DYSLEXIA

Timothy N. Odegard, PhD, CALP
Professor of Psychology
Chairholder, Murfrees Chair of Excellence in Dyslexic Studies
Middle Tennessee State University
Leadership U | Summer 2017

What is dyslexia?

Dyslexia is a specific learning disability that is neurological in origin. It is characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction. Secondary consequences may include problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge.

International Dyslexia Association definition and the definition adopted in Tennessee HB 1755 / SB 2002

Influences on Reading Achievement


READING ACHIEVEMENT

Poor Readers

Strong Readers

Individuals with dyslexia fall along the lower portion of this continuum.
 Individuals with dyslexia struggle to read words accurately and/or efficiently in spite of receiving the same reading instruction as their peers who acquire the ability to read words.

**What causes dyslexia?**

- **Phonological-Core Variable-Difference Model** (Stanovich, 1988)
- **Multiple Deficit Model** (Pennington, 2006)

- **Does Brain Imaging Differentiate Treatment Responders and Non-responders?**
  - /p/
  - /b/

- **Can Brain Imaging Differentiate Treatment Responders and Non-responders?**
  - /tone/
  - +


Early Warning Signs / Risk Factors

Preschool - Kindergarten

- Delay in talking; articulation problems
- Difficulty recognizing and producing rhymes
- Difficulty matching words by initial sound
- Difficulty remembering directions
- Family History of Reading Problems

CHARACTERISTICS OF DYSLEXIA

Grade 1 - 3

- Confusion of letters whose sounds are similar (d/t, b/p, f/v)
- Problems segmenting words into individual sounds and blending sounds to form words
- Difficulty learning sound/symbol correspondences
- Reading and spelling errors that involve difficulties with sequencing and monitoring additions (slip/sip), substitutions (rip/rib) and transpositions (stop/pots)
- Difficulty remembering spelling words over time and applying spelling rules when writing
CHARACTERISTICS OF DYSLEXIA

Grades 4 - 8

- Significant difficulty reading and spelling multisyllabic words
- Frequent misreading of common sight words (e.g., where, there, what, then, when)
- Lack of awareness of word structure (prefixes, roots, suffixes)
- Difficulty with reading comprehension and learning new information from text because of underlying word recognition difficulties
- Significant difficulty in writing related to problems in spelling and organization

CHARACTERISTICS OF DYSLEXIA

High School

- Slow rate of reading
- Continued difficulty with word recognition that significantly affects acquisition of knowledge and ability to analyze written material
- Continued difficulty with spelling and written composition
- Trouble learning a foreign language

Definition of Dyslexia

- Dyslexia is defined as
  - A condition that is characterized by difficulty with accurate and/or fluent word recognition and by poor spelling and decoding abilities,
  - which characteristics typically result from a deficit in one or more processes related to the phonological component of language,
  - that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction
  - that may result in problems in reading comprehension and reduced experience that may impede the growth of vocabulary and background knowledge.

International Dyslexia Association definition and the definition adopted in Tennessee HB 1735 / SB 2002

Dyslexia

- a condition that is characterized by difficulty with accurate and/or fluent word recognition and by poor spelling and decoding abilities
DYSLEXIA

• A condition that is characterized by difficulty with accurate and/or fluent word recognition and by poor spelling and decoding abilities
• characteristics typically result from a deficit in one or more processes related to the phonological component of language

International Dyslexia Association definition and the definition adopted in Tennessee HB 1735 / SB 2002

DYSLEXIA

• A condition that is characterized by difficulty with accurate and/or fluent word recognition and by poor spelling and decoding abilities
• characteristics typically result from a deficit in one or more processes related to the phonological component of language
• often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction

International Dyslexia Association definition and the definition adopted in Tennessee HB 1735 / SB 2002

What does it look like when word reading deficits prevent a student from comprehending written language?
What do characteristics of dyslexia look like in the classroom?

Case Study JW

- JW met major developmental milestones for motor, social, and oral language development.
- JW’s parents report a family history of a reading disorder (specifically in word reading accuracy).

Case Study

- JW’s parents read to him nightly
- Both parents work with him on homework nightly
- Both parents volunteer in JW’s class
- Both parents provide an enriched language environment
- JW is exposed to enrichment activities to support his development

FAMILY HISTORY

HOME ENVIRONMENT
Case Study JW

Kindergarten

- Whole word instruction in sight words and high frequency words
- Leveled Readers
- Academic language instruction
- Memorized words for spelling tests
- No phonics instruction
- No formal letter formation (handwriting instruction)

EDUCATIONAL HISTORY

Student in K – 3 are learning to read and developing knowledge about language to serve as a solid foundation for academic success

Academic Language Skills

Directly Teach Academic Vocabulary
Teach vocabulary when students listen to and read text – use targeted vocabulary words in other contexts to reinforce learning.

