ASSESSMENT AND INTERVENTION FOR DYSLEXIA

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Reading is a wondrous capability. It allows you to learn new things, entertain yourself and communicate. And when you are a successful reader it is an effortless undertaking.

My Goal: To Provide You With Information About These Critical Questions

• What is dyslexia?
• How does dyslexia affect kids?
• How DO Kids Learn To Read?
• What Are the Causes of Dyslexia?
• How Do We Know Who Might Have Trouble Learning To Read?
• How do we identify kids with dyslexia?
• What Is The Best Way To Teach Kids with Dyslexia to Read?
• How Do We Know if the Intervention is Working?
• How Can Assessment Inform Intervention?

Ab 1369

56334. The state board shall include “phonological processing” in the description of basic psychological processes in Section 3030 of Title 5 of the California Code of Regulations.

56335. (a) The Superintendent shall develop program guidelines for dyslexia to be used to assist regular education teachers, special education teachers, and parents to identify and assess pupils with dyslexia, and to plan, provide, evaluate, and improve educational services to pupils with dyslexia. For purposes of this section, “educational services” means an evidence-based, multisensory, direct, explicit, structured, and sequential approach to instructing pupils who have dyslexia.

(b) The program guidelines shall include, but shall not be limited to, characteristics typical of pupils with dyslexia and strategies for their remediation, as well as information to assist educators in distinguishing between characteristics of dyslexia and characteristics of normal growth and development.
(c) In developing program guidelines pursuant to subdivision (a), the Superintendent shall consult with teachers, school administrators, other educational professionals, medical professionals, parents, and other professionals involved in the identification and education of pupils with dyslexia.

(d) The Superintendent shall complete the program guidelines in time for use no later than the beginning of the 2017–18 academic year.

(e) The Superintendent shall disseminate the program guidelines through the department’s Internet Web site and provide technical assistance regarding their use and implementation to parents, teachers, school administrators, and faculty members in teacher training programs of institutions of higher education.

CASP position paper

State and local educational agencies (SEAs and LEAs) are reluctant to reference or use dyslexia, dyscalculia, and dysgraphia in evaluations, eligibility determinations, or in developing the individualized education program (IEP) under the IDEA. The purpose of this letter is to clarify that there is nothing in the IDEA that would prohibit the use of the terms dyslexia, dyscalculia, and dysgraphia in IDEA evaluation, eligibility determinations, or IEP documents.

Therefore, there could be situations where the child’s parents and the team of qualified professionals responsible for determining whether the child has a specific learning disability would find it helpful to include information about the specific condition (e.g., dyslexia, dyscalculia, or dysgraphia) in documenting how that condition relates to the child’s eligibility determination. 34 CFR §§ 300.306(a)(1), (c)(1) and 300.308.

In implementing the IDEA requirements discussed above, OSERS encourages SEAs and LEAs to consider situations where it would be appropriate to use the terms dyslexia, dyscalculia, or dysgraphia to describe and address the child’s unique, identified needs through evaluation, eligibility, and IEP documents. OSERS further encourages States to review their policies, procedures, and practices to ensure that they do not prohibit the use of the terms dyslexia, dyscalculia, and dysgraphia in evaluations, eligibility, and IEP documents. Finally, in ensuring the provision of free appropriate public education, OSERS encourages SEAs to remind their LEAs of the importance of addressing the unique educational needs of children with specific learning disabilities resulting from dyslexia, dyscalculia, and dysgraphia during IEP Team
What Is Dyslexia?

- Defining dyslexia
  - Discussion
    - What are the essential features of dyslexia?
- Defining dyslexia
  - Types of dyslexia
    - Acquired
    - Developmental

What Is Dyslexia?

- 1896, W. Pringle Morgan, developmental word blindness
- 1917 Hinshelwood congenital word blindness
- Orton – early 1900’s – first in U.S.
  - Stenophasia
  - Mixed cerebral dominance
  - Pioneer in remedial techniques
- Anna Gillingham – developed intervention program based on Orton principles
- Orton – Gillingham methods still supported today
  - VAKT
  - Geschwind
  - Localization of brain function
- Galaburda
  - Neurological abnormalities

A socially constructed disorder
What is Dyslexia?

International Dyslexia Association, National Institute of Child Health and Human Development

One of most commonly accepted definitions:

‘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.’

What Is Dyslexia?

DSM-5:
Specific learning disorder is a neurodevelopmental disorder with a biological origin that is the basis for abnormalities at a cognitive level that are associated with the behavioral signs of the disorder. The biological origin includes an interaction of genetic, epigenetic, and environmental factors, which affect the brain's ability to perceive or process verbal or nonverbal information efficiently and accurately.

- With impairment in reading 305.00 (F81.0):
  - Word reading accuracy
  - Reading rate or fluency
  - Spelling accuracy

- With impairment in written expression 305.2 (F81.83):
  - Spelling accuracy

What Is Dyslexia?

- DSM-5
  - NOTE: Dyslexia is an alternative term used to refer to a pattern of learning difficulties characterized by problems with accurate or fluent word recognition, poor decoding, and poor spelling abilities. If dyslexia is used to specify the particular pattern of difficulties, it is important also to specify any additional difficulties that are present, such as difficulties with reading comprehension or math reasoning.
  - Difficulties learning to map letters with the sounds of one's language – to read printed words (often called dyslexia) – is one of the most common manifestations of specific learning disorder.

What Is Dyslexia?

- Defining dyslexia
  - National Institutes of Neurological Disorders and Stroke
  - Dyslexia is a brain based type of learning disability that specifically impairs a person's ability to read. These individuals typically read at levels significantly lower than expected despite having normal intelligence. Although the disorder varies from person to person, common characteristics among people with dyslexia are difficulty with spelling, phonological processing (the manipulation of sounds), and/or rapid visual-verbal responding. In adults, dyslexia usually occurs after a brain injury or in the context of dementia. It can also be inherited in some families, and recent studies have identified a number of genes that may predispose an individual to developing dyslexia.
What Is Dyslexia?

- Defining dyslexia
  - Commonalities across definitions
    - Etiology is a neurobiological
    - Behavioral marker is difficulties with single word decoding
    - Unexpected given other learning/cognitive skills and abilities, and the presence of quality instruction
    - Can result in difficulty in constructing meaning from text and associated academic skill development

- More than just a lack of skill development
  - Early differences in phonological processing and associated processes
  - Phonological processing predicts reading skill development
  - Interventions that target phonological processing improve reading skill
  - Neuroimaging suggests functional brain differences
  - A heritable disorder connected to specific genetic differences
  - Affected by language skills (other than sound processing) and instruction, but such is not the primary cause of the disability
  - The environment affects the expression of EVERYTHING

- Phonological Processing
  - Manipulating the sounds of language
  - Rapid Naming
    - Fast, automatic retrieval processes
  - Orthographic Processing
    - Memory for the letters in words
  - Verbal Working Memory

- General IQ
  - Vocabulary
  - Oral reading
  - Decoding
  - Word identification
  - Reasoning
  - Concept formation

- Comprehension
  - Listening
  - Oral reading decoding
  - Word identification
  - Reasoning
  - Concept formation
How does dyslexia affect kids?

- Learning to read is associated with positive adult outcomes.
- Reading disabilities are associated with juvenile delinquency.
- The most common SLD referral is reading disabilities.
- Early identification and treatment of reading disabilities is essential.
  - “Matthew effect” reduces at-risk readers from approximately 25 to 6%.

Functional Consequences:

- “…can have functional consequences across the life span, including lower academic attainment, higher rates of high school dropout, lower rates of postsecondary education, high levels of psychological distress and poorer overall mental health, higher rates of unemployment and under-employment, and lower incomes. School dropout and co-occurring depressive symptoms increase the risk for poor mental health outcomes including suicidality, whereas high levels of social or emotional support predict better mental health outcomes.”

DSM-5

American Psychiatric Association (2013, p. 377)
How does dyslexia affect kids?

- In a sample of 54 students, Juel (1988) found the probability of being a poor reader in fourth grade given you were a poor reader in first grade was 88%.
- ...a longitudinal study of students with poor word identification skills in the third grade (Felton & Wood, 1992) indicated that most of these students failed to significantly improve their skills by the end of eighth grade. " (Felton & Pepper, 1995)
- Students in the bottom 25% of the reading continuum have a trajectory of progress that diverges early from their peers who have learned to read successfully

How does dyslexia affect kids?

- "Overall, national longitudinal studies show that more than 17.5 percent of the nation’s children—about 10 million children—will encounter reading problems in the crucial first three years of their schooling" (National Reading Panel Progress Report, 2000).
- Approximately 75% of students identified with reading problems in the third grade are still reading disabled in the 9th grade. (Shaywitz, et al., 1993; Francis et al., 1996)

What it feels like...
What is Reading?

