

Dyslexia: Reading Between the Lines

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What Is Reading?

- Humans are “hard wired” for verbal language.
- Spoken language is a generally continuous auditory stream.
- Written language is an abstracted, non-continuous code that uses symbols to represent the sounds of spoken language.
- To be able to read, one has to understand how the written code represents spoken language.

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How Many Codes?

This is how I write using cursive handwriting

And this is how I write when I don't use cursive handwriting.

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How Does Reading Work?

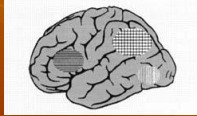
- Reading has two main components: decoding and comprehension.
- **Decoding:** readers must learn that the sounds of the words they hear can be broken down into basic elements (phonemes), and that these sounds can be represented by symbols (letters) and combined to form words. These abilities are called phonological (or phonemic) awareness and phonetic and orthographic decoding.
- **Comprehension:** once the word is identified, its meaning must be accessed and retrieved.

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Neural Systems Involved In Reading

- Anterior system in the left inferior frontal region
- Dorsal parietotemporal system involving the angular gyrus, supramarginal gyrus, and posterior portions of the superior temporal gyrus
- Ventral occipitotemporal system involving portions of the middle temporal gyrus and middle occipital gyrus



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What Is Dyslexia?

(N.J.A.C. 6A:14-1.3) 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. 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. Secondary consequences may include problems in reading comprehension and reduced reading experience that can impede the growth of vocabulary and background knowledge.

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Common Misconceptions About Dyslexia

- Dyslexia is a visual problem.
- Dyslexia is a developmental lag that most individuals outgrow.
- Dyslexia can be “fixed” through special education or intensive remediation.
- Dyslexia is much more common in males.
- Dyslexia does not really exist.

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How Common Is Dyslexia?

- Dyslexia affects 5-17% of school-aged children in the United States; similar figures have been reported in many other countries.
- Dyslexia is the most common of all learning disabilities (approximately 80%); many other learning difficulties, such as in math handwritten language, are often manifestations of a reading disability.

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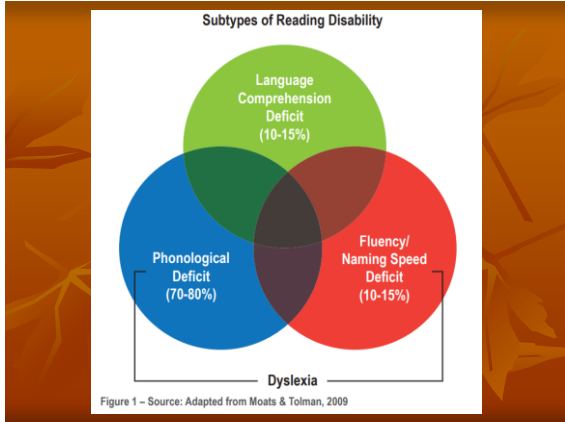
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What Causes Dyslexia?

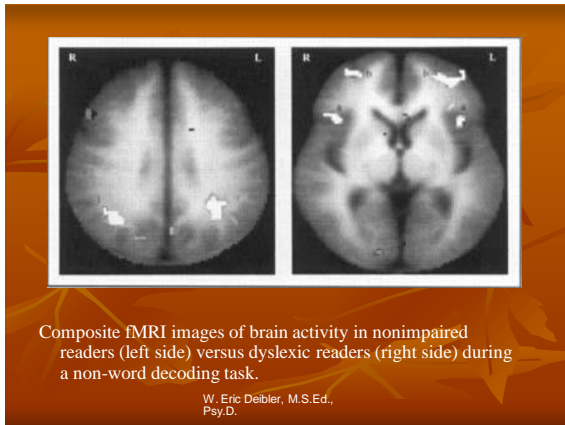
- The exact causation is unclear, but there is much evidence that dyslexia is both familial and heritable.
- 23-65% of children with dyslexic parents may also have dyslexia.
- 40% of siblings of dyslexics may also have the disorder.
- Chromosomes 6, 15, and 2 have been implicated in dyslexia.

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How Are Deficits In Phonological Awareness Demonstrated?

- Difficulties identifying phonemes in speech (strongest indicator for young children)
- Marked difficulty in decoding non-words (greatest indicator overall)
- Unusually slow reading rate
- Unusually high numbers of errors while reading (dysfluency), especially orally
- Considerable difficulty with spelling

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Demonstration #1

Please read the following passage aloud at a comfortable pace.

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Demonstration #1

The ancient Egyptians built pyramids as tombs for their pharaohs. They believed that the pyramids would protect them in the afterlife. This text has 38 words and uses vocabulary and concepts that are appropriate for sixth grade level.

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Demonstration #2

Please read the following passage aloud at a comfortable pace.

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Demonstration #1

INGREDIENTS/INGRÉDIENTS: WATER/EAU, SODIUM LAURYL SULFATE, SODIUM LAURETH SULFATE, COCAMIDOPROPYL BETAINE, GLYCOL DISTEARATE, DIMETHICONE, SODIUM CITRATE, COCAMIDE MEA, SODIUM XYLENESULFONATE, FRAGRANCE/ PARFUM, CITRIC ACID, SODIUM BENZOATE, POLYQUATERNIUM-76, SODIUM CHLORIDE, TETRASODIUM EDTA, PANTHENOL, PANTHENYL ETHYL ETHER, METHYLCHLOROISOTHIAZOLINONE, METHYLISOTHIAZOLINONE.

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Dyslexia In Adults

- With practice, many adults with dyslexia can become proficient with a finite number of frequently-encountered words (such as those encountered in work-related documents).
- Phonological deficits and slow reading rates continue to be evidenced in adults with dyslexia, particularly with unfamiliar words; in such instances, reading continues to be dysfluent.

