

What Is Dyslexia?

How does dyslexia affect school performance at different ages?

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Dubai

Dyslexia

Hidden Disability OR Tangible Disability??

-Sally Shaywitz, M.D.-

- ❑ With the use of fMRI (functional magnetic resonance imaging), scientists have made dyslexia, a "hidden disability," tangible.
- ❑ Specific areas in the brains of people with dyslexia are *not activated*, or *underactivated*, during attempts to read.
- ☑ These differences in activation patterns are universal across cultures and languages.

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Dyslexia

-a weakness in a sea of strengths-
-Sally Shaywitz, M.D.-

In relation to intelligence, motivation, education or professional status, dyslexia is an unexpected difficulty in reading—
“a weakness in a sea of strengths.”

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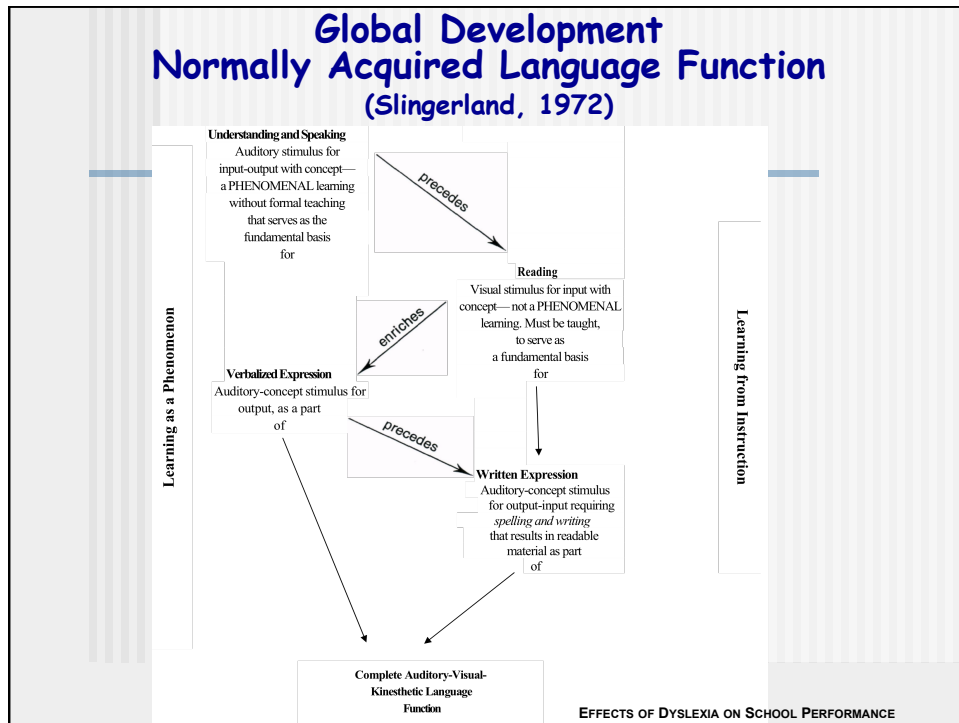
Neural Signature for Dyslexia: Disruption of Posterior Reading Systems ©Sally Shaywitz, M.D. *Overcoming Dyslexia* 2003

1. Disruption of posterior reading systems during reading of real and pseudo-words creates a need for compensatory overactivation of other parts of the reading system.
2. When readers with dyslexia have difficulty learning to link symbols with sounds, (letter-sound association), they over-rely on rote memorization of whole words.
3. These readers are ABLE to identify familiar, known words and UNABLE to identify new or unfamiliar words.
4. Readers who lack efficient strategies for identification of new or unfamiliar words using symbol-sound linkages over-rely on an alternate system—in the posterior medial occipito-temporal area—which functions via rote memory networks.

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What Is Dyslexia?
How Does Dyslexia Affect School Performance at Different Ages?



**Oral Language—Speaking and Listening
Written Language—Reading and Writing**

- ❑ Humans are “hardwired” for oral language (speaking and listening)—but not for written language (reading and writing).
- ❑ By the time most children begin school, they are able to use oral language relatively well.