- Reading – an extraordinary ability, peculiarly human and yet distinctly unnatural. Acquired in childhood, forms an intrinsic part of our existence as human beings, and is taken for granted by most of us. (p. 3)


What is Reading?

“The most fundamental responsibility of schools is teaching students to read.”

“Teaching reading is rocket science”

- Moats (1999)

Teaching Reading is Essential

- Literacy is more critical now than ever before
- NIH views illiteracy as a health problem
- “No matter what your social or economic status is if you do not learn to read you won’t make it in life.”
- Not being able to read limits access to information
- Most reading difficulties are preventable
- Reading is a gateway skill
- The school’s first mission is to teach a child to read.

(quotes and ideas taken from Dr. Reid Lyon and Dr. Phyllis Hunter)

Teaching Reading is Urgent

720 Days

Assuming that during reading instruction there are:

- 0 Absences
- 0 field trips
- 0 interruptions
- 0 school assemblies
- Attendance every day from Grade K through Grade 3

To Learn What It Took Humans 2000 Years to Develop (Wolf, 2007)
The Matthew Effect

Gap Starts Small

Reading grade level corresponding to age

Matthew Effect

Basic Assumptions

• Simple model of reading (Tunmer and Gough)
• Competent reading rests on the development of basic skills
• The "hands and feet of genius"
• Multiple components of reading must be taught in a systematic, explicit manner that also immerses children in language and text

Decoding

Comprehension

Reading

Basic Assumptions

• Our brains are wired for speech – it is a biological specialization
• Direct instruction is not needed
• Reading requires explicit instruction – no brain specialization
• Reading integrates multiple systems
  • Visual system
  • Phonology
  • Working memory
  • Language

Chall’s Stages of Reading Development

• Pre-reading or emergent literacy
• Beginning of formal instruction
• Confirmation and fluency
• Reading to learn
• Multiple viewpoints
• Construction and reconstruction
Acquiring The Alphabetic Principle

- Basic assumptions
  - Development of the Alphabetic Principle
    1. General awareness that words have parts
    2. Specific awareness that these parts are sounds
    3. Linkage of these sound parts to the printed word
    4. “Finally, he comes to understand that the printed word and the spoken word are related. He knows that the printed word has an underlying structure as that it is the same structure he hears in the spoken word. He understands that both spoken and written words can be pulled apart based on the same sounds, but in print the letters represent these sounds.” (p. 44)

- Letter name knowledge
- Alphabetic insight
- Phonetic cue reading
- Bi-directionality of phonological awareness
- Harder for some kids than for others
- Abstract

The Phoneme

- Basic assumptions
  - What is a phoneme?
    - “The root of that word is Greek”
    - The smallest unit of speech that distinguishes one word from another
    - The fundamental element of the language system
    - The essential building block of all spoken and written words
  - Dyslexic children have difficulty developing awareness that words are comprised of phonemes
    - “children who are dyslexic perceive a word as an amorphous blur, without an appreciation of its underlying segmental nature.” (p. 44)
Information About Words Is Stored in Memory

- Semantic
- Context
- Phonological
- Orthographic

These Systems Must All Connect

Automaticity

Word Reading Must Become:
- Accurate
- Fast
- Effortless

Stroop Test

- Blue
- Green
- Yellow
- Pink
- Red
- Orange
- Grey
- Black
- Purple
- Tan
- White
- Brown
Development of “Sight” Words  
(automatic word recognition)  (EHRI)

- Pre‐alphabetic
- Partial alphabetic
- Full alphabetic
- Consolidated
- Practice is essential

Automatic Readers:

- Develop generalized knowledge of the orthographic system
- Are aware of multi‐letter units
- Develop word knowledge in tandem with spelling knowledge
- Have reduced memory load while reading
- Are aware of syllables and orthographic conventions
- Requires
  - Development of internal, mental representations of words
  - Representations have meaning, sound and letter information
  - https://www.youtube.com/watch?v=0D1aMr8WzTk

Word Superiority Effect

- Count the ‘t’
- after trait cat crate father the pattern strong fits tough
- lktem hlytt itl twlich mdgx lwicthe tkq pewett lwitbo osts

Learning Is Training the Brain

- Recognizing printed words
- Keep brain‐based principles of learning in mind when designing interventions
- "Signature" neural characteristics of dyslexia
- Successful interventions lead to brain changes over all age spans
- Develop competence, then apply, automate and transfer

Catherine Christo  California State University, Sacramento
Differences in Early Experiences

- In some homes children will have had about 25 hours of storybook experience by 1st grade (Teale) – in others thousands of hours
- From 0 to 200+ books in the home
- 32 million less words heard by age 5
- Producing half as many words at age 3
- Vocabulary deficits at school entry predict later reading

Bilingual Environments

- Concepts learned well in one language can be transferred to another
- Knowledge of phonemes may be absent for English Learners
- Training helps
- Children with no phonological problems catch up with their peers in 1 to 2 years
- National Literacy Panel on Language Minority Children
- Profiles of both groups with reading problems are very similar
WHY DO SOME KIDS HAVE TROUBLE LEARNING TO READ?

Causes of dyslexia
Characteristics of Students With Reading Problems

- Most reading problems have to do with decoding and spelling
  - Some readers may understand the system but lack fluency
  - Some readers have trouble with comprehension
- Discrepancy within reading skills
  - Nonsense word reading
  - Real word reading
  - Text comprehension
  - Listening comprehension

Causes: Phonological Processing

- Definitions
- Phonological awareness is the meta-linguistic awareness of all levels of speech sound system, including word boundaries, stress patterns, syllables, onset-rime units, and phonemes.
- Phonemic awareness is the conscious awareness that words are made up of segments of our own speech that are represented with letters in an alphabetic orthography.
- Phonological loop or phonological scratch pad is the area in memory where phonological information is stored over for short periods of time

Causes: Phonological Processing

- Phonological Core Deficit
  - Most researchers and practitioners consider a phonological deficit the core deficit of dyslexia
  - Perception, interpretation, recall and production of language at the level of the speech sound system
  - Includes:
    - Pronouncing words
    - Remembering names and lists
    - Identifying words and syllables
    - Giving rhymes
    - Detecting syllable stress
    - Segmenting and blending phonemes
  - Necessary but not sufficient for learning to read
  - Strongly linked to decoding problems
  - Linked to reading problems in multiple languages
  - Phonological processing is an unnatural act
    - Hard wired for understanding and production of speech
    - In some ways this makes reading more difficult
  - Perception, interpretation, recall and production of language at the level of the speech sound system

Pugh, 2015
Causes: Rapid Naming
- Fast, Automatic Retrieval Processes
- Ability to name a sequence of letters, numbers, objects
- Differentiate dyslexic readers from average and other poor readers
- Are present in poor readers across languages
- Because readers do not generally name the letters of a word in the process of reading, it is unlikely that the correlation of reading skill and naming speed reflects a simple association
- Rather, naming speed is thought to provide a marker for underlying processes sensitive to precise and rapid timing requirements
- The speed with which you name and the speed that you read is really important not just for the speed, but for the brain’s ability to do these processes fast enough to allocate time to construct meaning from text (i.e., reading comprehension)
- Phonological process or different cognitive process
- May be more related to fluency

Causes: Orthographic Processing
- Creation of word forms requires the linking of print to sounds and of "chunking" letters into units
- Adds unique variance to some basic reading skills
- Children with orthographic processing problems have difficulties with:
  - Writing
  - Remembering common letter patterns
  - Recognizing correctly spelled words
  - Reading phonetically irregular words
  - Reading speed

Causes: Other Cognitive Processes
- Verbal ability
  - The ultimate goal of reading instruction is to help children acquire the knowledge and skills necessary to comprehend printed material at a level that is consistent with their general verbal ability or language comprehension skills (Torgesen, 2002)
  - Conversely, lack of reading may impact development of verbal ability
- Verbal working memory
  - Affects ability to quickly "sound out" words and develop sight word store
  - Affects reading comprehension
- Processing speed
  - May affect ability to develop store of sight words
  - May affect reading fluency
  - Likely to see in other academic areas as well
- Morphological awareness
  - Awareness of structure of words and ability to use that knowledge

Double Deficit
- Deficits in phonological processing and rapid naming
- Most impaired population
- Most at risk
- Differential effects on remediation and intervention
- Difficulties in building a "reading brain" (Berninger)
- Evidence is unclear but three types of poor readers can be identified
- Highlights need to link intervention to assessment and to differentiate interventions

(Wolf and Bowers, 1999)
**Causes: Neurobiological Structures**

- Brains of poor readers show different activation pattern
- Intervention leads to changes in brain function
- Those who don't respond to interventions show different brain activation pattern than those who do
- Good readers use different parts of the brain than do dyslexic readers
  - The reading system relies on 3 inter-related brain structures
    1. Parieto-temporal (slow word analysis)
    2. Occipito-temporal (automatic recognition of word form)
    3. Broca's area/Interior frontal gyrus (articulation/word analysis)
- Good readers activate the back of the brain
- Dyslexic readers overutilize the left frontal (Broca's area) and right frontal regions

**Non-impaired vs. Impaired Readers (Shaywitz, 2003)**
American Academy of Pediatrics (2009)

- Numerous studies have shown that children with dyslexia or related learning disabilities have the same visual function and ocular health as children without such conditions. Specifically, subtle eye or visual problems, including visual perceptual disorders, refractive error, abnormal focusing, jerky eye movements, binocular dysfunction, and misaligned or crossed eyes, do not cause dyslexia. In summary, research has shown that most reading disabilities are not caused by altered visual function. Many children with reading disabilities enjoy playing video games, including handheld games, for prolonged periods. Playing video games requires concentration, visual perception, visual processing, eye movements, and eye-hand coordination. Convergence and accommodation are also required for handheld games. Thus, if visual deficits were a major cause of reading disabilities, children with such disabilities would reject this vision-intensive activity.

