Outline

I. Approach to Reading Difficulties
II. Evidence of Reading Interventions
III. Controversial Treatments

Approach to Reading Difficulties

Specific Learning Disorder

Shift from DSM IV-TR to DSM-5

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<tr>
<td>Learning Disorder</td>
<td>Specific Learning Disorder</td>
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<td>i. Reading disorder</td>
<td>Specify impairment</td>
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<td>ii. Mathematic disorder</td>
<td>• Reading</td>
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<td>iii. Disorder of written expression</td>
<td>◦ Accuracy, Fluency and Comprehension</td>
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<td>iv. Learning disorder NOS</td>
<td>◦ Dyslexia</td>
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<td>*IQ achievement discrepancy requirement</td>
<td>• Mathematics</td>
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<td>• Dyscalculia</td>
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<td>• Written Expression</td>
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Developmental Trajectory

<table>
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<tr>
<th>Family history of Dyslexia</th>
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<td>DYSLEXIC</td>
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Infancy / Toddler
Slower speech and language development

Preschool
Slow to develop language skills,
Poor in letter knowledge, non-word repetition and rhyme awareness
Developmental Trajectory

Family history of Dyslexia

DYSLEXIC

School Age
- Difficulties in decoding related skills
- Milder deficits in language (vocabulary)


Language and Reading Skills

Prospective longitudinal study of children at risk of reading difficulties
- Family history
- Preschool language difficulties

Findings:
- Familial Recurrence Risk is 4-6x higher
- Reading comprehension at 8 years of age was predicted by decoding at 5.5 together with language at 3.5 years old

Hulme et al 2015
Snowling et al 2017

Response to Intervention (RTI)

(a) Focus on quality school-wide instruction to prevent challenges

(b) School wide screening and progress monitoring to identify overall effectiveness and students who require additional support

(c) Tiered model of service delivery

(d) Eligibility determination consisting of identifying the required level of individual support

Response to Intervention (RTI)

Tier 1
General Classroom Reading Instruction (ALL Students)

Tier 2
Supplemental (20-30%)

Tier 3
Intensive (1-20%)

MONITOR

Fletcher and Vaughn, 2009

Early Intervention

Classroom level interventions, pullout remedial approaches and combinations of both have reported positive results.

Data strongly indicate more positive response to interventions that are provided in the very first few years of school compared with those delivered in the later years

Shaywitz et al, 2008
Evidence on Reading Interventions

Evidence Based Initiative

Five Essential Elements of Effective Reading Instruction:
1. Phonemic Awareness
2. Phonics
3. Fluency
4. Vocabulary
5. Comprehension

Phonemic Awareness Instruction
Teaching the ability to recognize and manipulate phonemes in words.

- **Recognizing** phonemes
- **Blending** phonemes to words
- **Segmenting** a word into its phonemes
- **Eliminating** a phoneme from a word, or **adding** a phoneme to a word

Phonemic Awareness Instruction
ESTABLISHED Effective

+ PA training benefits word reading and comprehension of poor readers but not spelling.
+ Phonemic awareness trainings are widely recognized as being effective for the remediation of **preschool children** at risk for reading disabilities

Phonics Instruction
Way of teaching reading that stresses the acquisition of **letter-sound correspondence** and their use in reading and spelling.

Phonics Instruction
Systematic Phonics Program
Planned set of phonics element taught sequentially and includes:
- Short and long vowel sounds
- Vowel and consonant digraphs (ex. *oi*, *ea*, *sh*, *th*)
- Blends of letter sounds that form larger sub-units in words
Phonics Instruction

**ESTABLISHED Effective**
Systematic phonics instruction

- Effective in word/non-word accuracy and letter-sound knowledge
- Small effect on fluency, comprehension and spelling

Sugate, 2010
McArthur et al, 2012
National Reading Panel, 2000
Ehri, 2001

Multisensory Structured Language Programs

Approaches to teaching reading that are systematic, sequential, and multisensory and use both analytic and synthetic strategies to teach phonics

**ESTABLISHED Effective**
Structured systematic phonics component

Clark & Uhry, 1995, NRP 2000

Multisensory Structured Language Programs

**Key Component** is the use of the visual, auditory, and tactile-kinesthetic pathways to explicitly teach phonology, phonological-awareness, and sound-symbol correspondence. They may differ in instructional setting, materials, or targeted age group.