Directly Teach Grammatical Structure
Teach the parts of sentences.

Inferential Processing
Engage students in oral comprehension and reading comprehension activities that have them predict, problem-solve, hypothesize or contrast. Have students link information to their background knowledge.

Use various sources of student data to identify deficits in academic language skills. When assessing reading comprehension, use various sources of information to rule out word reading skills deficits. Address areas of weaknesses in Tier 2 and 3.

Reading Fluency

Oral and Silent Reading Fluency of Connected Text
Provide daily opportunities for students to read connected text with scaffolded support. Model the application of word reading skills when reading connected text. Support the acquisition of academic vocabulary during oral reading.

Oral Reading
Oral reading with teacher support – choral reading, echo reading, simultaneous reading

Repeated Reading
A student reads the same text multiple times with supervision to support mastery

Wide Reading
A student reads many different texts – teachers support accurate reading and scaffolds the application of decoding skills to read decodable skills

Comprehension Monitoring
When students are reading connected text use this opportunity to ask questions to support comprehension monitoring

Use various sources of student data to identify deficits in reading fluency and use various sources of information to rule out word reading skills deficits. Address areas of weaknesses in Tier 2 and 3.

Word Reading

Directly teach skills that support word recognition and provide opportunities for students to read words in isolation, in phrases and in sentences to support mastery

Directly Teach Phonological Awareness
Words, syllables, phonemes

Directly Teach Letter Knowledge
Letter formations, letter-sound correspondence

Directly Teach Sound Symbol Correspondence
Letters, graphemes – digraphs, trigraphs

Directly Teach Word Parts and Patterns
Morphology – base words, prefixes, suffixes, high frequency word parts

Directly Teach High Frequency Words & Irregular Words
Whole word instruction

Directly Teach Spelling Patterns
Write and recognize words

Use various sources of student data to identify skills deficits and provide more intensive direct instruction for the areas of weaknesses within Tier 2 and 3.

Case Study JW

First Grade

- Whole word instruction in sight words and high frequency words
- Phonics instruction
- Leveled Readers
- Academic language instruction
- No structured spelling instruction
- No formal letter formation (handwriting instruction)

EDUCATIONAL HISTORY

Student in K – 3 are learning to read and developing knowledge about language to serve as a solid foundation for academic success

First Grade

- Whole word instruction in sight words and high frequency words
- Phonics instruction
- Leveled Readers
- Academic language instruction
- No structured spelling instruction
- No formal letter formation (handwriting instruction)
Item level error analysis helps to identify the specific subskills that are deficient in a student.

The student accuracy is at frustration level for both passages. The student correctly answered comprehension questions about both passages.
Evaluators should link item level information back to the core reading program to differentiate instruction within the core and to monitor response to core instruction.
### 1st Grade High Frequency Words Sequence

<table>
<thead>
<tr>
<th>First 9 Weeks</th>
<th>Second 9 Weeks</th>
<th>Third 9 Weeks</th>
<th>Fourth 9 Weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>19</td>
<td>28</td>
</tr>
<tr>
<td>2</td>
<td>11</td>
<td>20</td>
<td>29</td>
</tr>
<tr>
<td>3</td>
<td>12</td>
<td>21</td>
<td>30</td>
</tr>
<tr>
<td>4</td>
<td>13</td>
<td>22</td>
<td>31</td>
</tr>
<tr>
<td>5</td>
<td>14</td>
<td>23</td>
<td>32</td>
</tr>
<tr>
<td>6</td>
<td>15</td>
<td>24</td>
<td>33</td>
</tr>
<tr>
<td>7</td>
<td>16</td>
<td>25</td>
<td>34</td>
</tr>
<tr>
<td>8</td>
<td>17</td>
<td>26</td>
<td>35</td>
</tr>
<tr>
<td>9</td>
<td>18</td>
<td>27</td>
<td>36</td>
</tr>
</tbody>
</table>