American Association for Pediatric Ophthalmology and Strabismus

- Do "training glasses" work?
- The scientific literature shows no experimental evidence of any benefits from a low-plus "training glasses".
- Does vision therapy improve learning disabilities and dyslexia?
- Many scientific studies have demonstrated that ocular coordination, motility, and visual processing are normal in children with dyslexia. The scientific evidence does not support the use of eye exercises or behavioral/ perceptual vision therapy in improving the long-term educational performance in children with learning disabilities.
- Why might a teacher recommend vision therapy?
- When a teacher notices that a student has problems with writing or fluent oral reading, he/she may believe that the child has a vision problem. A common misconception is that dyslexia is a problem of letter or word reversals. Reversals of letters or words, and mirror writing occur in normal early readers and writers. Children with dyslexia are not necessarily prone to reversals. So, although they do occur, reversals of letters or words, or mirror writing is not included in the definition of dyslexia. Letter and word reversals and skipping words have been demonstrated to be a symptom, not a cause, of reading disabilities. Children with dyslexia have a 30% to 40% chance of having other visual or perceptual disorders. Children with dyslexia often lose their place while reading because they struggle to decode a letter or word combination and/or because of lack of comprehension, not because of a "tracking abnormality."
Causes:

- Genetics
  - Heritability
  - Chromosomes 6 and 15 strongest links to reading
  - 6, 18, and 19 also implicated
  - Increased risk for both dyslexia and ADHD

- Environment
  - Not completely heritable
  - Supports the notion of gene x environment interactions
  - A genetic predisposition to dyslexia can be exacerbated or mitigated by the environment
  - While up to 20% of children are "at risk" for dyslexia, the "environment" (i.e., appropriate early intervention) reduces prevalence of dyslexia to 2-6%

Causes: Other Risk Factors

- Poor logical and analytical abilities
- Delayed language development
- Family history
  - About 40% of children who have parent or older sibling with dyslexia will have difficulty in learning to read. (Scarborough, 1999)
- Ear infections in early childhood

Fluency Problems

- More clearly linked to deficits in rapid naming than word reading problems
- Orthographic processing may be a factor
- Also could involve executive functions
- Reading fluency is both developmental in learning to read and an outcome of learning to read.
- Developmental
  - Automaticity of sublexical processes, lexical processes and their integration
  - Perceptual, phonological, orthographic and morphological
- Outcome
  - Effortless decoding
  - Smooth and accurate oral reading
  - Correct prosody
  - Attention allocated to comprehension

Reading Comprehension

- Problems generally linked to:
  - Higher order processes
  - Language
- Readers who are able to decode but not comprehend may have problems in
  - Working memory
  - Language (both oral and written)
  - Fluid reasoning
IQ and Reading

- Little support for IQ as predictor of progress in attainment of many basic early literacy skills such as phonemic awareness
- IQ does predict response to interventions when looking at development of other reading skills (Fuchs and Young, 2007)

Prevalence & Associated Conditions

- Reading difficulties vs true dyslexia
  - Early reading interventions from kindergarten through second grade reduced the prevalence of reading disabilities to an extrapolated figure of about 2% of the population.
  - Current percentage of children with reading disabilities in special education estimated to be about 2.7% of the school population.
  - 1.8 of the 66.8 million school children ages 6 to 22 years.
Prevalence & Associated Conditions

- Gender differences
  - Using school identification procedures
    • 1:4 (one girl for every four boys)
  - Using clinical identification procedures
    • More boys than girls, but the differences are not significant

- Discussion
  • Why, when schools identify reading disabilities, are more boys identified than girls?
  • Is there a problem with special education eligibility criteria, general education practices, or both?

Prevalence & Associated Conditions

- ADHD
  • 36% of children with ADHD also have dyslexia
  • 18% of children with Dyslexia also have ADHD
    - Even in the absence of a reading skill deficit, children with ADHD (predominantly inattentive type) have difficulty with rapid number naming and reading comprehension

- Communication Disorders
- Developmental Coordination disorders
- Autism
- Other mental disorders

Case Finding and Screening

- Family history
  • Family history of dyslexia is a strong risk factor that should be considered in any screening of children for dyslexia risk
  • Having a parent with dyslexia is a significant risk factor
  • Over 50% of achievement test score variance due to heritable factors
  • 66% of 4 year olds identified as at risk for reading failure due to having a parent with dyslexia were significantly delayed in reading at 8 years of age

HOW DO WE KNOW WHO IS AT RISK FOR DYSLEXIA?
Case Finding and Screening

• Language skill development
  • Important to understanding the meaning of language (i.e., semantics and syntax)

• Speech skills development
  • Important to phonological processing and development of the alphabetic principle


Case Finding and Screening

• Language and speech skill development
  • Oral language
    • May have some relationship to later reading problems if the speech difficulties are not resolved during early reading instruction
    • Greater risk conveyed when speech difficulties are comorbid with more global language delays
  • Vocabulary
    • Spoken vocabulary facilitates reading word recognition
    • May also create richer phonological representations
    • May be simply related to underlying (more fundamental) language facility important to development of reading skills (e.g., phonological processing)


Case Finding and Screening

• Language and speech skill development
  • Phonological processing (rhyming detection/production, segmenting, phoneme recognition sound categorization)
    • Good early development of these skills positively predicts reading achievement
    • Poor early development of these skills, by themselves, is not as powerfully predictive of later reading achievement
      • Preschoolers who went on to later be identified as dyslexia also had family histories of dyslexia and tended to have more global language delays.
      • Preschoolers who went on to become average readers had a more mixed language profile (while low in phonological processing had average or above performance on measures of syntax and semantics).


Case Finding and Screening

• Language and speech skill development
  • Letter knowledge
    • One of the best preschool predictors of reading success.
    • May be facilitative of learning to read.
    • May also be a task that serves to represent the outward manifestation of cognitive processes (verbal memory)
      • predispositions (interest in books)
      • environmental factors (access to print) important to reading.
Dyslexia Assessment 4/3/2016

Case Finding and Screening

• Otitis media (OM)
  • Conflicting results in studies examining the relationship between OM and later academic outcomes
  • Roberts et al. (2002) did not find any long term detrimental effects of a Hx of OM on word recognition.
  • Winskel (2006) reports that children in grades 1 and 2 with a Hx of OM were deficient on phonological, semantic, and reading abilities.
  • The impact of OM most pronounced when occurring between 6- and 18 months.
  • The fluctuating hearing loss associated OM (and not OM per se) interferes with development of speech sound representations, making mapping of print to speech more challenging.

Case Finding and Screening

• Preschool screening
  • Family history
  • Letter naming
  • Sentence memory
  • Specific measures
    • Phonological Abilities Test (Muter, Hulme, & Snowling, 1997)
    • Get Ready to Read (Reading Rockets)
      • http://www.readingrockets.org/article/get-ready-read-screening-tool

Case Finding and Screening

• Kindergarten screening
  • Visual processing
  • Phonological awareness
  • Vocabulary
  • Naming speed tasks

Case Finding and Screening

• Kindergarten screening
  • Screening measures
    • Ready to Learn (Fawcett, Nicolson, & Lee, 2004)
    • Test of Phonological Awareness (2nd ed.; PLUS, Torgesen & Bryant, 2004)
    • Test of Auditory Analysis Skills (Rusiner, 1979)
    • Yopp-Singer Test of Phoneme Segmentation (Yopp-Singer; Yopp, 1995)
    • Test of Early Reading Ability (3rd ed.; Reid, Hesk, & Hammill, 2004)
    • Dynamic Indicators of Basic Early Literacy Skills (Good et al., 2003)
    • AIMSweb
Dyslexia Assessment

Case Finding and Screening

- Kindergarten screening
  - Screening measures
    - Letter knowledge measured at the beginning of K the best predictor of mastering basic reading skills.
    - However, such screening will yield false positives at the beginning of K.
    - Screening in the middle of K will reduce false positives.
  - “Children who enter school with good language skills (i.e., phonologic, semantic, and syntactic skills), knowledge about the alphabet, and no family history of dyslexia are likely going to be successful readers.”
  - “…the child with global language deficits, lack of alphabetic knowledge, and a family history of dyslexia is at high risk for reading disabilities.”

