Unraveling the Puzzle of Dyslexia

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Middle Tennessee State University

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Individuals with dyslexia struggle to read words accurately and efficiently and show a slow response to instruction, in spite of receiving the same reading instruction as their peers.
Poor Readers

Strong Readers

Individuals with dyslexia fall towards the lower end of a continuum of reading achievement
DYSLEXIA DEFINED

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 growth of vocabulary and background knowledge.

International Dyslexia Association (2002)
ORAL COMPREHENSION

VOCABULARY

ABILITY TO RECOGNIZE TEXT SIGHT WORD

DECODING

WORD RECOGNITION

READING FLUENCY

READING COMPREHENSION

SYNTACTIC STRUCTURE

MORPHOLOGY

VOCABULARY

BACKGROUND KNOWLEDGE

LETTER KNOWLEDGE

PHONOLOGICAL AWARENESS

SIGHT WORD

RAPID NAMING

ACCURATE

AUTOMATIC
“difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities”
“difficulties typically result from a deficit in the phonological component of language”

Deficits linked to Dyslexia identified in the definition
“Secondary consequences may include problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge.”

Secondary Consequences that can stem from the primary deficits
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 growth of vocabulary and background knowledge.
<table>
<thead>
<tr>
<th>BASIC IDEA</th>
<th>ABILITY ACHIEVEMENT</th>
<th>INTRA INDIVIDUAL DIFFERENCES</th>
<th>RESPONSE TO INSTRUCTION &amp; INTERVENTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>BASIC IDEA</td>
<td>Unexpected Underachievement</td>
<td></td>
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<tr>
<td>DECISION PROCESS</td>
<td>Comparison of Two Test Scores</td>
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<tr>
<td>TIME FRAME</td>
<td>Fixed Point in Time</td>
<td></td>
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</tr>
<tr>
<td>KEY DATA</td>
<td>IQ score and achievement score</td>
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</tbody>
</table>
How much of a discrepancy is enough?

How is this determined?

What if a child scores low average on a measure of ability (e.g., IQ)?
SUGGESTED READINGS


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<tr>
<td>Unexpected Underachievement</td>
<td>Deficient psychological processing</td>
<td></td>
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<tr>
<td>Comparison of Two Test Scores</td>
<td>Profile Analysis of Test Scores</td>
<td></td>
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<tr>
<td>Fixed Point in Time</td>
<td>Fixed Point in Time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IQ score and achievement score</td>
<td>Cognitive abilities / processes and achievement scores</td>
<td></td>
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</tbody>
</table>
Phonological processing skills deficits are not necessary nor sufficient to identify dyslexia. Nor do they distinguish individuals with dyslexia from garden variety poor readers.
There is not a single cognitive profile of strengths and weaknesses that distinguishes a dyslexic from a garden variety poor reader.
There are not differences in treatment response based on cognitive profiles of strengths and weaknesses.
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 growth of vocabulary and background knowledge.
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<tr>
<td></td>
<td>Unexpected Underachievement</td>
<td>Deficient psychological processing</td>
<td>Prevention / early intervention</td>
</tr>
<tr>
<td>DECISION PROCESS</td>
<td>Comparison of Two Test Scores</td>
<td>Profile Analysis of Test Scores</td>
<td>Underachievement and Lack of Response</td>
</tr>
<tr>
<td>TIME FRAME</td>
<td>Fixed Point in Time</td>
<td>Fixed Point in Time</td>
<td>Multiple time points</td>
</tr>
<tr>
<td>KEY DATA</td>
<td>IQ score and achievement score</td>
<td>Cognitive abilities / processes and achievement scores</td>
<td>Benchmark testing Progress Monitoring</td>
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<tr>
<td>Language Construct</td>
<td>Tier 1</td>
<td>Tier 2</td>
<td>Tier 3</td>
</tr>
<tr>
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<td></td>
<td>M (SD)</td>
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<td>M (SD)</td>
</tr>
<tr>
<td>Pseudoword Decoding WIAT-III</td>
<td>79.83 (12.90)</td>
<td>81.00 (8.62)</td>
<td>79.43 (15.50)</td>
</tr>
<tr>
<td>Phonemic Decoding Efficiency TOWRE-2</td>
<td>75.84 (12.29)</td>
<td>71.00 (5.80)</td>
<td>71.40 (10.41)</td>
</tr>
<tr>
<td>Word Reading WIAT-III</td>
<td>80.40 (13.93)</td>
<td>77.63 (10.89)</td>
<td>75.43 (15.05)</td>
</tr>
<tr>
<td>Sight Word Efficiency TOWRE-2</td>
<td>77.51 (12.19)</td>
<td>74.57 (13.15)</td>
<td>73.93 (11.79)</td>
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<tr>
<td>Oral Reading Fluency WIAT-III</td>
<td>82.30 (15.17)</td>
<td>77.71 (14.09)</td>
<td>75.15 (12.31)</td>
</tr>
<tr>
<td>Reading Comprehension WIAT-III</td>
<td>83.55 (12.05)</td>
<td>80.71 (11.56)</td>
<td>78.38 (13.09)</td>
</tr>
<tr>
<td>Receptive Vocabulary WIAT-III</td>
<td>101.49 (13.61)</td>
<td>106.00 (11.90)</td>
<td>96.57 (14.45)</td>
</tr>
<tr>
<td>Phonological Awareness CTOPP-2</td>
<td>86.49 (15.62)</td>
<td>81.40 (13.74)</td>
<td>90.25 (16.26)</td>
</tr>
</tbody>
</table>
Common practices across the country specify the RTI process using curriculum-based assessments and rate of responding to instruction / intervention, and the use of norm referenced measures of areas of achievement obtained at a single timepoint to be separate means of determining LD eligibility.