### Case Study JW

**ERROR**

**PATTERN**

**WEEK TAUGHT IN CORE**

The passage was read during week 22 first grade.
<table>
<thead>
<tr>
<th>ERROR</th>
<th>PATTERN</th>
<th>WEEK TAUGHT IN CORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>high frequency word</td>
<td>kindergarten (4th Fry word)</td>
</tr>
<tr>
<td>that</td>
<td>high frequency word</td>
<td>kindergarten (9th Fry word)</td>
</tr>
<tr>
<td>what</td>
<td>high frequency word</td>
<td>kindergarten (33rd Fry word); week 1</td>
</tr>
<tr>
<td>from</td>
<td>High frequency word</td>
<td>kindergarten (25th Fry word); week 15</td>
</tr>
<tr>
<td>hang - hug</td>
<td>closed syllable a</td>
<td>1st grade week 1</td>
</tr>
<tr>
<td>crack - crunch</td>
<td>closed syllable a</td>
<td>1st grade week 1</td>
</tr>
<tr>
<td>shells - see</td>
<td>closed syllable e</td>
<td>1st grade week 7</td>
</tr>
<tr>
<td>shells - see</td>
<td>/sh/</td>
<td>1st grade week 10</td>
</tr>
</tbody>
</table>
### Case Study JW

<table>
<thead>
<tr>
<th>ERROR</th>
<th>PATTERN</th>
<th>WEEK TAUGHT IN CORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>High frequency word kindergarten (4th Fry word)</td>
<td></td>
</tr>
<tr>
<td>that</td>
<td>High frequency word kindergarten (9th Fry word)</td>
<td></td>
</tr>
<tr>
<td>what</td>
<td>High frequency word kindergarten (33rd Fry word); week 1</td>
<td></td>
</tr>
<tr>
<td>from</td>
<td>High frequency word kindergarten (25th Fry word); week 15</td>
<td></td>
</tr>
<tr>
<td>hang - hug</td>
<td>Closed syllable a</td>
<td>1st grade week 1</td>
</tr>
<tr>
<td>crack - crunch</td>
<td>Closed syllable a</td>
<td>1st grade week 1</td>
</tr>
<tr>
<td>shells - see</td>
<td>Closed syllable e</td>
<td>1st grade week 7</td>
</tr>
<tr>
<td>shells - see</td>
<td>/sh/</td>
<td>1st grade week 10</td>
</tr>
<tr>
<td>mate - mountain</td>
<td>a-e</td>
<td>1st grade week 13</td>
</tr>
</tbody>
</table>

When concerns arise it can be useful to use a tool to organize various sources of student data.
Questions

- How did we know the student was struggling?
- What information did we use to identify the student's deficits?
- How did we look at the student's information?
- How did we link the student's data / information back to instruction?
What do we know about school based identification and delivery of services to students who struggle to read?

**Connecticut Longitudinal Study**

**WHAT WE LEARNED**

1) Reading Deficits Persist without Intervention
   - Students did not outgrow their reading deficits. 20% had reading deficits in the 9th grade.
2) Lack of School Based Services
   - Only 1/3 of the struggling readers were receiving instructional services to address their reading deficits in the 9th grade.

**Influences on Reading Achievement**

Will RTI catch and remediate the reading deficits of all kids in the early grades (K – 3)?

**Connecticut Longitudinal Study**

Tracked 445 children entering kindergarten


RTI is intended to create a safety net that catches children who are at risk of academic failure.


**Influences on Reading Achievement**

- **Behavioral / Psychosocial**
  - Motivation
  - Self Efficacy
  - Student Engagement

- **Environmental**
  - Home Environment
  - Classroom Instruction

- **Neurobiological**
  - Genetics
  - Brain Regions
  - Brain Communication

- **Cognitive**
  - Phonological Awareness
  - Rapid Naming
  - Vocabulary
  - Working Memory

WHAT WE HAVE LEARNED ABOUT RTI?

1) Structured, direct, systematic reading instruction provided as part of RTI (K – 3) positively impacts the reading outcomes of struggling readers
   - Tier 2
   - Tier 3

2) Persistent Poor Responders

3) Sustained Intensive Intervention
   - Students who struggle to make gains within RTI require sustained, intensive intervention

4) Schools Struggle to Implement RTI
   - When RTI is implemented at scale by school personnel, students do not benefit from more intensive instruction.
Will RTI catch and remediate the reading deficits of all kids in the early grades (K – 3)?

Late Emerging Poor Readers

WHAT WE LEARNED

1) We Can’t Stop Looking After 3rd Grade
   - Some students with word reading issues will not struggle with reading until after 3rd grade.
2) Multiple Types of Poor Readers
   - Not all poor readers have word reading deficits.
3) Word Reading Deficits can Surface Late
   - 48% of late emerging poor readers had word reading deficits.