Screening within a Three Tiered Model

- Assessment by response to intervention
- Tier 1: Primary Intervention
  - Provide classroom support
- Tier 2: Secondary Intervention
  - Provide more intensive support
- Tier 3: Tertiary Intervention
  - Consider special education
- Monitor and evaluate at all stages

Case Finding: Typical Academic Characteristics

- Gap between written language skills and other abilities
- Delayed and poor reading and spelling – disordering of letters
- Bizarre spelling
- Confusion of direction
- Sequencing difficulties
- Poor short term verbal memory
- Problems in learning math facts
- Problems in repeating multi-syllabic words
- Difficulties with written expression

- Thomson 2009

High Quality Classroom Instruction

- National Reading Panel Identified Five Component Skills
  - Three are critical to the development of automatic word identification
    - Phonemic Awareness
    - Phonics
    - Fluency
  - Two are critical to reading comprehension
    - Vocabulary
    - Comprehension strategies
  - There is interaction/additive effects among these five skills
  - Instruction that contains core classroom components
    - Phonological awareness, alphabetic principle, application of skills
    - Result in about 6% or less of children expected to experience reading problems
    - California’s currently adopted curriculums
Criteria to Determine Need for Intervention

- Family history
- Delayed language development
- Poor performance on screening tests
- Lack of progress in phonological awareness
- Mid K screening

Poor Phonological Awareness at First Grade


Tier I Interventions

- Within classroom
- Often part of regular curriculum
- Provided by teacher, aides, volunteers
- Instituted early for identified and at-risk students
- Individualized and flexible grouping
- Guidance and feedback
- Ongoing assessment

Results of First Tier Interventions

<table>
<thead>
<tr>
<th>Study</th>
<th>Hours</th>
<th>Pre-Interv AVG Reading %ile for Participants</th>
<th>Post-Interv % of Total Students Predicted Below 30th%ile</th>
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<tbody>
<tr>
<td>Foorman et al, 1996</td>
<td>174</td>
<td></td>
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<tr>
<td>Mathes et al, 2001</td>
<td>15</td>
<td></td>
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<tr>
<td>Allor et al, 2002</td>
<td>35-55</td>
<td></td>
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</tr>
<tr>
<td>Ferguson (MAXIS)</td>
<td>71</td>
<td></td>
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</tr>
</tbody>
</table>

Research suggests that systematic, explicit instruction is most effective in teaching and improving reading skills (Gersten, et al., 2009; Joseph, 2015; International Dyslexia Association; National Reading Panel, 2000). Strong classroom reading instruction is critical to children gaining the necessary foundational reading skills: prevention is the first line of intervention. In a Response to Instruction and Intervention (RII) model, all students receive core instruction using Universal Design for Learning (Tier 1) instruction. Those students who do not meet the Tier 1 benchmark assessment criteria may receive additional Tier 1 instruction or may be referred for a different instructional program or intervention (Tier 2). Districts must ensure that they provide high-quality, evidenced-based reading instruction to all students (Tier 1) with differentiated instruction as needed. All reading instruction should be continuously monitored for fidelity of implementation and effectiveness for each child across every classroom within the school (Cortiella & Horowitz, 2014). If issues with fidelity of implementation are found within Tier 1 reading instruction, e.g. not following the steps and sequence of the program, not giving the student the prescribed number of minutes of instruction and practice each day, or not implementing the program for the length of time needed to produce change, those issues should be resolved first before moving to the next level of intervention designed for struggling readers. Sound reading programs focus on the BIG IDEAS in early literacy: Phonemic awareness, alphabetic principle, accuracy and fluency with text, vocabulary, and comprehension (National Reading Panel, 2000).
Tier II: Supplemental Reading Instruction

- Goes beyond classroom instruction
- Provided in small group or one to one
- Systematic, integrated program
- Provided by trained persons
- Frequent, intense
- Explicit, systematic instruction
- Target areas of need (five components of skilled reading)
- Provide intense intervention
- Opportunities for guided practice of new skills in context
- Scaffold instruction to needs of child

Results of Second Tier Interventions

<table>
<thead>
<tr>
<th>Study</th>
<th>Hours</th>
<th>Student/Teacher Ratio</th>
<th>Pre-Interv. Avg Reading %ile for Participants</th>
<th>Post-Interv. % of Total Students Expected Below 30th Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Felton, 1993</td>
<td>160</td>
<td>1:8</td>
<td>16th</td>
<td>3.8%</td>
</tr>
<tr>
<td>Vellutino et al, 1996</td>
<td>33-65</td>
<td>1:1</td>
<td>15th</td>
<td>4.5%</td>
</tr>
<tr>
<td>Torgesen et al, 1999</td>
<td>88</td>
<td>1:1</td>
<td>12th</td>
<td>4%</td>
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<tr>
<td>Torgesen et al, in press</td>
<td>92</td>
<td>1:3</td>
<td>18th</td>
<td>1%</td>
</tr>
</tbody>
</table>

Catherine Christo
California State University, Sacramento

HOW DO WE IDENTIFY STUDENTS WITH DYSLEXIA?


Preventing and remediating reading difficulties. MD: York sPress
Assessment

• Purposes of Assessment
  1. Non-categorical identification of dyslexia
  2. Categorical special education eligibility decision
  3. Inform interventions

Diagnosis

• DSM-5
  • Specific Learning Disorder
    A. Difficulties learning and using academic skills, as indicated by the presence of at least one of the following (6) symptoms that have persisted for at least 6 months, despite the provision of interventions that target those difficulties:
      1. Inaccurate or slow and effortful word reading (e.g., reads single words aloud incorrectly or slowly and hesitantly, frequently guesses words, has difficulty sounding out word.
      2. “understanding
      3. “spelling”
      4. “written expression”
      5. “number sense
      6. “mathematical reasoning”

American Psychiatric Association (2013, p. 66)

Diagnosis

• DSM-5
  • Specific Learning Disorder
    • 315.00 (F81.0) With impairment in reading
      • Word reading accuracy
      • Reading rate or fluency
      • Reading comprehension

American Psychiatric Association (2013, p. 67; emphasis added)

Diagnosis

• DSM-5
  • Specific Learning Disorder
    • 315.01 (F81.0) With impairment in reading
      • Word reading accuracy
      • Reading rate or fluency
      • Reading comprehension

American Psychiatric Association (2013, p. 67; emphasis added)
Dyslexia Assessment

Diagnosis

- DSM-5
- Specific Learning Disorder
  - Severity specifier
    - Mild: the individual may be able to compensate or function well when provided with appropriate accommodations or support services.
    - Moderate: unlikely to become proficient without some intervals of intensive and specialized teaching.
    - Severe: unlikely to learn those skills without ongoing intensive individualized and specialized teaching for most of the school years. Even with an array of appropriate accommodations or services... the individual may not be able to complete all activities efficiently.

Diagnosis

- DSM-5
- Specific Learning Disorder
  - Comprehensive assessment is required... No single data source is sufficient for diagnosis... is a clinical diagnosis based on a synthesis of the individual's medical, developmental, educational, and family history; the history of the learning difficulty, including its previous and current manifestation; the impact of the difficulty on academic functioning; previous or current school reports; portfolios of work requiring academic skills; curriculum-based assessments; and previous or current scores from individual standardized tests of academic achievement. If an intellectual, sensory, neurological, or motor disorder is suspected, then the clinical assessment... should also include methods appropriate for these disorders. Thus, comprehensive assessment will involve professionals with expertise in specific learning disorder and psychological/cognitive assessment.

Diagnosis

- DSM-5
- Specific Learning Disorder
  - Associated features supporting diagnosis
    - Frequently but not invariably present: in preschool years, by delays in attention, language, or motor skills.
    - An uneven profile of abilities is common.
    - Cognitive deficits associated with difficulties learning to read words are well documented...
    - But cognitive testing, neuromapping, or genetic testing are not useful for diagnosis at this time
    - Increased risk for suicidal ideation and suicide attempts.
  - Risk and prognostic factors
    - Environmental: Prematurity or very low birthweight... prenatal exposure to nicotine.
    - Genetic: Family history of dyslexia and parental literacy skills predict therapy problems in offspring.
    - Course modifiers: Comorbidity with ADHD is predictive of worse mental health outcome. Systematic, intensive, individualized instruction, using evidenced based interventions, may improve or ameliorate the learning difficulties in some individuals or promote the use of compensatory strategies in others, thereby mitigating the otherwise poor outcomes.