Oral Language—Speaking and Listening Written Language—Reading and Writing

- ❑ Literacy (reading and written expression) builds on a foundation of oral language skills.
 - Speech Skills—Phonology→foundation for learning the alphabetic principle—associating speech sounds with letters that represent them—for word identification and spelling
 - Listening—Language Comprehension→foundation for understanding words and sentences—for comprehension of narrative and expository text

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Oral Language—Foundation for Literacy -Snowling, 2005-

- ❑ Oral language skills are the foundation of the written language system.
- ❑ Children with oral language difficulties are at risk for literacy failure.
- ❑ To understand the nature of the risk, both phonological and language comprehension skills must be considered.
- ❑ Availability of strong oral language comprehension skills can mitigate (but not eliminate) the risk of reading problems among children.
- ❑ Both word identification and reading comprehension processes will be negatively affected by global language deficits→speech AND language comprehension (Snowling, Bishop & Stothard, 2000)

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Speech Problems—Articulation

-Snowling, 2005-

- ❑ Children with speech difficulties often develop reading problems IF they have poor language comprehension skills.
- ❑ Language comprehension skills (*i.e., listening vocabulary and listening comprehension*) may act as a “protective factor” in children with poor speech articulation skills.

speech difficulties + poor language comprehension = reading problems

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For Dyslexic Students, Higher Level Thinking Skills Are Often Intact

- ❑ The ability to read and comprehend simultaneously depends largely on completely automatic decoding skills.
- ❑ The uniqueness of students with dyslexia is that higher-level thinking skills are often intact, frequently at a superior level, but decoding skills are slow to develop.

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How Do We Learn to Read & Comprehend Text Rapidly and with Ease?

-Ehri, 2002-

"One of the great mysteries to challenge researchers is how people learn to read and comprehend text rapidly and with ease. A large part of the explanation lies in how they learn to read individual words. *Skilled readers are able to look at thousands of words and immediately recognize their meanings without any effort.*"

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Lexical and Phonological Pathways

-Dehaene, 2009, p. 26-

- ❑ Both the lexical→meaning and phonological→auditory pathways operate in parallel and reinforce each other.
- ❑ Expert readers enjoy direct access to word meanings—which spares them from consciously pronouncing words mentally before comprehending.
- ❑ Nevertheless, even proficient readers continue to use the sounds of words—although they may be unaware of it.
- ❑ *At a very deep level, information about the pronunciation of words is automatically retrieved.*

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Word Level Reading Skills -Snowling, 2005-

<u>PRIMARY RISK FACTORS OF POOR PHONOLOGY</u>	<u>CONSEQUENCES OF POOR PHONOLOGY</u>
<ul style="list-style-type: none">▪ Phoneme Awareness → critical factor in the prediction of word-level reading skills▪ Letter Knowledge	<ul style="list-style-type: none">▪ Inaccurate Word Identification▪ Lack of Systematic Strategy → decoding new or unfamiliar words▪ Spelling Weaknesses

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Auditory-Kinesthetic/Oral-Motor The Power of the Speech Connection -Jeannine Herron-

- ❑ Phonemes are not sounds processed uniquely by the auditory system; they are articulated sounds.
- ❑ It is the powerful motor system of speech that sequences and remembers phonemes.
- ❑ Letters represent articulated (spoken) sounds.

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Individual Differences in Reading Comprehension -Snowling, 2005-

<u>PREDICTORS OF READING COMPREHENSION</u>	<u>CONSEQUENCES OF POOR GRAMMAR AND VOCABULARY</u>
<ul style="list-style-type: none">▪ Vocabulary Knowledge▪ Grammatical Sensitivity▪ Efficient Decoding-Word Identification Skills	<ul style="list-style-type: none">▪ Decoding OK▪ Spelling OK▪ Language Comprehension Problems▪ Problems recognizing/reading/pronouncing homographs and words with unfamiliar/low frequency orthographic patterns: <i>/brōd/ for broad</i> <i>/blūde/ for blood</i>

