- CAM for Came
- NIT for Night
- Child writes a letter for each of the sounds

Example:

\[ \text{tuth Fare} \]
\[ \text{wnt hit I wsh mi} \]
\[ \text{bed and the tuth Fare cam.} \]
Phase 4: **Consolidated/Automatic Alphabetic Spelling**

in **Chunks** of brain words and syllable patterns

No later than the end of **First Grade**

- EVREWHAIR for Everywhere
- Child writes EV then RE in a chunk
- Child analogizes with AIR and writes WHAIR
- Child consolidates the sounds into chunks of spelling patterns
Phase 4—Consolidated/Automatic Phase

For most kids learning to read (and write) in English is starts out being slow and laborious in the first half of first grade. Then all of a sudden after the December holidays, “the lights come on!”

Phase 4 is when “the lights come on” in the reading brain.
Decoding/Encoding the Word *interesting*

Decoding/encoding *interesting* in **Phase 3** uses a lot of working memory—slow and laborious.

- *in(t(ə)r)est(ing)*

1 2 3 4 5 6 7 8 9 10 11 graphophonic units]

Decoding/encoding the *interesting* in **Phase 4** is when kids can do it automatically in chunks.

- *i n t e r e s t i n g* [consolidated into 4 units]

This reduces memory load and enables comprehension.
The Power of Chunking in Phase 4

What happens in your brain when you see this word?
ICECREAMANDCOOKIES
Word Study should include the Six Syllable Types. They are Chunking Patterns.

The brain learns to recognize six syllable types!

What are they?
Open syllables \((V, Cv, CCv)\): (me, she, he and no, so, go, to-tal, ri-val, Bi-ble, mo-tor, me-te-o-rol-o-gy)

Closed syllables \((CvC)\) (about 50% in running text): (com-mon, but-ter, stuff, in-com-pre-hen-si-ble)

Vowel-Consonant-e \((VCe)\) syllables: (make, while, yoke, rude, ape, op-er-ate)
(Called “e-marker” or “silent e”)

Vowel team syllables (may be two, three, or four letters): (thief, boil, hay, boat, straw, hey, boy, taugh, bough, night, counsel) and can represent a long, short, or diphthong vowel sounds.

Vowel-r syllables (vowel followed by r (er, ir, ur, ar, or): numerous, hard to master; they require continuous review: (fir, fur, for, perform, ar dor, mirr or, fur ther, wart, in-form)

Consonant-le \((C-le)\) syllables (stable final syllable, C-le combinations)
(There is no doubled consonant. It is combined with a closed syllable.): (circle, puzzle, riddle, quadruple)
Teacher Modeling

Super Man Saved the City!

Proud Student

“Kid Writing”

Teach Finger-Spelling

Laminated Wipe Off at the Spelling Word Study Center
What about building brain words in Grade 2 and beyond?

The science of reading indicates:

A call for change! A major change needed is

Comprehensive, integrated, explicit, systematic, intensive, spelling instruction!
What does work?
What **Word Study** works?

Using spelling instruction as a word study curriculum!

**Teach Spelling Explicitly**

20 minutes per day in a standalone grade-by-grade curriculum—Explicit, systematic, standalone spelling instruction is strongly supported by research.

**Characteristics of Effective Spelling Instruction**

Randall R. Wallace, Ph.D. Missouri State University

*Reading Horizons*, 2006, 46 (4) along with Gentry & Ouellette, Moats, and many others.
Moats doesn’t shy away from explicit spelling instruction:

“As a general guide for covering the proposed content, **about 15-20 minutes daily** or 30 minutes three times per week should be allocated to spelling instruction. Application in writing should be varied and continual.” (Moats, 2005/2006, p. 42-43)
What Word Study works for spelling?

A Leveled Grade-by-Grade Curriculum

Teach the Right Words at the Right Time!

Most state standards call for a Grade-by-Grade Spelling Curriculum.
What a Grade 3 Curriculum Looks Like

• Note specificity of these Brain Words weekly lessons.

• This builds Word Level Proficiency.
There are Five Best Learning Strategies According to Psychological Science.