Assessment

- Non-categorical identification of dyslexia
- Developmental, family, and health history form
Assessment

- Berninger's Non-categorical Differential Diagnosis
  1. Rule out exclusionary factors such as language, other developmental disorders
  2. Administer test of verbal comprehension, reading, spelling, decoding and fluency
  3. Is reading/spelling measure below average and 1 SD below verbal comprehension?
  4. Is student impaired (below 25th percentile) on phonological coding, orthographic coding, rapid naming? Having related difficulties in classroom?
  5. If exclusionary factors are ruled out and the answer to questions asked in 2 & 3 is "yes," consider diagnosis of dyslexia

CA Code of Regulations Eligibility Criteria : 3030 (a)

(a) A child shall qualify as an individual with exceptional needs, pursuant to Education Code section 56026, if the results of the assessment as required by Education Code section 56320 demonstrate that the degree of the child's impairment as described in subdivisions (b)(1) through (b)(3) requires special education in one or more of the program options authorized by Education Code section 56363. The decision as to whether or not the assessment results demonstrate that the degree of the child's impairment requires special education shall be made by the IEP team, including personnel in accordance with Education Code section 56341(b). The IEP team shall take into account all the relevant material which is available on the child. No single score or product of scores shall be used as the sole criterion for the decision of the IEP team as to the child's eligibility for special education.

CA Code of Regulations Eligibility Criteria : 3030 (b) 10

(10) Specific learning disability means a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may have manifested itself in the imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations, including conditions such as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. The basic psychological processes include attention, visual processing, auditory processing, sensorimotor skills, cognitive abilities including association, conceptualization and expression. (A) Specific learning disabilities do not include learning problems that are primarily the result of visual, hearing, or motor disabilities, of intellectual disability, of emotional disturbance, or of environmental, cultural, or economic disadvantage.

CA Code 3030. (b) (10) (B)

(B) In determining whether a pupil has a specific learning disability, the public agency may consider whether a pupil has a severe discrepancy between intellectual ability and achievement in oral expression, listening comprehension, written expression, basic reading skill, reading comprehension, mathematical calculation, or mathematical reasoning. The decision as to whether or not a severe discrepancy exists shall take into account all relevant material which is available on the pupil. No single score or product of scores, test or procedure shall be used as the sole criterion for the decisions of the IEP team as to the pupil's eligibility for special education. In determining the existence of a severe discrepancy, the IEP team shall use the following procedures:

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Severe Discrepancy Procedures

- When standardized tests are valid for pupil, 1.5 standard deviations between ability and achievement (is required)
- Some as previous
- When standardized tests are not valid for pupil use alternative means
- Team decision using other data if not a discrepancy

CA Code 3030 (b) (10) (C) (1):

(C) Whether or not a pupil exhibits a severe discrepancy as described in subdivision (b)(10)(B) above, a pupil may be determined to have a specific learning disability if:

1. The pupil does not achieve adequately for the pupil's age or to meet State-approved grade-level standards in one or more of the following areas, when provided with learning experiences and instruction appropriate for the pupil's age or State-approved grade-level standards:
   (i) Oral expression.
   (ii) Listening comprehension.
   (iii) Written expression.
   (iv) Basic reading skill.
   (v) Reading fluency skills.
   (vi) Reading comprehension.
   (vii) Mathematics calculation.
   (viii) Mathematics problem solving, and

CA Code 3030 (b) (10) (C) (2):

RTI or PSW

2. (i) The pupil does not make sufficient progress to meet age or State-approved grade-level standards in one or more of the areas identified in subdivision (b)(10)(C)(1) of this section when using a process based on the pupil's response to scientific, research-based intervention; or
   (ii) The pupil exhibits a pattern of strengths and weaknesses in performance, achievement, or both, relative to age, State-approved grade-level standards, or intellectual development, that is determined by the group to be relevant to the identification of a specific learning disability, using appropriate assessments, consistent with 34 C.F.R. sections 300.304 and 300.305; and

CA Code 3030 (b) (10) (C) (3) : Exclusionary Factors

3. The findings under subdivisions (b)(10)(C)(1) and (2) of this section are not primarily the result of:
   (i) A visual, hearing, or motor disability;
   (ii) Intellectual disability;
   (iii) Emotional disturbance;
   (iv) Cultural factors;
   (v) Environmental or economic disadvantage; or
   (vi) Limited English proficiency.
Need the Following for SLD

**CA Code 3030. (b) (10)**
- Underachievement (age or grade level standards) in at least 3 of 8 identified areas

**CA Code 3030. (b) (10) (C) (1) (2)**
- severe discrepancy or response to intervention OR
- patterns of strengths and weaknesses

**CA Code 3030. (b) (10) (C) (3)**
- not primarily due to any of exclusionary factors

**BUT there is more...**

**CA Code 3030 (b) (10) (C) (4) (5)**: Further Conditions

4. To ensure that underachievement in a pupil suspected of having a specific learning disability is not due to lack of appropriate instruction in reading or math, the group making the decision must consider:
   - (i) Data that demonstrate that prior to, or as a part of, the referral process, the pupil was provided appropriate instruction in regular education settings, delivered by qualified personnel; and
   - (ii) Data-based documentation of repeated assessments of achievement at reasonable intervals, reflecting formal assessment of student progress during instruction, which was provided to the pupil's parents.

5. In determining whether a pupil has a specific learning disability, the public agency must ensure that the pupil is observed in the pupil's learning environment in accordance with 34 C.F.R. section 300.310. In the case of a child of less than school age or out of school, a qualified professional must observe the child in an environment appropriate for a child of that age. The eligibility determination must be documented in accordance with 34 C.F.R. section 300.311.

**Assessment**

- **Categorical special education eligibility decision**
  - **Comprehensive Assessment**
    - RTI does not replace a comprehensive evaluation and all other requirements required under 34 CFR §§ 300.301-300.316 (Evaluation and Reevaluations) are applicable. (slide B)
    - A comprehensive evaluation requires the use of a variety of data-gathering tools and strategies even if RTI is used. (slide 9)
    - Results of RTI may be one component of the information reviewed. (slide 9)
    - The evaluation and reevaluation sections referenced in the above (34 CFR §§ 300.301-300.316) address the need to use a variety of assessment tools, assess a child in all areas of suspected disability, use technically sound, non-discriminatory assessment procedures in an appropriate manner, and assure that the assessment is both sufficiently comprehensive to identify all of a child’s special education needs and provides information directly related to the student’s educational needs.

**Assessment**

- **Categorical special education eligibility decision**
  - **Criteria 300.309 (b)**
    - For a child suspected of having a specific learning disability, the group must consider, as part of the evaluation described in §§300.304 through 300.306, data that demonstrates that—
      - (i) Prior to, or as a part of, the referral process, the child was provided appropriate high-quality, research-based instruction in regular education settings, consistent with section 300.321(D)(1)(3) and 200.3(B)(1) of the IDEA, including that the instruction was delivered by qualified personnel; and
Critical to any assessment of dyslexia is a professional with specialized knowledge of brain functions, learning, and learning disorders, such as a school psychologist, as a member of the team. School psychologists have advanced training in individual administration of standardized tests of learning and cognitive functions. They understand test construction and measurement, validity, and reliability; knowledge that helps them to interpret an individual student’s performance across various domains of functioning. In assessing for dyslexia, the school psychologist and other team members will use a variety of observations and tools to measure the abilities that underlie reading. The psychologist will also examine and identify or rule out other possible contributors to reading disorders such as problems with visual discrimination, memory, or attention. Further, school psychologists will consider such factors as language status and educational background in their assessments. School psychologists have the education and training to consider all aspects of the child’s functioning and the multiple factors that can impact reading.

### Framework for Eligibility as a Student with a Reading Disability

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Student is referred for consideration of eligibility because of reading difficulty.</td>
</tr>
<tr>
<td>Step 2</td>
<td>Formal assessment of reading skills to determine that student is not achieving adequately for his age or grade level standards.</td>
</tr>
<tr>
<td>Step 3</td>
<td>Determine if the reading deficit is due lack of appropriate instruction.</td>
</tr>
<tr>
<td>Step 4</td>
<td>Determine if the reading deficit is due to one of the exclusionary factors.</td>
</tr>
<tr>
<td>Step 5</td>
<td>Psychological process assessment to identify areas of strength and weakness. Need normative weakness related to academic deficit.</td>
</tr>
<tr>
<td>Step 6</td>
<td>Analysis of cognitive/academic profile to determine to determine whether student meets criteria of discrepancy model, RTI model or pattern of strengths and weaknesses model for SLD identification.</td>
</tr>
<tr>
<td>Step 7</td>
<td>Determination that the reading disability is affecting the student’s performance to a significant degree and the student’s needs cannot be met without special education.</td>
</tr>
</tbody>
</table>

### Categorical special education eligibility decision

- Student displays reading difficulty.
- Student is significantly different from peers.
- Student has received appropriate instruction.