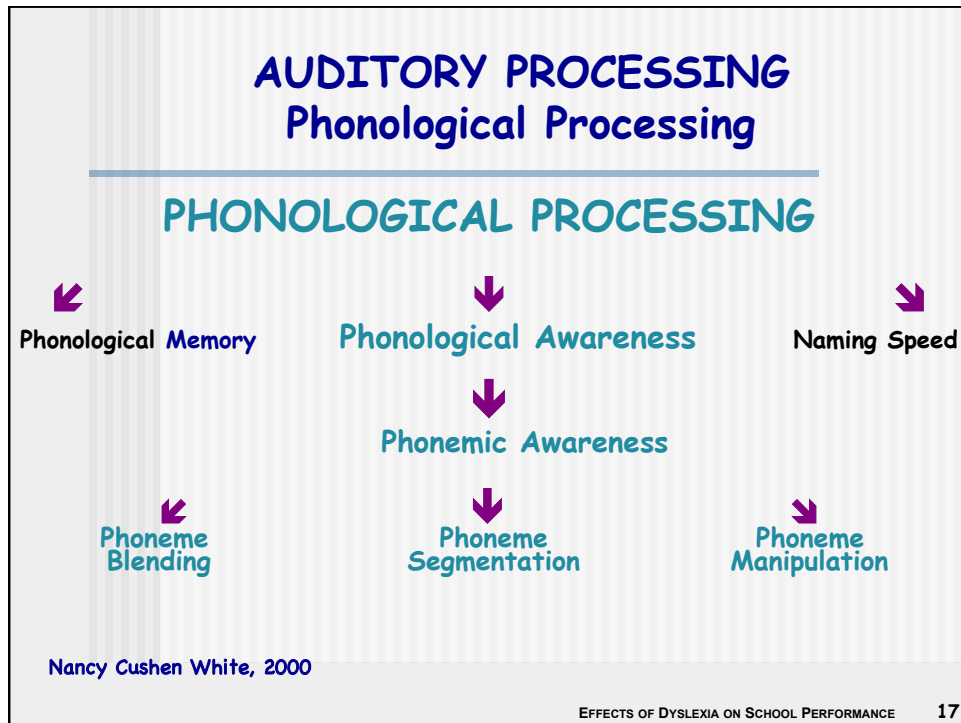
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Phonemic Awareness Skills Critical to Understanding of Phonics

In order to benefit from phonics instruction, students need to have rudimentary knowledge and understanding of the following phonemic awareness skills:

- Phoneme Blending
- Phoneme Segmentation
- Phoneme Manipulation

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What Is a Phoneme??

- Single speech sound
 - Distinctive linguistic unit
 - Smallest unit of sound contrast creating words with different meanings
 - house mouse louse
 - street straight strut
 - sheaf beef thief
 - stream street streak

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Phonemic Awareness Marilyn Jager Adams

It is not working knowledge of phonemes that is so important but **conscious, analytic knowledge**. It is neither the ability to hear the difference between two phonemes nor the ability to distinctly produce them that is significant. What is important is the **awareness that they exist as abstract components of the language that can be manipulated**. Developmentally, this awareness seems to depend upon the student's inclination or encouragement to lend conscious attention to the sounds (*as distinct from the meanings*) of words.

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Phonemic Awareness is NOT Phonics What Is Phonics?

- ❑ Relationships between letters-symbols and their sounds → **grapheme-phoneme relationships**
- ❑ Relationships between sounds and their spelling → **phoneme-grapheme relationships**
- ❑ Strategic use of **symbol-sound** associations to identify unfamiliar words (decode) → **grapheme-phoneme**
- ❑ Strategic use of **sound-symbol** associations to spell words (encode) → **phoneme-grapheme**

English has 40+ phonemes and more than 250 graphemes to spell them.

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Consensus of Research

-Adams, Treiman & Pressley; Fletcher & Lyon;
Learning First Alliance, Snow et al. -

The consensus of researchers is that some approaches for teaching reading are more effective than others and that what works best can be explained on the basis of the developmental level of the student, the cognitive and linguistic characteristics of the student, and the language content itself.