1) self-testing, 2) self-explanation, 3) elaborative interrogation, 4) distributed practice, and 5) interleaved practice.

“Improving Students’ Learning With Effective Learning Techniques: Promising Directions From Cognitive and Educational Psychology”

Psychological Science in the Public Interest 14(1) 4–58 © The Author(s) 2013
1. Self-Testing—Self Check

Self-Test in every weekly unit (except review units).

1. **Self-Testing.** Self-testing or taking practice tests over to-be-learned material. E.g. **Self-Testing** is the **Pretest** in a **Pretest/Study/Post Test Methodology** for weekly word study.
2. Teach a few spelling rules! “HOW DO YOU KNOW?” You learn the rule!

A Spelling rule for Grade 3:

If a word ends in a **consonant** followed by **y**, the **y** changes to **i** to add any suffix except **-ing**: carry, carried; carries, but carrying.

If a word ends in a **vowel** followed by **y**, the **base word** is unchanged: delay, delayed, delays, delaying (Gentry, 2022, Unit 32, page T178a).

**Self-explanation** is when the student can state the rule.
3. Teach **WHY** *great* and *grate* are spelled differently.

Third graders learn both spellings and meanings of single-syllable homophones in a lesson on words such as *roll* and *role*, *scent* and *cent*, and *great* and *grate*. (Gentry, 2016, Unit 23, page T152A.)

**Elaborative Interrogation** is when students can explain “why.”
Teach Morphology and Vocabulary

**Root Words**: the primary meaning part
Latin root *cycl* in *cycle, bicycle, cyclone,*

**Base Words**: stand on their own—may receive *prefixes, suffixes,* or be *compound words, contractions*

Begins in K-1 and intensifies up through the grades:

(e.g., Study of Greek and Latin forms such as L. root *jud* 
*judge, adjudicate, in*judicious, *judicial,* 
*misjudge, prejudice,* and many more.)
4. Interleaved Practice

Mix up the practice for long-term effects.

- A Look-Say-See-Write-Check “Flip Folder” technique
- Digital practice options for in school or home practice
- Meaningful workbook pages
- Online spelling practice
- Word sorting options
E.g. Using the Flip Folder for Distributed Practice
5. Distributed Practice

Break up the practice into short sessions throughout the week

• 20 minutes per day (Moats, 2005/06).

• Students leave it and come back to it day after day— but only for a short time.

These word study strategies result in TRANSFER (Brain Words) not simple short term memorization.
Pause and Ponder

1. Are 90% of your first graders entering second grade with 300+ brain words?

2. Do 90% of your fourth graders spell and read on grade level?

3. Are you spending about 20 minutes per day on integrated spelling word study?

4. Is your school and district teaching spelling explicitly and systematically in a grade-by-grade curriculum?

5. Is your school or district explicitly teaching manuscript handwriting beginning in kindergarten and cursive beginning in second grade?
Welcome to Overcoming Dyslexia: the #1 Reading Disability
How I became an expert on dyslexia:

“In when I was a sophomore …”
Let’s begin with Facts from Neuroscience and Cognitive Psychology

5 Important Questions and Answers about Dyslexia

This is little self test to find out what you know and what you might not know.
1) How many kids in your school are dyslexic?
   A. 1 in 5
   B. 2 in 100

2) Are more boys dyslexic than girls?

3) Does dyslexia run in families?

4) Which statement is true?
   A. Many dyslexics end up in prison.
   B. Many dyslexics are successful in life.

5) Can dyslexia be cured?
Dyslexia is a specific learning disability that is neurobiological in origin.

It is characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities.

Secondary consequences may include problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge.

--International Dyslexia Association (IDA)
Dyslexia is brain-based but its cause generally has nothing to do with intelligence.

[A brilliant person can be dyslexia and a not so brilliant person can be dyslexic!]

Simply put, kids who are dyslexic most often have trouble learning to decode print and to spell (encode).