1. Student displays reading difficulty.
   - No
   - Yes
     - RTI: Implement instruction/intervention and continue to monitor.
     - Perform further eligibility analysis.
     - Perform further reading skills analysis.
     - Make differential Dx regarding dyslexia.

2. Student is significantly different from peers.
   - No
   - Yes
     - No RTI: Implement instruction/intervention and continue to monitor.
     - Yes RTI: Implement instruction/intervention and continue to monitor.
     - Perform further eligibility analysis.
     - Perform further reading skills analysis.
     - Make differential Dx regarding dyslexia.

3. Student has received appropriate instruction.
   - No
   - Yes
     - No RTI: Implement instruction/intervention and continue to monitor.
     - Yes RTI: Implement instruction/intervention and continue to monitor.
     - Perform further eligibility analysis.
     - Perform further reading skills analysis.
     - Make differential Dx regarding dyslexia.
Assessment

- Special education involves categorical decisions
- Reading skill is not categorical
- Thus, not all students with dyslexia will be eligible for special education assistance
- Special education is not THE answer to the challenge of dyslexia
- It is AN answer for a select group of students with more severe reading difficulties

CASP POSITION PAPER AB1369

Students who have been identified with dyslexia may be offered a continuum of services based upon their identified needs: special education, a 504 Plan, or general education. The level of service is based on the intensity of need. Assessment teams will define student needs, which in turn will determine the appropriate program. A student with severe dyslexia who needs specialized instruction in order to access the general education curriculum will likely require special education services. A student with dyslexia who is able to participate adequately within the general education curriculum when provided with appropriate accommodations (e.g. more time on tests, books on tape) would likely be served by a 504 Plan. Other students who have dyslexia may function adequately without specialized instruction or accommodations. Interventions provided within special education differ from those provided in general education as part of a multi-tiered system of supports (or RTI). Intensity is increased through frequency of instruction, increased time on specific skills, lower student to teacher ratio and specialized instruction. It is important to balance the need and value of these intensive services with the academic benefits of participating in the general education classroom.
Text Comprehension

- Classroom sources
- Curriculum
- Lexiles
- IRIS
- Running records

- Tests:
  - Most achievement batteries
  - Gray Oral Reading Test
  - Gray Silent Reading Test
  - Maze reading tests (CBM)

- Problems in assessing comprehension
- Students with good background knowledge and language skills may do well on comprehension tests but not in school related reading
- (Fletcher et al., 2007)
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- Problems in assessing comprehension
- Students with good background knowledge and language skills may do well on comprehension tests but not in school related reading
- (Fletcher et al., 2007)

- Differences in performance

- Maze Passage www.interventioncentral.org

Bobby was preparing to go to bed late one evening when he heard a shrill screech coming from the barn outside. Bobby was unsure what was making an eerie noise so late in the night. He had trouble falling asleep and tossed and turned all night dreaming (interest, net, about) the haunting sounds emanating from the barn. When Bobby awakened the following morning, he, always, science (breathe, monster) hurried out to the barn to (fit, discover, selfishly) what was causing such a peculiar (umm, wear, noise) the night prior. He gathered his (noisily, courage, library) and entered the barn but left (sharply, cool, befuddled) when he could not find what (was, school, hospital) making such noise. That evening after (forget, understand, dinner) as the sun was setting, Bobby (grabbed, smooth, frighten) a flashlight and set out for the barn.

"Where are you heading?" Bobby’s (copper, fought, father) asked.

"I am going to go (fatally, learn, find) the monster that was making such commotion last night," Bobby replied. "If you are going to look for a monster, you might need some assistance," Bobby’s (afford, dad, harass) responded

Oral Language

- Oral language clusters
  - WISC
  - KABC-II
  - Language specific tests
    - CELF
    - Test of Early Language Development
    - Oral and Written Language Scales
  - Vocabulary tests
    - PPVT
  - WISC: Vocabulary
  - DAS: Word Definition
  - KABC: Verbal Knowledge
  - WI: Comprehension Knowledge

- The ultimate goal of reading instruction is to help children acquire the knowledge and skills necessary to comprehend printed material at a level that is consistent with their general verbal ability or language comprehension skills (Torgesen, 2002)

- Conversely lack of reading may impact development of verbal ability
  - Listening Comprehension
  - Most achievement tests
Dyslexia Assessment 4/3/2016

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LINKING ASSESSMENT TO INTERVENTION

- Reading Comprehension
- Language Skills
- Comprehension Strategies & Vocabulary
- Text Reading Fluency
- Direct Instruction in Sound Symbol & Word Reading
- Assess Phonological Processing & Rapid Naming
- Fluency in Text
- Word Reading Skills (Decoding & Encoding, Real & Nonsense Words)
- Practice & Fluency

Below Age Level

Language

Assess Language Skills

Fluency in Text

TEXT LEVEL ASSESSMENTS/Fluency

- Is child developing automaticity/fluency?
  - Components
  - Accuracy
  - Rate
  - Fluency
  - Comprehension

- Classroom sources
  - Embedded in curriculum
  - Levels (lexile)
  - District fluency tests
  - Informal reading inventory
  - Running records

- Tests
  - Gray Oral Reading Test-5 (GORT-5)
  - Reading achievement tests
  - Oral reading fluency measures
    - DIBELS
    - AIMSweb
    - EASY CBM
    - Intervention Central

Easy CBM
https://app.easycbm.com

Cindy's teacher had been talking about sandwiches all week. She had told the class that they would make sandwiches. She said they would make them the following Friday. She said it was a special treat for all the children. They were getting that special treat because they had been working so hard. Every day, her teacher told them how happy she was. She was happy because all the students were doing their work. They were all learning. Every day, they learned something new. Cindy thought it was kind of strange that they would make sandwiches at school. Every day she brought her own sandwich from home for lunch. She wondered what kind of sandwich they would make. Would it be peanut butter and jelly? She liked those kinds of sandwiches. But there were some kinds of jelly that she did not like very much. She hoped if they made peanut butter and jelly sandwiches that they would use jelly jam. Maybe they would make cheese sandwiches. Cindy liked that kind. But
Assess Word Level Knowledge and Abilities

- Has student acquired alphabetic principle/sound-symbol correspondence?
- Is child developing automatic word recognition
- Components
  - Accuracy
  - Rate
  - Reading
  - Spelling
- Both decoding and encoding
- Timed and untimed

Word Level Assessments

- Classroom
  - Embedded in curriculum
  - Spelling tests
  - Invented spelling
  - Writing
- Tests
  - Decoding tests
  - Measure knowledge of phonics
  - Use nonsense words
  - Achievement Tests
- Real word reading accuracy
- Achievement tests
- Fluency
  - Test of Word Reading Efficiency (TOWRE 2)
  - Test of Silent Word Reading Efficiency
  - Achievement Tests
- Encoding
  - Going from sounds to letters that represent them
  - WJII Spelling of sounds
  - Spelling subtests
  - Look at spellings for both knowledge of phonics and orthographic knowledge (legal letter combinations)
Untimed Nonsense Word Reading

box op ig et dar
slimp grasp blit pennang lenk
preen strilt sef freddy hij
quarn scad poost sost sode
jeal hife bount durl bune
jow liel ipsidm salder toog
cim cardonite springerplilling kaphridge
gep phoner her concerated
dissantomified apprxicingleate

Test of Word Reading Efficiency 2

is jump inside
up part plane
part fast pretty
red fine children
me milk famaus
mil back without
no lost finally
lost lost
we find strange
find budget
he paper repress
paper contain
the open confident
open kind
and want
able justine
and justice
of shoes
of morning
her resolve
him money
describe
as great
as describe
fit farthe
fit farthent

Test of Silent Word Reading Efficiency

Real Words | Nonsense Words
---|---
Decoding - Reading
Timed | Automaticity of Word Retrieval | Automaticity of Decoding
Untimed | Lexicon | Phonics Knowledge
Encodings - Spelling
Timed | Orthographic Knowledge | Lexicon | Phonics Knowledge
Untimed

Word Level Processes to Be Assessed

CHRISTO CSUS

4/3/2016
### Word Level Assessments

<table>
<thead>
<tr>
<th></th>
<th>Real</th>
<th>Nonsense</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decoding</td>
<td></td>
<td></td>
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<tr>
<td>Timed</td>
<td>TOWRE 2 PAL II Achievement Tests (e.g. WIAT III)</td>
<td>TOWRE 2 PAL II Achievement Tests (e.g. WIAT III)</td>
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<tr>
<td>Untimed</td>
<td>Most achievement batteries</td>
<td>Most achievement batteries</td>
</tr>
<tr>
<td></td>
<td>Encoding – Spelling</td>
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<tr>
<td>Timed</td>
<td>CBM</td>
<td></td>
</tr>
<tr>
<td>Untimed</td>
<td>Spelling</td>
<td>Spelling of Sounds</td>
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</table>