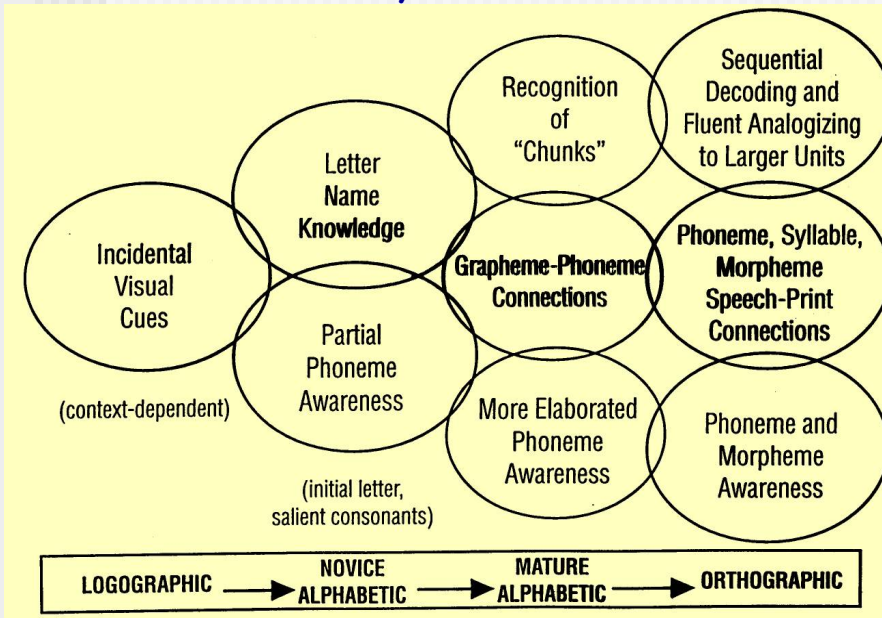
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Characteristics of Struggling and Beginning Readers

- ❑ Over-reliance on context and guessing
- ❑ Limited phoneme awareness
- ❑ Slow naming speed—lack of fluency in word recognition

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Development of Word Recognition -Ehri, Perfetti-



Importance of Letter Names

- ❑ The name of a letter is its most stable property.
- ❑ The shape of a letter may change (e.g., upper-lower case forms, cursive-manuscript).
- ❑ The speech sound represented by that letter may vary (e.g., long or short vowel sound, hard or soft c or g).

Letter Names as a Foundation for Learning the Alphabetic Principle -Ehri, 1987-

<df> → "deaf" <yt> → "white" <lbo> → "elbow"
 <frm> → "farm" <ets> → "eats"
 <trtl> → "turtle" <koped> → "copied"
 <yl> → "well" OR "will" OR "while"

Letter names provide a foundation for learning the alphabetic principle. These examples illustrate a beginning understanding of the alphabetic principle in which a grapheme represents a phoneme.

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Orthographic Memory

- ❑ Memory for patterns of written language
 - Letters
 - Syllables
 - Morphemes
- ❑ Syllables—linguistic units

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Instant Pattern Recognition

- ❑ The ease and automaticity with which a skilled reader is able to read individual words is known as instant pattern recognition.
- ❑ Instant pattern recognition is achieved by repeated encounters with words and by overlearning (i.e., learning to automaticity) the orthographic and phonological PATTERNS of the language.

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SYLLABLES: Spoken and Written Written Language Conventions

- ❑ There are two "m's" in *hummus* but only one "m" in *humid*.
- ❑ These spelling conventions were invented to help readers decide how to identify/pronounce an unfamiliar word (Moats—LETRS/Module 3/148).
- ❑ Knowledge of syllable types and spelling conventions also helps students to know how to *spell* words—but this knowledge alone is not sufficient for being a good speller.
- ❑ The study of morphology and etymology is also needed to help students with spelling.

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Stages of Orthographic Awareness -Dehaene, 2009-

- Expert readers encode written words hierarchically:

single letters



bigrams



graphemes



syllables



morphemes

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Word Reading: Multiple Levels of Analysis -Dehaene, 2009-

In English—and other languages—the decomposition of a word into its morphemes is an essential step on the path that leads from vision to meaning.

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The Role of Context in Word Recognition

- ❑ Poor readers over-rely on context because letter-sound knowledge is weak.
- ❑ The **content words** in a passage tend to be **less common**, not in the sight vocabulary, and must be decoded accurately.
- ❑ Context alone resolves ambiguity and sometimes supplies meaning for unfamiliar words.

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How Accurately Can Words be Identified by Context Alone?