Dyslexia is generally not considered a comprehension disorder; however, if one can’t read words, one can’t comprehend.
How common is dyslexia?
How many kids in your school are dyslexic?
A. 1 in 5
B. 2 in 100

Nobody knows. Recent studies suggest that 1 in 5 people have neurologically-based processing difficulty for learning to read. Brain scientists are often saying about 10%.

Part of the difficulty in determining the incidence of dyslexia is that dyslexia manifests itself across a continuum: some cases are mild, others severe.

Likely that all teachers work with students who are dyslexic.
Yes. It has a genetic origin. It’s biologically and neurologically based so familial occurrence is not surprising.

If you are dyslexic, it’s likely that half of your brothers and sisters are too.

If you are dyslexia it’s about a 50% chance that one of your parents is dyslexic.

It sometimes skips a generation.
Yes. Recent studies debunk a popular myth that the numbers are equal. The latest science reports that dyslexia is more common boys.
What about the prison question?

4) Which statement is true?
   A. Many dyslexics end up in prison.
   B. Many dyslexics are successful in life.
5. Can dyslexia be cured?

No—it’s genetic.

However, both genetic and environmental factors play a role.

Early intervention is a major goal.

We can help all kids overcome dyslexia.
Let’s think about symptoms.

It’s important to know the classic symptoms. HOWEVER

Recognize that the symptoms you see are not a diagnosis.

Refer to a medical specialist or trained psychologist.

Educators are not equipped to diagnose neurological processing disorders.
### Classic Early Warning Signs in Early Childhood (Symptoms)

- **Speech delay**—Language isn’t occurring as it should. Receptive is language fine. Expressive language is delayed.
- **Saying sounds in the wrong sequence**—Odd pronunciations P-sketetti, am-i-nal, em-iny, a-lu-ni-mum
- **Word retrieval** Trouble finding the word they want to use—”You know, that thingy.”
- **Trouble with rhyming words**
- **Trouble with phonemic awareness**
- **Trouble with invented spelling**
- **A history with family members with reading problems**

*Adapted from Susan Barton [https://bartonreading.com/the-barton-system-is/](https://bartonreading.com/the-barton-system-is/)*
Classic Elementary School (Symptoms)

- Difficulty memorizing arbitrary sequences: days of the week, months of the year
- Spelling their own name
- Learning their address
- Learning their phone #
- Learning names of the letters
- Learning the sounds of the letters
- Multiplication tables
- How to tie shoes (Age 6 or 7 or later)
- Issues with dominance—right handed or left handed [Normal—4 years old—Dyslexic—7, 8, 9 years old—Dyslexic—mixed dominance]
- Difficulty with written expression
- Slow reading rate
- Poor handwriting skills
- Poor test taking skills
- Terrible spelling
- Difficulty reading musical notes from a score

Adapted from Susan Barton https://bartonreading.com/the-barton-system-is/
5 Ways Dyslexia Affects a Person

- Spells
- Articulates
- Remembers
- Reads
- Dyslexia Affects How a Person
I have daily dyslexic deficit experiences:

* A slow reading rate
* Poor spelling
* Challenges with word retrieval when I’m under the gun
* Embarrassing pronunciations
Classic Warning Signs for Me!

- Struggling with academics in school
- May compensate by working harder
- Lifelong struggles with spelling
- Slow reading rate
- Poor test taking skills
- Difficulty with written expression
- Fear of reading out loud
- Difficulty with foreign languages (most colleges waive)
- Bad Sense of directionally in hotels / airports / Conference centers / maze-like buildings

Adapted from Susan Barton https://bartonreading.com/the-barton-system-is/
It’s not unusual that some people who are dyslexic like myself become experts in the area of their disability.

I attribute dyslexia to helping me become a leading authority on spelling and dyslexia, and a 40+ year researcher and supporter of spelling books.

Without dyslexia I probably would never have co-authored the *Brain Words* book or have more than a million readers on a *Psychology Today* education blog.
How can schools help children with dyslexia?