### Elena

<table>
<thead>
<tr>
<th></th>
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<th>Nonsense</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Weak</td>
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<tr>
<td>Timed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Untimed</td>
<td>Adequate</td>
<td>Adequate</td>
</tr>
<tr>
<td></td>
<td>Encoding</td>
<td></td>
</tr>
<tr>
<td>Timed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Untimed</td>
<td>Adequate</td>
<td>Adequate</td>
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### Benny

<table>
<thead>
<tr>
<th></th>
<th>Real</th>
<th>Nonsense</th>
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<tbody>
<tr>
<td>Decoding</td>
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<tr>
<td>Untimed</td>
<td>Weak</td>
<td>Weak</td>
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<tr>
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<td>Encoding</td>
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</tr>
<tr>
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</tr>
<tr>
<td>Untimed</td>
<td>Weak</td>
<td>Weak</td>
</tr>
</tbody>
</table>

### Learning Activities and Progress Monitoring Method

- **DECODING**
  - WJ Word Attack SS = 69, Spelling of Sounds SS = 75
  - TOWRE phonemic decoding efficiency SS = 72
  - Limited decoding ability @ ending 1st grade level

  **Learning Activities**
  - alphabetic phonics: use word families to decode at an ending third grade level.
  - biweekly probes of decoding accuracy and speed with third grade nonsense words.

  **Progress Monitoring Method**
  - weekly probes for accuracy and speed on selected word lists.

- **WJ Letter word ID = 73, TOWRE = 62**
  - Beginning 2nd grade

  **Learning Activities**
  - using Fry word list practice with coded flash cards.
  - 90% success rate with third grade word list.

  **Progress Monitoring Method**
  - weekly probes for accuracy and speed on selected word lists.
Phonological Processing

- Phonological processing tasks
  - Blending
  - Segmenting
  - Memory
  - Onset rhyme
- Classroom Information
  - Embedded in curriculum
  - BPST, APST
  - Invented Spelling

Component Reading Skills: Sub-word level

- Is child developing phonological awareness?
- Does the child have any naming speed deficits?
- Does the child have deficits in orthographic processing?
- Verbal working memory?
Orthographic Awareness

- A less studied area
- Letter name knowledge
- Letter production
- Expressive coding
- Receptive coding
- Berninger’s work in developing Process Assessment of the Learner (PALS-II) and in developing interventions
  - Orthographic choice
  - Alphabet writing
  - Receptive and expressive coding

Orthographic Coding

- PAL-II: Alphabet Writing
- Receptive Coding
- Expressive Coding

Spelling Tests: combinations
- Review for “illegal” letter combinations

Not many instruments available to look at this

Rapid Naming

- The ability to quickly access verbal labels for visually presented material
- Pictures, letters, numbers, simple words
- Can also include switching

CTOPP 2
- Rapid Digit Naming
- Rapid Letter naming
- Rapid Color Naming
- Rapid Object Naming
NEPSY II
- Speeded Naming
- PAL II
- RAN Words
- Ran Digits
- RAN Words and Digits
KTEA 3
- Naming Facility
DAS II
- Rapid Naming
WISC V
- Naming Facility
Component Skills Continued

- Production processes
- Handwriting
- Keyboarding
- Oral language comprehension
- Recall
- Syntax
- Expression
- PAL II
- Automaticity
- Accuracy
Dyslexia Assessment

CHRISTO CSUS

Letter formation poor. Alphabet writing is at 10th decile for grade.

Learning Activities

Handwriting lessons using classroom curriculum

Weekly measures of alphabet writing speed and when appropriate text copying.

SPELLING

WJ Spelling = 73
Spells at partial phonetic level.

Learning Activities

Spelling words coordinated with reading words. Use highlighting for identifying letter clusters.

Spell third grade level word list with 85% accuracy.

Weekly spelling progress checks.

MOTIVATIONAL COMPONENT

ACTIVITIES

Chart progress on weekly basis. Begin each lesson with review of progress, goal setting, and affirmative statement. End each lesson with review of material accomplished.

Reports

- Bobby
- Mel
- Lily
INTERVENTION

English Spelling

Now what???

- How do you know if what was tried was evidence based?
- How do you help teams determine an evidence based practice or program?

THE BUCK DOES NOT STOP (OR BEGIN) WITH ELIGIBILITY DECISION!!

Early Intervention Critical

- Increased risk of dropping out of school (Frieden 2004)
- 82% of the street youth in Toronto and all the adolescent suicides in Ontario, tracked over a three-year period, had undetected and unremediated learning difficulties (Siegel, 2000)
- If not reading at grade level by 3rd grade only 1 in 17 odds of catching up

Early Intervention Makes a Difference

- Can significantly reduce number of children performing below criterion
- Increase scores on standardized tests
- Results are long lasting for most children
- Largest gains are made in first part of intervention

Early Intervention Critical

- In the U.S., estimates for the percent of incarcerated youth with significant reading problems ranges from 19% to 43% (Finn et al. 1988; O'Brien et al. 2007)
- More difficulties in all aspects of adult life (Mellard and Woods 2007)
Learning and plasticity in RD (Shaywitz, Shaywitz, Pugh et al., 2004, Biological Psychiatry)

- Q) Are under-engaged LH systems fundamentally disrupted, or does observed de-activation reflect an unstable but potentially “trainable” state?
  - First grade cohorts: TD, RD-treat, RD-control
  - fMRI: pre, post and (for RD-treat) at one year follow up
  - Treatment Plan:
    - 50 min tutoring, 5 days per week, 9 months (205 hours total)
    - 5 step plan (unscripted) & individualized
    - Letter-sound associations
    - Phoneme manipulation
    - Reading words
    - Reading text
    - Assessment
  - Found increased activity at end of treatment in LH areas

CASP Position Paper

First, IDEA stresses the importance of research-based interventions and highly qualified teachers.

Second, because children who qualify for special education need to have every educational minute count, it is critical that the intervention used be appropriate for the identified needs of the child.

Third, when choosing an intervention, it is important to consider the student characteristics as well as the setting in which the intervention will be provided.

Fourth, there are certain agreed-upon characteristics that are important to interventions for students with dyslexia. The National Reading Panel (2000) listed five components of reading instruction that are relevant to both general education instruction and intervention: phonemic awareness, phonics, fluency, vocabulary and text comprehension. Interventions for students with dyslexia should be structured, systematic, explicit and involve diagnostic teaching. Students with dyslexia need to be taught using an intervention that has a clear sequence of skills, is explicit (i.e. students are directly taught the skills they need to know) assures mastery of basic skills such as phonemic awareness and monitors progress regularly.

Fifth, these students need to be taught by a teacher trained in the intervention who understands reading development, how to meet the needs of unique learners and can provide for diagnostic teaching.
Interventions

• Most reading problems have to do with decoding and spelling
  • Some readers may understand the system but lack fluency
  • Some readers have trouble with comprehension

These reading problems require different interventions

Interventions

• National Reading Panel's Report and Recommendations
  1. Alphabetics
  2. Fluency
  3. Comprehension
  4. Teacher education and reading instruction
  5. Computer technology and reading instruction

• International Dyslexia Association (IDA) Recommendations
  • Structured
  • Systematic
  • Sequential
  • Multisensory

Intervention Principles

• Working to change brain function
• Intensive
• Prolonged
• Skill development
• Fluency

• Neural plasticity indicates that it is easier to create new connections than reconfigure old ones
• Learning requires accurate repetition
• Establish correct pathways from cognitive to behavioral
• Avoid stimuli that are too different
• Learning requires intensity
• Brain has affinity for novelty

Who Does It Most Readily Help?

• Those without underlying processing disorders (phonological and naming speed)
• Those who respond quickest
• Those whose reading problems are a result of limited exposure
• Those with better foundational literacy skills
• IQ does not differentiate those who will be helped
Why Does It Help?