- ❑ Average predictability of words in 4th through 8th grade text is 29.5%. **Low frequency words, usually content words that carry the bulk of the meaning in a passage, are the least guessable** (Torgesen, 2004).
- ❑ **OVERALL**, context enables the reader to predict accurately **one out of four words** (Gough & Hillinger, 1980).
- ❑ Higher level of predictability was shown for ***function words (40%)** because they are **high frequency** and contain **fewer letters** (Torgesen, 2004).
**prepositions, pronouns, conjunctions, helping verbs, articles*
- ❑ The **content words** that carry meaning are **predictable only 10% of the time** (Gough, 1983). *Content words are often low frequency words that vary in length and are most likely to be unfamiliar.*

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Automatic Word Recognition...

-Adams & Bruck, 1995-

- Automatic word recognition is the result of familiarity with letter-sound correspondences and spelling patterns.

To Pause or Not to Pause...

- The reader should be encouraged to pause and study unknown words instead of to skip or to guess an unfamiliar word (Adams, 1990).
- Using systematic decoding strategies takes time and practice—but the result is accurate word identification.
- Guessing incorrectly is practicing (and learning) errors.

How Skillful Readers Read...

-Adam, 1990-

Although this processing often is not perceived on a conscious level, studies show that misprints of even very familiar words are detected by readers. When the letters *tqe* rather than *the* are embedded in a sentence, the amount of eye fixation time increases.

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How Skillful Readers Read...

-Adams, 1990-

"Skillful readers visually process virtually every individual letter of every word as they read, and this is true whether they are reading isolated words or meaningful, connected text."

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Eye Fixations During Reading -Dehaene, 2009-

- Our eyes impose many constraints on the act of reading.
 - The structure of our visual sensors forces us to scan the page by jerking our eyes around every two or three tenths of a second.
 - Reading is "the word-by-word mental restitution of a text through a series of snapshots."
- ☑ While some small function (grammatical) words like the, it, of or is can sometimes be skipped, almost all content words (nouns, verbs, adjectives, adverbs) must be fixated at least once.

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Wide Range of Word Frequencies -Adams, 1990-

"It is in overcoming the problem of infrequent words that the connectivity among the processors is so critical to the skilled reader. By mutually facilitating, reinforcing, and reminding each other of their relevant knowledge they collectively ensure that we will recognize printed words, ranging in frequency and familiarity from the to disproportionate, with the greatest speed and accuracy possible" (p. 185).

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Signs of Problems with Intersensory Integration...

Created by Genevieve Oliphant

- Recognizes letters visually but cannot recall name or sound (V-A)
- Recognizes that he has seen a word before but cannot remember what the word is (V-A)
- Can write (copy) some words or sentences, then cannot read what he has written (K-V)
- Can spell orally, but not on paper (A-V-K)
- Can select correctly spelled word from a group but cannot write it from dictation (A-V-K)
- Poor at recognizing and identifying correct word from group when word is spoken (A-V)

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Symptoms-Characteristics of Dyslexia

Preschool Ages 3 to 4 years

- ◆ Delayed speech—difficulty learning to talk
 - Difficulty pronouncing words correctly
 - Unclear enunciation
 - Mixes up sequence of sounds—especially when trying to pronounce words with more than one syllable
 - Points and makes signs/signals to communicate instead of speaking
- ◆ Difficulty with verbal expression of thoughts-needs-ideas
 - Uses only single words or short phrases in verbal expression
 - May be slow to add new vocabulary words
 - Difficulty with word retrieval
 - Difficulty recalling names for toys and other common objects
 - Difficulty describing or explaining because he/she can't retrieve the words needed

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Symptoms-Characteristics of Dyslexia Preschool Ages 3 to 4 years

- ◆ Difficulty with rhyming
 - Learning common nursery rhymes
 - Recognizing words that rhyme
 - Generating words that rhyme
 - Lack of interest in listening to rhymes
- ◆ Difficulty remembering and/or following a sequence of oral directions
- ◆ Difficulty learning—and remembering—letters in own name
- ◆ Often forgetting what he/she wanted to say
- ◆ Late to establish a dominant hand for writing tasks

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Symptoms-Characteristics of Dyslexia Kindergarten-Grades 1-2 Ages 5 to 7 years