Guiding Questions

- What is the earliest age that we should be looking for characteristics of dyslexia?
- How do you determine, identify, and screen for characteristics of dyslexia?
- How do you know for sure? Is there a specific test that identifies dyslexia in a child?

Dyslexia Assessment in Tennessee

<table>
<thead>
<tr>
<th>Purpose of evaluation</th>
<th>School Setting</th>
<th>Private &amp; Clinical settings</th>
<th>MTSU Center for Dyslexia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criteria</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaluator</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terms used</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Dyslexia Assessment in Tennessee

<table>
<thead>
<tr>
<th>School setting</th>
<th>Private &amp; clinical settings</th>
<th>MTSU Center for Dyslexia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefits</td>
<td>Assessment team very familiar with student and history of reading progress; respond to instructional needs; recommend and implement school services and accommodations</td>
<td>A formal diagnostic statement can support access to accommodations on SAT/ACT tests and within college/university classes</td>
</tr>
<tr>
<td>Challenges</td>
<td>The term dyslexia is not always specified (however, Specific Learning Disability in Basic Reading or Reading Fluency is consistent with characteristics of dyslexia)</td>
<td>Evaluation criteria is different from the educational setting; schools still need to consider its impact on educational performance in order to consider services and accommodations</td>
</tr>
</tbody>
</table>

What is the cause of deficits in accurate and/or efficient word reading exhibited by a student who makes very modest response to direct, intensive, systematic reading instruction provided in Tier 1 and Tier 2 when you confirm the following:

- Instruction has been provided over a sustained period of time
- The student has a supportive home environment
- The student attends school and strives to learn the material
- The student does not have TBI or a complicating developmental disability

Dyslexia-Specific Intervention

Dyslexia-specific intervention means evidence-based, specialized reading, writing, and spelling instruction that is multisensory in nature, equipping students to simultaneously use multiple senses, such as vision, hearing, touch, and movement. Dyslexia-specific intervention employs direct instruction of systematic and cumulative content, with the sequence beginning with the easiest and most basic elements and progress methodically to more difficult material. Each step must also be based on those already learned. Components of dyslexia-specific intervention include instruction targeting phonological awareness, sound symbol association, syllable structure, morphology, syntax, and semantics.

Common Features of Effective Interventions for individuals with dyslexia

Direct
- Concepts are taught explicitly
- Leter Knowledge, Phonological Awareness, Decoding, and Spelling are integrated
- Morphology instruction is incorporated into word reading and spelling
- High frequency words are taught
- Word learning informs fluency and comprehension instruction
- Vocabulary instruction is integrated into comprehension work

Integrated
- Built around the structure of the English language and introduces concepts following a defined scope and sequence

Cumulative
- New concepts are introduced and integrated with previously taught concepts throughout the program
Components of Dyslexia-Specific 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 Interpretation
- Word Spelling (Accuracy)
- Sentence Dictation (Accuracy)
- Morphology

**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

Key Ingredient: Intensity

- Small group instruction
- Guided by rate of progress
- Greater chance of closing the grade gap with their peers in reading accuracy and comprehension than in large groups
- Engage in highly structured, sequential activities with close monitoring
- Form direct connections between what is known and what is new
- Time for explicit practice to build automaticity and fluency

Dyslexia-Specific Intervention

**DYSLEXIA**
Dyslexia is a brain-based type of learning disability that specifically impairs a person’s ability to read.

**INTERVENTION**
- Direct Instruction
- Phonemic Awareness
- Sight Words
- Spelling
- Fluency
- Vocabulary
- Reading Comprehension

**IMPACT OF CHILD**
- Improved – Phonological Decoding
- Improved – Word Reading
- Improved – Reading Fluency
- Improved – Spelling
- Improved – Reading Comprehension

As children get older, the intensity of the intervention must increase exponentially to get the same improvement as younger children.

TAKEAWAY POINTS

- Dyslexia is a specific learning disability that impacts basic reading and or reading fluency (spelling and writing).
- Accurate and / or efficient word reading is the central characteristic of dyslexia in school age children.
- There are risk factors that can help to identify if a young child is at risk of having dyslexia.

- What does dyslexia relate to RTI and the terms used in TN schools?
- What are the characteristics of individuals with dyslexia in middle & high school?
- What are the risk factors of dyslexia in young children?
- Do all children in pre-k or kindergarten, who present with risk factors, have dyslexia?