Defining and Addressing Dyslexia in Young Children

Salli Forbes, Director
Debra Rich, Assistant Director
Jacobson Center for Comprehensive Literacy
University of Northern Iowa

Session Goal:

- Framing the issues around the term ‘dyslexia’
- Identifying the definitions and research findings about dyslexia from different disciplines
- Looking to the future with caveats and a call for future research

“...children are born ‘wired’ for language, but print is an optional accessory that must be painstakingly bolted on.” (Pinker, 1997 in Norton & Wolf, 2012)

“...each child must develop reading skills using brain areas that have developed for other purposes, such as language, vision, and attention. (Norton & Wolf, 2012, p. 429)
Different disciplines view dyslexia through different lenses.

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Reasons for Differences Between Disciplines

- Developed understandings separately
- Have unique research methodologies
- Have unique terminology and definitions

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Adolph Kussmaul (1878)

Word Blindness

Vortblindheit

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Rudolf Berlin (1887)

Dyslexia

Eine besondere Art der Wortblindheit (Dyslexie)
Recent History from the Fields of Literacy and Special Education

Stanovich (1986) – “Matthew Effects”
Reciprocal causation
- Phonological awareness and early reading acquisition (limited)
- Ease/speed of word recognition and comprehension
- Reading ability and vocabulary knowledge
- Vocabulary knowledge and comprehension
- Reading skill level and volume of reading

Recent History from the Fields of Literacy and Special Education

Clay (1987) - Learning to be learning disabled
- Reading disability for most - not an organic cause
- Reading disability for most - instructional cause
- Effective instruction significantly reduces the number of children with reading disability
- Identification using IQ-achievement discrepancy not valid
Recent History from the Fields of Literacy and Special Education

Stanovich (1991) - Challenge to discrepancy definition for identification

Vellutino (1996) – Identification through response to instruction

Cognitive/Medical Perspective

Definition of Dyslexia

“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.”  p.2


Phonological Processing


- Refers to the child’s ability to use the sound structure of oral language in service of processing oral and written language

- Debate: Is it **language-specific** or **sound-general**?
Double-Deficit Hypothesis
(Wolf & Bowers, 1999)

- Deficits in phonologic or naming-speed processes can impeded reading acquisition
- Naming speed cannot be subsumed under phonology
- Phonological and naming-speed processes make unique contributions to reading

Additional Theories

- Rapid auditory processing theory (Tallal, 1980, 2000; Tallal et al., 1993)
  - General impairment in the ability to adequately process brief sounds
  - Not generally supported

- Cerebellar Deficit Model (Nicolson and Fawcett, 1990; Nicolson et al., 2001)
  - Deficit in motor system related to task automaticity
  - Not consistently supported

Genetic Theories

- Rare chromosomal translocations have been identified in familial studies
- Three genes associated with white matter volume have been identified, which may influence reading ability
Is the spotlight of attention shining on the right issues?

Theoretical Deficit Frameworks for Dyslexia

- Cerebellar
- Magnocellular
- Anchoring
- Motor
- Visual
- Auditory
- Perceptual Learning
- Rhythmic Processing
- Rapid Temporal Processing
- Phonology
- Phonological Memory
- Phonological Awareness
- Rapid Naming
- Naming Speed

Single word Reading Difficulty

Can Dyslexia be Treated?

Instructional Approaches

**Fast ForWord**

- Fast Forward
  - Children

fMRI studies have shown that left-hemisphere brain regions that are typically under activated in dyslexia exhibit a gain in activation after effective intervention

**Lindamood Bell**

- Adults
There is no behavioral research to demonstrate increased reading achievement of children with Dyslexia with these or any other educational programs.

Promising Research: The Compensation Brain

Hyper activation in the left and right prefrontal cortex

Increases in age in dyslexic children, not in typically reading children


Recommendations

- Dyslexic children who overcome their reading difficulties somehow bypass regions normally used for reading
- This finding encourages consideration of intervention approaches that capitalize on alternative reading strategies in addition to current interventions that build on typical reading instruction

Manuel Casanova, professor of psychiatry at the University of Louisville, says the study’s most important contribution is revealing that the behavioral and intelligence measures commonly used to evaluate a dyslexic child’s chances of improvement — such as IQ tests and standardized reading tests — are not reliable. “The conventional wisdom until now has been behavioral measurements,” says Casanova. “I am blown away by the fact that IQ is not predictive of the ability to improve.”

Areas for further research

What **personalized interventions** will improve the reading achievement of individual children with dyslexia?

Caveats for Moving Forward:

Each discipline has somewhat unique research methodologies

Each discipline has unique terminology and definitions - dyslexia, reading disability, learning disability

Each discipline has different methods of identification of people with dyslexia—fMRI, DTI & EEG, CTOPP & RAN, DSM-5, RtI

Different disciplines view dyslexia through different lenses.

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There is no single test and no absolute criteria for diagnosing dyslexia.

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(Norton & Wolf, 2012, p. 430)
In the 2013 edition of the DSM-5 from the American Psychiatric Association, dyslexia is listed in the category of 'specific learning disorder'.

The DSM-5 Neurodevelopmental Work Group concluded that the many definitions of dyslexia and dysgraphia meant those terms would not be useful as disorder names or in the diagnostic criteria.

DSM-5 Diagnosis of Disorder (Learning Disability)
315.00 (F81.0) With impairment in reading:
- Word reading accuracy
- Reading rate or fluency
- Reading comprehension

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 this 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.

“More than 100 years of research into developmental reading difficulties has yet to reveal anything resembling one single explanation for all the symptoms of dyslexia.”
(Norton & Wolf, 2012, p. 430)

Caveats for Moving Forward:
There is still much more research that needs to be completed before we have a clear understanding of dyslexia, and effective instructional practices for people with dyslexia.
As yet, there is no certifiable best method for teaching children who experience reading difficulty (Mathes et al, 2005). Therefore, the ILA research advisory committee has called for a research agenda for determining evidence-based methods for teaching students with dyslexia.

ILA Research Advisory on Dyslexia

...the nature and causes of dyslexia, and even the utility of the concept, are still under investigation. Although genetics and neurology appear to play a role in reading difficulties, environment and instruction moderate that role.
Research indicates that most students who experience literacy problems in their early years do not ultimately have long-term difficulties when appropriate instruction and intervention are provided.

- In fact, interventions that are appropriately responsive to individual needs have shown to reduce the number of children with continuing difficulties in reading to below 2% of the population (Vellutino et al., 2000).

Reviews of research focusing solely on decoding interventions have shown either small to moderate or variable effects that rarely persist over time, and little to no effects on more global reading skills.

Rather students classified as dyslexic have varying strengths and challenges, and teaching them is too complex a task for a scripted, one-size-fits-all program (Coyne et al., 2013; Phillips & Smith, 1997; Simmons, 2015). Optimal instruction calls for teachers’ professional expertise and responsiveness, and the freedom to act on the basis of that professionalism.