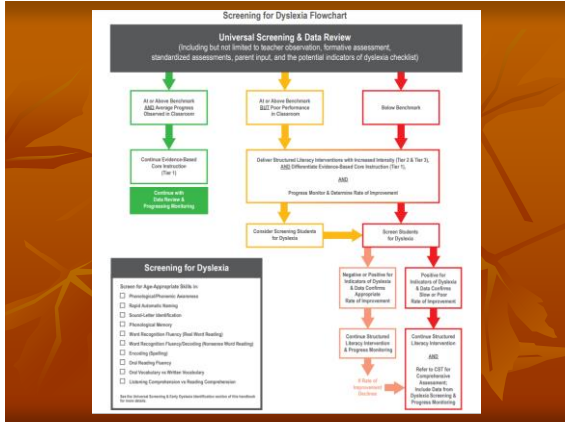
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How Do We Address Dyslexia?

- . Your first and best resource is usually the public school system
- . Evidence-based instructional methods are the ONLY way to go
- . Disorder vs. disability
- . Intervention should be as early as possible, and as intense as is appropriate
- . “Alternative” treatments all have one thing in common: they don’t work

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Assessment Of Dyslexia And Other Learning Disabilities

Approaches and Considerations

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- ### Specific Learning Disability As Defined In The IDEA
- Disorder in one or more of the basic psychological processes in understanding or using spoken or written language
 - Manifests as imperfect inability to listen, think, speak, read, write or spell or do mathematical calculations
 - Includes perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia
 - Severe discrepancy between achievement and intellectual ability in one or more major area of academic functioning
 - Learning problems are not primarily due to visual, hearing, or motor disabilities, general cognitive deficits, emotional disturbance, or environmental, cultural, or economic disadvantage
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Purposes Of Learning Disabilities Assessment

- Obtaining an estimate of general intelligence
- Determining areas of impaired functioning
- Determining deficits in basic psychological processes
- Finding areas of strength
- Providing possible explanations for poor achievement
- Determining possible interventions

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Problems With The IDEA Definition

- “Severe ability-achievement” discrepancy is not defined
- Requirements for documenting the existence of said discrepancy are not specified
- “Disorder in one or more...basic psychological processes” is vague and clinically tenuous

Nonetheless, schools are bound by the requirements of the law in determining eligibility for special education services. Overall, best practice suggests that clinical and psychoeducational factors must be considered in diagnosing learning disabilities.

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Defining A Severe Discrepancy

- This is the primary classification problem in determining learning disabilities; different schools and clinicians use different methods
- Some methods classify students as learning disabled when they demonstrate notably low achievement, regardless of level of intelligence, or if they show a significant verbal/performance split on an IQ test. *These methods are never appropriate by themselves and can easily result in overidentification of students with learning disabilities*

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Deviation From Age Or Grade Level

- These models define underachievement as a discrepancy between the student's grade equivalency score on an achievement test and their actual grade placement
- The constant deviation criterion method does not take into account that the same discrepancy means different things at different grade levels
- Graduated deviation criterion methods are inappropriate because the grade equivalent scores used in the procedures have few acceptable psychometric properties

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Expectancy Formulas

- These methods use formulas to determine an expected grade equivalent as a means of comparison against an actual grade equivalent score from an achievement test
- These formulas are based on a student's mental age (MA) and chronological age (CA)
- Example: expected grade equivalent = $\frac{2MA + CA}{3} - 5$
- The "MA" concept has serious limitations
- These formulas have limited empirical and theoretical support

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Difference Between Standard Scores

- A commonly used approach is to compare standard scores on two different tests (usually achievement and cognitive instruments)
- A set criterion is selected, such as a difference of 1SD between scores on the instruments
- This method does not take into account regression of IQ on achievement
- This method requires that the two instruments be based on the same standard score distribution; otherwise, one or both scores must be transformed

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Regression Equations

- These methods use regression equations to account for regression-to-the-mean effects on two measures that are not perfectly correlated
- Regression equations require solid knowledge of the correlation between the two tests being used

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Sattler: Comments On Discrepancy Formulas

- Clinicians using the same discrepancy formulas, but different tests, are likely to arrive at different classifications
- Using discrepancy formulas without regard to the absolute level of the child's performance may result in serious misinterpretations and misclassifications

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Sattler: Comments On Discrepancy Formulas, Continued

- Discrepancy formulas are based on the assumption that the tests used to evaluate a child's intelligence and achievement measure independent constructs, when actually reading and intelligence tests to some extent measure the same constructs (e.g. vocabulary, comprehension, factual information)
- Discrepancy formulas may prevent some lower SES students from receiving services when they exhibit the same reading problems as students from higher socioeconomic backgrounds

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Sattler: Comments On Discrepancy Formulas, Continued

- Discrepancy formulas fail to identify those children with learning disabilities who show no discrepancy between achievement and intelligence test scores
- The discrepancy formula approach to classification lacks validity on both theoretical and empirical grounds
- The discrepancy formula approach prevents children from receiving services during their early school years

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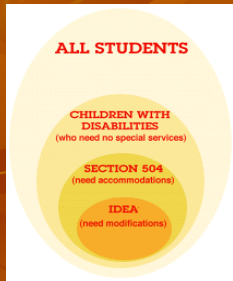
Utility Of Discrepancy Formulas

- They rely on reliable and valid assessment instruments
- They allow for the provision of services even though the specific causes of learning disability are not known
- They provide a focus on academic achievement in assessment
- They provide a consistent, objective, and accountable identification procedure

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Who Needs Special Education?



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