• Intervene early.
• Teach phonics linked to phonemic awareness.
• Teach spelling explicitly. Spelling and brain words ignite the reading brain.
• Teach writing. Begin teaching writing in preschool and kindergarten.
• Teach handwriting including manuscript for beginners and cursive beginning in second grade. Handwriting is a proven language learning skill.
• Embrace repetition because the brain loves repetition for almost every skill.
• Don’t ever give up on children with dyslexia.
All American Family
Mom and Dad
Older brother diagnosed with dyslexia in Grade 5.
Sister and brother three years younger.
All smart, talented, musical, artistic, athletic, loving family
With educational advantages.
Read the first Draft. Notice the spelling

I don't know what I want to be when I grow up. But I like to mountain bike, skiing, sailing, and soccer. I like sailing the most. I want to be on Team Oracle in America's Cup. If I want to do that, I think I need to be a engineer.

Some classes I need to take are science, hydrodynamics, aerodynamics and physics. And also math (measurements of speed and studying the wind). I need to be physically fit. Finally, I need to know my sailing knots and just sail to feel good when I sail and I have been doing this since I was six.

Sincerely,

Kaden
<table>
<thead>
<tr>
<th>Symptomatic of Dyslexia</th>
<th>105 Words – 14 misspellings</th>
</tr>
</thead>
<tbody>
<tr>
<td>doivent for don’t</td>
<td>mesuremenunts for measurements</td>
</tr>
<tr>
<td>moutain for mountain</td>
<td>programing for programming</td>
</tr>
<tr>
<td>tean for team</td>
<td>siling for sailing</td>
</tr>
<tr>
<td>americas for America’s</td>
<td>studiing for studying</td>
</tr>
<tr>
<td>a for an</td>
<td>feels for feel</td>
</tr>
<tr>
<td>enginer for engineer</td>
<td>ben for been</td>
</tr>
<tr>
<td>chydiodynamics for</td>
<td>sincerly for sincerely</td>
</tr>
<tr>
<td>hydrodynamics</td>
<td></td>
</tr>
</tbody>
</table>
## Dyslexia: First Grade Twins Monster Test Results

<table>
<thead>
<tr>
<th>Monster Test Word</th>
<th>Kaia (No Symptoms) Spelling &amp; (Phase)</th>
<th>Anderson (Symptoms of Dyslexia) Spelling &amp; (Phase)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 monster</td>
<td>monst (2) left out /r/</td>
<td>moostootr (3)*</td>
</tr>
<tr>
<td>2 united</td>
<td>ynitid (4)</td>
<td>unidid (4)</td>
</tr>
<tr>
<td>3 dress</td>
<td>jres (4)</td>
<td>jest (2) left out /r/</td>
</tr>
<tr>
<td>4 bottom</td>
<td>botum (4)</td>
<td>bootum (4)</td>
</tr>
<tr>
<td>5 hiked</td>
<td>hicked (4)</td>
<td>icht (3)</td>
</tr>
<tr>
<td>6 human</td>
<td>Hyomin (4)</td>
<td>pwmim (2) left out /h/*</td>
</tr>
<tr>
<td>7 eagle</td>
<td>egol (4)</td>
<td>igl (3)*</td>
</tr>
<tr>
<td>8 closed</td>
<td>closed ✓</td>
<td>codst (2) left out /l/</td>
</tr>
<tr>
<td>9 bumped</td>
<td>bumed (2) left out /p/</td>
<td>but (2) left out /p/*</td>
</tr>
<tr>
<td>10 type</td>
<td>tipe (4)</td>
<td>tell (2) left out /ɨ/ and /p/*</td>
</tr>
</tbody>
</table>
Dyslexia Symptomatic Spellings

Kaia Anderson

2 Phase 2 5 Phase 2
7 Phase 4 3 Phase 3
2 Phase 4

1 Correct

* 6 Red Flag Spellings for Dyslexia
No clue about short vowels.

MOOSTOOR (monster)
BOOTUM (bottom)
PWMIM (human)
IGL (eagle)
BUT (bumped)
TELL (type)
Think about the Spelling Connection to Dyslexia?—Let’s Be Reminded:

Explicit spelling instruction is a **DYSLEXIA SPECIFIC INTERVENTION**.