- ◆ Difficulty with phonemic awareness tasks
 - Blending /m/+/a/+/t/ = /mat/
 - Segmentation /ship/ = /sh/+/i/+/p/
 - Manipulation Say /soak/ without saying /s/ (oak)
- ◆ Difficulty learning the names of letters *b* = “*b*”
- ◆ Difficulty learning to associate letters with sounds *b* = /b/
- ◆ Lack of a systematic strategy for decoding
 - Guesses from context or pictures with no attention or connection to the letters that spell the word
 - Guesses based on “shape” of word
 - Guesses based on first letter of word

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Symptoms-Characteristics of Dyslexia Kindergarten-Grades 1-2 Ages 5 to 7 years

- ◆ Word identification errors in visually similar words
 - Transposing sequence of sounds/letters
 - *left* for *felt* *stop* for *spot* *tip* for *pit*
 - Confusing visually similar letters
 - *bad* for *dad* *dog* for *bog* *men* for *win*
 - Substitutions-visually similar words
 - *horse* for *house* *that* for *what* *pasture* for *picture*
- ◆ Skipping or adding extra words when reading connected text
- ◆ Avoiding reading altogether

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Symptoms-Characteristics of Dyslexia Kindergarten-Grades 1-2 Ages 5 to 7 years

- ◆ Math
 - Confusing signs
 - *+* for *X* *-* for *+*
 - Confusing sequence of digits when writing numbers
 - *17* for *71* *287* for *782*
- ◆ Writing
 - Difficulty learning consistent sequence of movements for forming letters and numbers
 - May hold pencil with inefficient grip (fist, thumb wrap, etc.)
 - Lack of a systematic strategy for spelling
- ◆ Difficulty remembering names, labels, facts
- ◆ Difficulty with retrieval of specific vocabulary
- ◆ Resorts to memorization by rote without understanding

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Indications of Strengths in Higher Level Thinking Processes Kindergarten-Grades 1-2 Ages 5 to 7 years

- ◆ Curiosity
- ◆ Active imagination
- ◆ Ability to figure things out
- ◆ Open to new ideas
- ◆ Understanding of new concepts
- ◆ Solid speaking vocabulary
- ◆ Enjoyment of solving puzzles
- ◆ Talented at building
- ◆ Listening comprehension
- ◆ High level of empathy

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Symptoms-Characteristics of Dyslexia Grades 2 to 6 Ages 7 to 11 years

- ◆ Lack of a systematic strategy for word identification—
 - One-Syllable Words—visually similar but semantically different
read for ride bay for buy now for new wish for which
 - Multi-Syllable Words—visually similar but semantically different
immunize for immobilize symphony for sympathy historical for hysterical
- ◆ Inaccurate reading of short function words (often unpredictable)
for for from seed for ride world for would them for their
- ◆ Avoidance of reading
- ◆ Fear of reading aloud
- ◆ Lack of prosody in oral reading—word-by-word reading
(does not chunk words into meaningful phrases)
- ◆ Slow laborious reading

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Symptoms-Characteristics of Dyslexia Grades 2 to 6 Ages 7 to 11 years

- ◆ May ignore punctuation when reading orally and omit punctuation when writing
- ◆ May struggle to recall sequence of movements necessary for automatic letter formation resulting in illegible handwriting
- ◆ May learn to spell a list of words well enough to “pass” a weekly spelling test and forget how to spell them by the next week
- ◆ May mispronounce or misuse words in oral expression
- ◆ May have superb ability to express ideas and concepts verbally but struggles with even very basic written expression
- ◆ Difficulty retrieving vocabulary and organizing oral responses—which interferes with written expression
- ◆ Poor spelling

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Indications of Strengths in Higher Level Thinking Processes Grades 2 to 6 Ages 7 to 11 years

- ◆ Excellent thinking skills
 - Conceptualization
 - Reasoning
 - Imagination
 - Abstraction
- ◆ Excellent memory for information and concepts understood
- ◆ Difficulty with rote memory
- ◆ Strong listening comprehension
- ◆ Sophisticated listening vocabulary
- ◆ Strong fluid reasoning—nonverbal abstract reasoning skills
- ◆ Empathy—sensitivity to the plight of others