**Hybrid Approaches to the identification of specific learning disabilities (including dyslexia) have been proposed that blend these two approaches**

**SUGGESTED READINGS**


MULTI FACTOR CONDITION

BEHAVIORAL / PSYCHSOCIAL
- Motivation
- Self Efficacy
- Student Engagement

NEUROBIOLOGICAL
- Genetics
- Brain Regions
- Brain Communication

ENVIRONMENTAL
- Home Environment
- Classroom Instruction

LANGUAGE
- Phonological Awareness
- Rapid Naming
- Vocabulary
- Background Knowledge

Dyslexia is neurobiological in origin, and it is characterized by deficits in accurate and efficient word recognition and by poor spelling and decoding abilities. These difficulties are unexpected in relation to the provision of effective classroom instruction and are marked by a slow response to instruction. The behavioral characteristics of dyslexia fall along a continuum of severity from mild to severe and are associated with deficits in multiple factors. No single factor indicates the presence or absence of dyslexia. The primary means by which to identify dyslexia is by screening for multiple factors associated with it and documenting the behavioral characteristics of dyslexia.
BEHAVIORAL CHARACTERISTICS OF DYSLEXIA IN THE ENGLISH ORTHOGRAPHY

• *Deficits in Accurate and Efficient Word Recognition*
• *Deficits in Spelling*
• *Slow Response to Instruction*
TIER 1 READING INSTRUCTION

Direct Instruction → Modeling → Practice → Immediate Corrective Feedback

Reading Comprehension
- Listening Comprehension
- Comprehension Strategies
- Text Structure
- Morphology
- Vocabulary
- Background Knowledge

Fluency
- Word and Connected Text Reading (Instructional Level)
- Application of Word Recognition Skills
- Practice to Support Automatic and Prosodic Reading
- Syllabication
- Decoding
- Encoding
- Sight Words

Word Study
- Phonological Awareness
- Letter Knowledge
- Letter-Sound correspondence
- Syllables

Writing
- Letter Formation
- Handwriting Instruction
- Sentence Structure
- Paragraph Structure
- Text Structure
- Syntax
INTENSIVE INTERVENTION

**WORD READING**
- Letter Knowledge (Accuracy & Automaticity)
- Phonemic Awareness
- Phonics / Decoding (Accuracy & Automaticity)
- High Frequency Words (Accuracy & Automaticity)
- Repeated Accurate Practice (Automaticity)
  - Nonsense & Real Words
  - Phrases, Sentences, Passages

**SPELLING**
- Sound – Symbol (Automaticity)
- Word Spelling (Accuracy)
- Sentence Dictation (Accuracy)

**COMPREHENSION**
- Reading Comprehension
  - Text Reading (at reading level)
  - Vocabulary
  - Comprehension Monitoring
  - Inference Making
  - Text Components
- Listening Comprehension
  - Text (above reading level)
  - Vocabulary
  - Comprehension Monitoring
  - Inference Making
  - Text Components

_Morphology_

**Small group instruction, 4 days per week, 1.5 hours per session**
## Curriculum Overview

<table>
<thead>
<tr>
<th>Books</th>
<th>Year 1</th>
<th>Year 2</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
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<td>6</td>
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<td>7</td>
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### Phonemic Awareness
- Phonics
  - Grapheme-Phoneme Accuracy
  - Word Reading Accuracy

### Phonics
- Grapheme-Phoneme Accuracy
- Word Reading Accuracy

### Phonics
- Morphology
  - Anglo-Saxon
  - Latin
  - Greek

### Fluency
- Rate
- Prosody

### Vocabulary

### Comprehension
- Narrative
- Expository
Today;
Yesterday;
Previous Instant words

The

The

Sh

The

Sh

shock

of

the
crash

sho

k

him.

The

shot

rang

in

the

door.

Shut

the

hood

of

the

truck.
Next New Learning Lesson

Alphabet
Reading Deck
Discovery New Learning
L-1  L-2
L-3  L-4
Code and Read
Instant Words
Code and Read Sentences
Repeated Accurate Practice
Spelling Deck
Phonemic Awareness
Spelling Practice
Dictation
Review
Comprehension Skills
Next Lesson
Digraph sh