- Establishes basic early skills
- Puts children on growth trajectory
- Response to early intervention shows growth curve in basic skills to be greater than normal for those receiving later intervention

Length of Intervention

- Rate of progress in intervention predicts future reading
- Three types of responses to intervention
  - Rapid responders
  - Responders: Meet rate goals with more prolonged intervention
    - Both word reading and comprehension are low
    - Word reading lower than comprehension
  - For slower responders gains may occur in later years
- For each hour of intervention Standard Score gains ranged from:
  - .28 to .76 for word attack
  - .07 to .34 for word identification
  - .11 to .9 for comprehension

Basic Skills and Reading Rate

<table>
<thead>
<tr>
<th>Hours</th>
<th>Teacher/Student Ratio</th>
<th>Initial Word ID</th>
<th>Initial Rate</th>
<th>Post Rate</th>
<th>Rate Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>1:2-4</td>
<td>92</td>
<td>71</td>
<td>99</td>
<td>.28</td>
</tr>
<tr>
<td>50</td>
<td>1:2-4</td>
<td>80</td>
<td>70</td>
<td>78</td>
<td>.2</td>
</tr>
<tr>
<td>100</td>
<td>1:2-4</td>
<td>83</td>
<td>70</td>
<td>78</td>
<td>.24</td>
</tr>
<tr>
<td>78</td>
<td>1:1</td>
<td>72</td>
<td>72</td>
<td>72</td>
<td>.0</td>
</tr>
<tr>
<td>135</td>
<td>1:1, 1:2</td>
<td>72</td>
<td>72</td>
<td>70</td>
<td>.0</td>
</tr>
</tbody>
</table>

Group Size and Composition

- Same ability grouping
- Small groups within classrooms
- Small groups equal to or better than one on one
- Up to three to four students
What Can Be Expected?

- Typical students in first grade gain @ 2 words per week in oral reading fluency (ORF)
- Grade two students gain about 1.66 decreasing to about .6 in fifth and sixth grade
- Special education students is about ½ that of regular education students
- High quality interventions was about 1.5
- Benchmark for interventions
- 2 words per week to level of 30 CWM
- Approximately 1 word per week thereafter

Tier III: Tertiary Interventions

- Intensive
- Generally given later than first and second tier (Primary and Secondary)
- Problems in reading rate remain for most children who require this level of intervention
- Brain activity becomes more like normal pattern but also increases in other areas (compensation?)

Target Intervention by Assessing All Levels of Reading

- Underlying processes
- Word level processes
- Text processes
- Oral language
- Production

<table>
<thead>
<tr>
<th>Reading Component</th>
<th>Reading Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenological Decoding (sounding out)</td>
<td></td>
</tr>
<tr>
<td>Phonological Encoding (spelling words by sounding out)</td>
<td></td>
</tr>
<tr>
<td>Word Identification (reading unrelated words)</td>
<td></td>
</tr>
<tr>
<td>Text Reading Fluency</td>
<td></td>
</tr>
<tr>
<td>Text Reading Comprehension</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reading Related Cognitive Processes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orthographic Processing: Ability to store letter patterns in words</td>
</tr>
<tr>
<td>Phonological Processing</td>
</tr>
<tr>
<td>Naming Speed</td>
</tr>
<tr>
<td>Phonological Memory: Remembering information by sound</td>
</tr>
<tr>
<td>Verbal Memory</td>
</tr>
<tr>
<td>Associative Memory</td>
</tr>
<tr>
<td>Visual Ability</td>
</tr>
<tr>
<td>Visual Spatial Skills</td>
</tr>
<tr>
<td>Working Memory</td>
</tr>
</tbody>
</table>
Age At Intervention

- Some evidence that brain changes that occur for younger children happen with older children.
- Also increase in compensatory areas.
- General cognitive ability affects comprehension.
- Typical special education during 4th and 5th grade increases reading by only .04 SD over what would occur in classroom.

Upper Grade Interventions

- Often lack intensity.
- Little direct instruction or guided practice in phonics.
- Lack of comprehension strategy instruction.

- Teach phonemic decoding explicitly.
- Provide opportunities for supervised practice.
- Intensive.
- Small group.
- Related to entry level skills.
- Provide all NRP elements of reading instruction.
- Brain studies show intervention effect on brain function.
- Teach morphology as need more than phonics at upper grades to read words.

Conclusions for Upper Grades

- Older children around 30th percentile can bring phonemic decoding, text reading accuracy and fluency into average range (60 hours).
- Those around 10th percentile can bring phonemic decoding, accuracy and comprehension into average range. Fluency increases but still low (100 hours).
- Those at 2nd percentile can bring phonemic decoding into average and increase accuracy and comprehension but little relative change in fluency.

Projected growth in “sight vocabulary” of normal readers and disabled children before and after remediation.


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CHRISTO CSUS
Persistent Fluency Deficits

• As children learn to read they increase their store of “sight words”
• Average readers are doing so from 1st grade on and continue to do so
• Delayed readers fall behind early
• Gap continues to widen without intervention
• Effects of early delay are both direct and indirect
  • Text support
  • Vocabulary

Difficulties For Older Children

• Low entering word reading scores reflect underlying deficits
• Deficit makes it impossible to close the gap
• Those with better word reading at entry may have more words “on the verge”
• May have additional deficit in ability to form orthographic representations

These are interesting and challenging times for anyone whose professional responsibilities are related in any way to literacy outcomes among school children. For, in spite of all our new knowledge about reading and reading instruction, there is a widespread concern that public education is not as effective as it should be in teaching all children to read.


Measuring Progress

<table>
<thead>
<tr>
<th>GORT Rate</th>
<th>Baseline</th>
<th>3 months</th>
<th>6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Score</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Percentile</td>
<td>&lt;1st</td>
<td>&lt;1st</td>
<td>&lt;1st</td>
</tr>
</tbody>
</table>
Growth in Correct Words per Minute

Iris modules on eb interventions

- [http://iris.peabody.vanderbilt.edu/module/ebp_os/challenge/#content](http://iris.peabody.vanderbilt.edu/module/ebp_os/challenge/#content)
- How do you currently determine whether a student has had an evidence based practice or program?
- How do you decide if a program is appropriate for a student with a learning disability?
  - Parent wants optometric training, Lindamood-Bell, Barton
  - Evidence based practice and program
Scientific, Research Based Interventions

- Research studies are empirical, scientific
- Stressed in NCLB
- Requirement under IDEA
- Part of eligibility criteria

Evidence based practices: ebp

- Benefits
- How to select EBP
  - Consider
    - Students and setting
    - Resources
    - Evidence level
- http://iris.peabody.vanderbilt.edu/module/ebp_os/resource/ebp_secondaries#content
- Selecting an EBP
- Comparison worksheet
- Research based

Sample Interventions

- Focus on Phonological Awareness and Phonics
- Barton Reading and Spelling
- Road to the Code
- Focus on Phonological Awareness, Phonics and Fluency
- Great Leaps
- System 44
- Focus on Phonological Awareness, Phonics, Writing
- Lindamood Phoneme Sequencing Program
- Spell, Read P.A.T.
- Read/Write/Type
- Berninger PAL aligned
- REWARDS – also vocabulary

- Best Evidence Encyclopedia (BEE) (Center for Data-Driven Reform in Education at Johns Hopkins University)
- National Center on Intensive Intervention (NCII)
- https://app.box.com/s/ume7t8rrbgpb7h4z2jhq57y4xbyxt8jt
- REWARDS – also vocabulary
Interventions

• Programs
  1. Success for All
  2. Direct Instructional System of Teaching Arithmetic and Reading
  3. Reading Roots and Reading Wings

Interventions

• Controversial Treatments
  • Fast ForWord-Language (Miller & Tallal, 1996)
  • Tomatis (1978)
  • Irlen lenses (Irlen, 1983)
  • optometric visual training (Rayner, 1983; Taylor, 1965)
  • Davis Method (Davis & Braun, 1997; 2003)
  • Dore Program (Dore & Rutherford, 2001)

The brains of those with dyslexia look “different” during reading.
• Less activity in “word form” area
• More activity in “thinking” area and other areas

Dyslexia is a life-long disability that may show up in adolescence only in spelling or fluency problems.
• Problems with foreign languages
• Compensated dyslexics

Problems in phonological processing one of most robust findings in dyslexia research.
• Though not the whole picture
• Verbal working memory

Dyslexia is not due to a vision problem
• Same number of reversals as reading peers
• Do as well on purely visual tasks
• BUT there is some possibility for a small percent of students

It’s all about speed and automaticity
• Laking information about words.
• Press up resources for comprehension.
• Cross linguistic studies

CASES
In the Simple View of Reading, dyslexia is a problem on the word side of reading.

- Children can also have problems with comprehension but that is not dyslexia.

Dyslexia falls under category of SLD
- IDEA language
- Can be assessed in schools by trained professionals

There are some good protocols for assessing dyslexia.
- Difference between comprehension of oral language vs. written
- Deficits in identified processing area

Intervention is difficult, but most effective if done early.
- Provide intervention with highest chance of success
- Provide targeted intervention (assess to intervene)

Dyslexia is a complex disorder affecting reading, writing, spelling, and sometimes arithmetic. It is not a disability of intelligence and can be assessed in schools by trained professionals. There are good protocols for assessing dyslexia, such as comparing oral language comprehension to written language. Intervention is difficult but most effective if done early. Providing targeted intervention based on assessment results can be beneficial.