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Symptoms-Characteristics of Dyslexia Middle School-High School

- ◆ Dysfluent oral reading
 - Hesitant, word-by-word
 - Fraught with inaccuracies—omissions, insertions, substitutions
 - Lack of prosody in reading—does not chunk words into meaningful phrases
 - Slow reading rate
- ◆ No systematic strategy for identifying new-unfamiliar words
 - Failure to read-pronounce words accurately means those words do not sound familiar when heard in a lecture or discussion
- ◆ Avoids reading whenever possible
- ◆ Difficulty copying from distance or from books
- ◆ Difficulty taking notes while listening
- ◆ Difficulty learning a foreign language

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Symptoms-Characteristics of Dyslexia Middle School-High School

- ◆ Lack of retrieval fluency
 - Difficulty recalling facts, details
 - Word retrieval—leading to lack of specificity in choice of vocabulary for both speaking and written expression
- ◆ Poor spelling in written expression
 - Misspelling of high frequency, unpredictable function words
 - Misspelling of predictable content words
 - Omissions, insertions, substitutions when writing
 - May choose lower level vocabulary words for written expression—because they are easier to spell
 - Difficulty finding errors in written expression

EFFECTS OF DYSLEXIA ON SCHOOL PERFORMANCE

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Symptoms-Characteristics of Dyslexia Middle School-High School

- ◆ Mispronunciation of names of people and places
- ◆ May need time to organize thoughts and retrieve vocabulary before responding to questions in class discussions
- ◆ Receptive-listening vocabulary exceeds speaking vocabulary and speaking vocabulary may exceed written expression vocabulary
- ◆ Must understand and be able to talk about concepts—in own words—in order to remember them—difficulty with rote memory without understanding

EFFECTS OF DYSLEXIA ON SCHOOL PERFORMANCE 51

Indications of Strengths in Higher Level Thinking Processes Middle School-High School

- ◆ Often a significant improvement in test performance when given the accommodation of extended time
- ◆ More successful in subjects not dependent on rote memory
- ◆ Original insights
- ◆ Strong ability in higher level conceptualization
- ◆ Resilience
- ◆ Tenacity

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Demands of High School

- ❑ Quickened pace
- ❑ Increased demands
- ❑ More intensely abstract curriculum
- ❑ Different lexicon for each subject

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What makes learning stick?

Practice Makes Permanent

- Be certain that what you practice IS what you want to become permanent.

-Joyce Steeves

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Variations on a Theme: Practice Makes Permanent

- "We are what we repeatedly do.
Excellence, therefore, is not an act but
a habit."

Aristotle—Greek Philosopher

- "Speed is not the road to success.
Careful practice is the road to speed."

Beth H. Slingerland—Teacher

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Reading is a skill... -Dehaene, 2009-

- As we move our eyes across the page, each word is a myriad of fragments that our brain later pieces back together.
- It is only because these processes have become automatic and unconscious, thanks to years of practice, that we are under the illusion that reading is simple and effortless.

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5 Steps to Teaching a New Concept GOAL ➡ AUTOMATICITY -Beth H. Slingerland-

◆ from teacher modeling ➡ guided practice ➡ to independent functional use ◆

1. Teacher demonstrates and verbalizes.
2. Individual students practice with guidance, verbalizing.
3. Class (or group) practices with guidance, verbalizing.
4. Students practice independently.
5. INDEPENDENT FUNCTIONAL USE

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Kinesthetic:

Helping each student develop awareness:

- Oral-motor movement for pronunciation of each phoneme
- Sequence of hand movements for formation of each letter of the alphabet

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Thoughts on the process of writing...