- Often you can see symptoms as early as first grade.
- That leads to early intervention.

*Dyslexia Is Complex*
7 Ways to Accommodate Children with Dyslexia in Regular Classrooms

J. Richard Gentry PhD
<table>
<thead>
<tr>
<th><strong>Allow</strong></th>
<th>Allow children who may have dyslexia to demonstrate their competence.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Change</strong></td>
<td>Change your seating arrangement to address students’ difficulty with organizing, managing time, following teachers directions, filtering out background noise.</td>
</tr>
<tr>
<td><strong>Use</strong></td>
<td>Use a research-based spelling curriculum as a dyslexia-specific intervention.</td>
</tr>
<tr>
<td><strong>Teach</strong></td>
<td>Teach handwriting, including manuscript for beginners and cursive beginning in second grade.</td>
</tr>
<tr>
<td><strong>Expect</strong></td>
<td>Expect to give those with dyslexia more help with proofreading for spelling.</td>
</tr>
<tr>
<td><strong>Be</strong></td>
<td>Be sensitive during foreign language study.</td>
</tr>
<tr>
<td><strong>Make</strong></td>
<td>Make appropriate accommodations.</td>
</tr>
</tbody>
</table>
Advocate for all students who struggle with dyslexia.

Compassion for students who are struggling

Not mistaking dyslexia as a sign of inferior intelligence or laziness

Recognizing that students with dyslexia also have strengths—some experts even suggest dyslexics are gifted and have special talents—such as thinking outside of the box, being creative, entrepreneurial, artistic, and athletic.
What’s It Like to Be Diagnosed at 24 Years of Age?

• Emily-Ruth’s dyslexia diagnosis included the following:
  • **Attention Deficit** Hyperactivity Disorder (ADHD) — It is common for dyslexia and ADHD to co-occur.
  • “Double-deficit dyslexia”—a more severe form of dyslexia—based on the theory that Emily-Ruth demonstrated deficits in both phonological awareness and rapid naming speed. Auditory memory and sequencing skills were reported to be at a fifth-grade level.
  • **Dysgraphia**. Emily-Ruth’s crate included outstanding samples of talented writing at every level of schooling, yet there was early evidence in first grade of symptoms of dysgraphia such as difficulty spacing things out on paper or within margins, inconsistency in letter and word spacing, and unfinished words or missing words or letters.
  • A “severe degree” of Irlen Syndrome, a perceptual processing disorder for light, color, and contrast sensitivity, such as difficulty with fluorescent lights, which Emily-Ruth self-reported. The report seemed to imply that this was one of the most important findings.

There were symptoms of all of these in kindergarten and first grade!
Understanding dyslexia may help people avoid problems later in life.

While most people with dyslexia do not have psychological and emotional disorders, research shows they are disproportionately at greater risk for the following (Cosden, Patz, and Donahue, 2010):

• Low self-esteem
• High anxiety
• Difficulty reading social cues (Ryan, 2004)
• Poor social relationships
• Depression
• Likelihood of substance abuse including drugs, tobacco, and alcohol (Cosden, 2001)
• Poor understanding of their own strengths and weaknesses (California Dyslexia Guidelines, 2017)
Filming *The Truth About Reading* documentary

*Sold a Story* podcast by Emily Handford

John Cockran
Nick Nanton

*The Teacher Who Couldn’t Read*
Award Winning Videographer
Gifts found in people with dyslexia:

Some experts present evidence that dyslexics are gifted beyond what is found in non-dyslexic individuals and often have special talents:

• Thinking outside of the box
• Visualization in three dimensions
• Being creative, entrepreneurial, artistic, and athletic

Dyslexia can lead to positive life skills that are developed within oneself such as grit and resilience, being optimistic and in-tune with one’s passion, taking positive risks and getting the job done, all qualities of “the entrepreneurial spirit” (Ehrlichman, 2015) which seems to be in great abundance in millennials.
“New Riveting Reports on Neuroscience, Dyslexia, and Reading”


See how theory and practice are coming together to help readers.
Thank You!

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