Schlesinger and Gray, 2017; Ritchey & Goeke, 2006; Alexander and Slinger-Constant, 2004

Reading Fluency

Ability to read with Speed, Accuracy, and Appropriate Expression

- Bridge between word identification and comprehension
- Difficult to remediate especially for older students who missed out on reading practice/intervention.
- Poor Fluency is the marker of dyslexia in other languages

Torgesen, 2007

Multisensory Structured Language Programs

**UNESTABLISHED EVIDENCE**
Multisensory Component

- Review of literature showed some positive results in word reading, word decoding, spelling, and comprehension but not all studies reported them to be superior.
- Caution in generalizing evidence due to the mixed results

Schlesinger and Gray, 2017; Ritchey & Goeke, 2006; Alexander and Slinger-Constant, 2004

Reading Fluency

**Repeated Reading**
Fluency practice in which a student repeatedly reads a passage aloud to increase oral reading fluency.

**EMERGING EVIDENCE**
- Positive effect on rate, accuracy and comprehension

National Reading Panel 2000, Chard, 2002; Stevens et al, 2016
**Reading Fluency**

**Repeated Reading**
- Synthesis of research on fluency intervention that included 19 studies (2001-2014) on students with LD (Level K-5)
- Positive outcomes:
  - Listening passage preview (teacher, peer, audiobook)
  - Multi-component intervention
  - Performance feedback
  - Setting a performance criterion

*Lee and Yoon, 2015*

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**Reading Comprehension**

**EMERGING Evidence**

**Oral Language Training**
- Most effective in improving reading comprehension and vocabulary knowledge compared to Text-Comprehension and Combined Trainings.
- 1 RCT study among 8-9 year olds with reading difficulties

Oral Language Training – Vocabulary, Reciprocal teaching, figurative language, spoken narrative

*Clarke et al, 2010*

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**Reading Comprehension**

Small Studies with positive effects but need more evidence

- Inference Training

*I make mental pictures that change as I read like a movie playing in my mind*

*Duff and Clarke, 2012*

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**Reading Comprehension**

**Mental Imagery**

*Clarke et al, 2010*

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**Support Settings**

**ESTABLISHED**
- Affected children should receive support from their first school year, as an early start is more effective than a start from the second to sixth year.
- Support measures should be implemented in individual group settings or small groups settings (≤ five).

*Galuschka K and Schulte-Körne G, 2016*
Accommodations

Interventions, while promising, have yet to close the gap in the ability of dyslexic children to read fluently. Dyslexic children often remain accurate but slow readers. This correlates with the neurobiological evidence of the disruption of the posterior brain system (word-form area).

Text to Speech Technology (TTS)

TTS reads aloud digital text—the words on computers, smartphones and tablets.

Types
- Built-in text-to-speech
- Web-based tools
- Text-to-speech apps
- Chrome tools
- Text-to-speech software programs

Co-Morbidities

- ADHD (8-18%)
- Dyscalculia (20-40%)
- Anxiety Disorder (20%)
- Depression (14.5%)
- Language Disorder

+ Course Modifiers
+ A MUST to Evaluate the presence of these conditions to start appropriate and timely intervention.
Learning Disabilities, Dyslexia and Vision

There is inadequate scientific evidence to support the view that subtle eye or visual problems cause or increase the severity of learning disabilities.


Learning Disabilities, Dyslexia and Vision

UNESTABLISHED
+ Visual training
+ Muscle exercises
+ Ocular pursuit-and-tracking exercise
+ Behavioral/perceptual vision therapy
+ “Training glasses”
+ Prisms
+ Colored lenses and filters

Handler and Friesen, 2011

Medication Treatment

Polyunsaturated Fatty Acid (PUFAs)

Background:
PUFAs (EPA/DHA) are considered ‘brain food’ and promoted for improving learning abilities.

UNESTABLISHED
There is a need for well designed randomized study to support or refute use.

Tan ML, Ho JI, Teh KN. 2012

Neurofeedback Therapy

Increased Theta waves was viewed as suggestive of maturational delay.

UNESTABLISHED
+ 2-year follow up study done on 10 children with LD but it had significant flaws in the methodology.
+ 1 Study showed small positive effects on spelling but none on reading.

Hurt, Arnold and Lofthouse, 2015

What we have is a BIG GAP

We also need to consider the CULTURAL GAP before applying these recommendations.

Early detection and early intervention as well as provision of evidence based curriculum as soon as our children enters school are already big steps in minimizing the ACTION GAP in addressing the needs of children with reading difficulties.