-Sir Charles Sherrington, 1906-

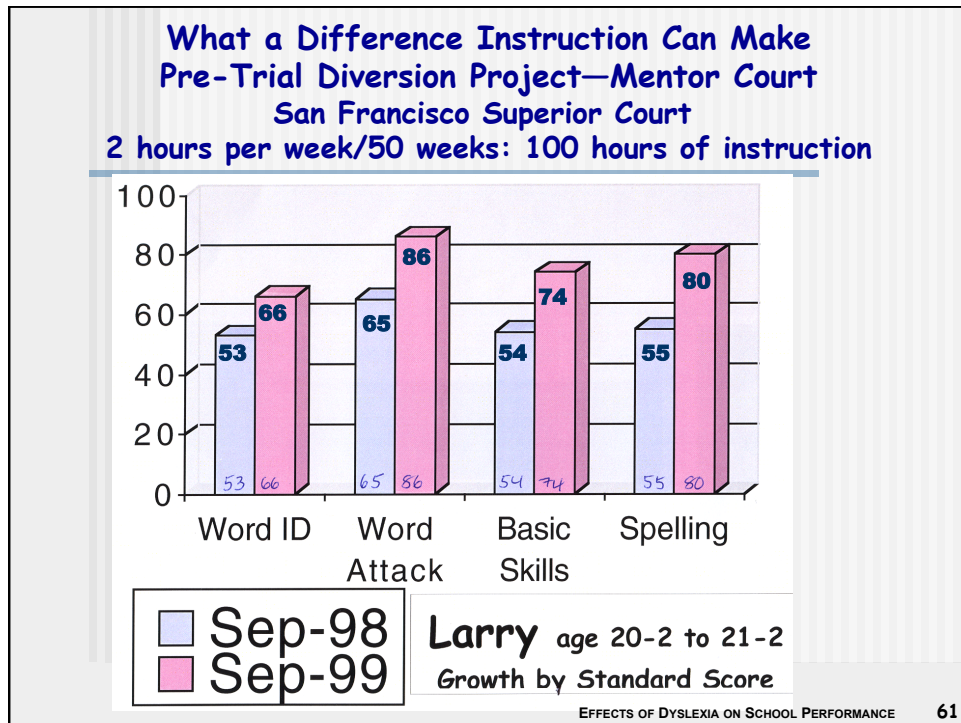
"As I write my mind is not preoccupied with how my fingers form the letters; my attention is fixed simply on the thought the words express. But there was a time when the formation of the letters, as each one was written, would have occupied my whole attention."

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Anita Archer...

DRILL → SKILL → THRILL

EFFECTS OF DYSLEXIA ON SCHOOL PERFORMANCE 60



Perspective on Sustained Effort **-Carlos Castaneda-**

- "We either make ourselves miserable, or we make ourselves strong. The amount of work is the same."

Stress Points→→→→Transitions

Adapted from Jane Holmes Bernstein, Ph.D.

- Kindergarten→learning to learn
- Grade 1→learning to read (decoding)
- Grade 4→learning to read to learn
- Jr. High/Middle School→learning to organize learning
- High School→learning to organize and learn on your own
- College→learning to learn on your own

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Prognosis for Success...

Dyslexic students are born with their developmental difficulties. Emotional, behavioral, and social issues can be secondary to the frustrations and feelings of inadequacy that follow their attempts to perform satisfactorily. Progress in learning to cope with their difficulties leading toward satisfactory achievement in areas dependent upon language is determined by several factors:

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Factors That Affect Prognosis

- ❑ Severity or degree of the disability
- ❑ Innate intelligence
- ❑ Inner drive
- ❑ Background of educational values
- ❑ Duration and intensity of effective remediation received
- ❑ Time at which remediation begins (the more delayed the beginning, the more difficult it is to give adequate help in a classroom situation)
-Beth H. Slingerland 1960
- ❑ Degree of understanding student has of his/her own individual pattern of learning strengths and weaknesses
- ❑ Ability of the student to self-advocate
-Nancy Cushen White 1993

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Knowledge of Language Structure

-Louisa Cook Moats-

Knowledge of language is as essential for teachers of students with dyslexia as knowledge of anatomy is for a physician.

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Know Your Stuff!

- Know your stuff.
- Know whom you're stuffing.
- Stuff every minute of every lesson.

-coined by a Florida teacher quoted by Dr. Joseph Torgesen-

Resources for Additional Information

- International Dyslexia Association (IDA)
www.interdys.org
- National Center for Learning Disabilities (NCLD)
www.nclld.org
- National Joint Committee on Learning Disabilities (NJCL)
www.ldonline.org/about/partners/njclld
- Slingerland Institute for Literacy
www.slingerland.org
- International Multisensory Structured Language Educational Council (IMSLEC)
www.imslec.org