Dyslexia

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Three Objectives for Today

• Help you better answer 3 questions:
  
  – 1. **What is dyslexia?** Goal is to help you become most knowledgeable person in your school and community about dyslexia.

  – 2. **What is reading-related phonological processing?** And how is it related to dyslexia?
Three Objectives for Today

• Help you better answer 3 questions:
  – 3. **What should be assessed if dyslexia is suspected?** And how should you integrate assessment results?
What is Dyslexia?
Dyslexia is a Latent Condition

• Latent means you can’t observe it directly.
  – All we can do is infer its presence by its effect on things we can observe.
What’s the Story about Reversals?

• Yes, children in 2\textsuperscript{nd} grade with reading problems make reversal errors.

• But so do reading-age matched younger normal readers!
  – Reversals are routine in K and 1\textsuperscript{st} grade.
What’s the Story about Reversals?

• Children in 2\textsuperscript{nd} grade with reading problems are reading at an early 1\textsuperscript{st}-grade level, making routine 1\textsuperscript{st}-grade errors.

• They just stand out because their peers are no longer making them.
Summary About Reversals

• An easy error for all of us to make.
• Reasons why reversal errors are easy to make in reading are known (VWFA, visual similarity, same category of letter, item vs. order information).
Summary About Reversals

• Individuals with dyslexia do not make more reversal errors than do reading-matched younger readers.
  – A 2\textsuperscript{nd} grade student with dyslexia makes reversal errors because reading is at beginning 1\textsuperscript{st}-grade.

• They stand out because their age-matched peers make fewer reversal errors.
Three Compelling Studies

• 1. Give normal readers difficult material to read—material that is so hard they read the text comparable to how a child with dyslexia reads grade-level material.

  – Their eye-movements look as jumpy and hesitant as the eye-movements of individuals with dyslexia!
Three Compelling Studies

• 2. Give individuals with dyslexia easy material they actually can read.
  – Their eye-movements look like those of normal readers!
Three Compelling Studies

• The effects of eye-movement training programs.
  – Can train the ballistic saccades, so visual pursuit is trained. Results?
    • Visual pursuit can be improved with training, but training doesn’t generalize to actual reading.
What Should we Conclude about Role of Eye Movements in Dyslexia?

• Faulty eye movements not the cause of poor reading but a by-product of it!
Conclusions

• 1. Reversal errors are not a cause or hallmark characteristic of dyslexia.
• 2. Faulty eye-movements are not a common cause of dyslexia.
• 3. Dyslexia is a language problem not a visual problem. Language problem resides in the phonological system.
Conclusions

• 4. Dyslexia runs in families.
• 5. Children and adults with dyslexia may have other problems (e.g., ADHD).
• 6. Dyslexia occurs in boys and girls, but is about twice as common in boys.
• 7. Dyslexia is universal.
What is Reading-Related Phonological Processing?

And how is it related to dyslexia?
Three Kinds of Phonological Processing Important for Reading

• Wagner and Torgeson (Psychological Bulletin, 1987) recognized that 3 independent areas of research on speech-sound tasks actually were related, and coined the term reading-related phonological processing.
Three Kinds of Phonological Processing Important for Reading

- Phonological Awareness
- Phonological Memory
- Phonological Access to Long-Term Memory (Rapid Naming)
Phonological Awareness Plays Causal Role in Learning to Read

• To a child who can hear similarities and differences among “cat,” “rat,” and “hat,” their spellings (cat, rat, hat) are sensible.

• Impaired phonological awareness is a common characteristic of individuals with dyslexia.
Phonological Awareness can be Taught and Trained

• Every major reading series now includes lessons on phonological awareness.

• Training phonological awareness early can prevent or at least mitigate the severity of later word-level reading problems.
  – Early identification is critical to prevention.
Measuring Phonological Awareness

• Common measures of phonological awareness include elision, segmenting, blending, sound matching, sound isolation, and phoneme reversal.
Measuring Phonological Memory

• Digit Span
  – Best with rapid presentation of digits (e.g., 2 per second).
    • Minimizes rehearsal strategies and maximizes dependence on phonological processing.
Measuring Phonological Memory

• Nonword Repetition
  – Works best with “nonword-like” nonwords.
    • “tobraj” is better than “vellow.”
  – Has been used with children as young as 2 or 3 by having a puppet game with the puppets or dolls having nonword names.
    • “Put srismuz on the horse.”
Some Facts About Phonological Memory

• Tasks are simple cognitively compared to phonological awareness tasks.

• Before children learn to read, the correlation between phonological memory and phonological awareness approaches 1.0!
Measuring Phonological Recoding for Lexical Access

• Rapid Naming Task
  – Items to be named can be colors, objects, digits, or letters.
    • It matters.
  – Task can be latency to name a single object using a voice key or serial naming.
    • Serial correlates more with reading.
Limitations of Rapid Naming Tasks

• Complex—difficult to identify source of poor performance.
• Highly similar to reading, especially for naming letters and digits.
  – Is poor reader RAN performance poor simply because it also is a decoding task?
Learning Objective 3: What Should be Assessed if Dyslexia is Suspected?

And How Should You Integrate Assessment Results?
Best Practices

• Rely on evaluation of multiple sources of information—no single criterion will be reliable or valid.

• What should be your targets of evaluation and assessment?
Relative to Oral Language Proficiency

• 1. poor nonword decoding.
• 2. limited sight-word vocabulary.
• 3. impaired phonological processing
• 4. poor response to instruction/intervention.
• 5. poor spelling and writing.
Other Characteristics

• 6. family history of reading problems.
• 7. listening comprehension better than reading comprehension.
• 8. co-occurring inattention common.
• 9. co-occurring math disability common.
Other Characteristics

• 10. found in boys and girls, although boys are twice as likely to have relatively severe problem.
Bayesian Approach

• Use a Bayesian approach by beginning with prevalence and updating probability as you consider information.
Summary
What is Dyslexia?

• Dyslexia is caused by a language problem not a visual problem. Language problem resides in the phonological system.

• Dyslexia is a latent condition but has identifiable observable characteristics that were described.
What is Reading-Related Phonological Processing?

And How is it Related to Dyslexia?
Three Kinds of Phonological Processing Important for Reading

- Phonological Awareness
- Phonological Memory
- Phonological Access to Long-Term Memory (Rapid Naming)
Three Kinds of Phonological Processing Important for Reading

• They play a causal role in the development of dyslexia.
What Should be Assessed if Dyslexia is Suspected?

And How Should You Integrate Assessment Results?
• The targets of assessment are the observable characteristics that were described.
• It is important to consider multiple characteristics—no single criterion has adequate reliability and validity.
• A Bayesian approach is useful for combining information.