

Following the Science Upstream: EarlyBird App Identifies Children with Reading Challenges

Emerging Models Webinar

May 5, 2020

gradelevelreading.net @readingby3rd #GLReading #LearningTuesdays





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Tremain Foundation


OAK
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The Peter and Elizabeth C.
TOWER Foundation

POSES
FAMILY
FOUNDATION

IMAGINE. COLLABORATE. TRANSFORM.



Carla E. Small, MBA

- CEO, EarlyBird Education
- Executive Director, Innovation and Digital Health Accelerator, Boston Children's Hospital
- Business Strategy Consultant – Health Care, Education
- Director Product Development at startup company Work/Family Directions, Inc.
- Mother of three, one with dyslexia





Ranked the **#1 Children's Hospital** by U.S. News & World Report: 2014-2019

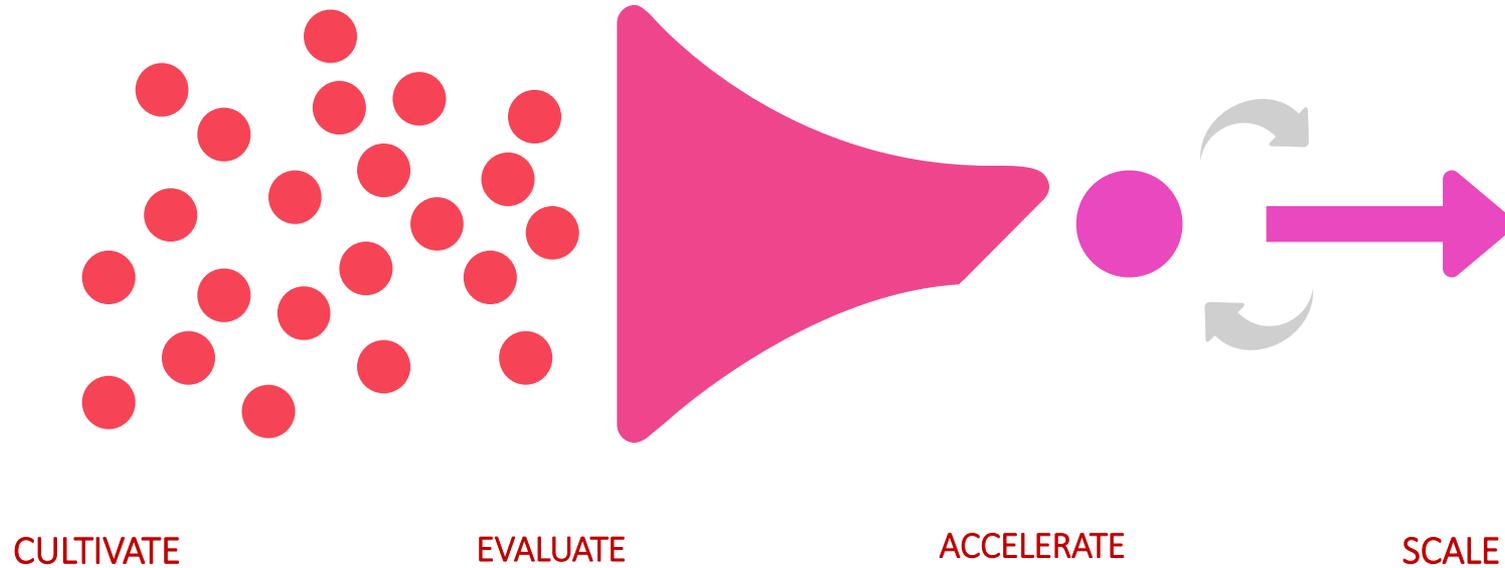


 National Institutes of Health

#5 in NIH funding for research among all health systems

 Boston Children's Hospital

Boston Children's Hospital Accelerator Model



Portfolio



health-voyager

REACT Neuro Inc.
detect. track. react.

MINDLIGHT

Always Hungry?

knot

crowdclinical

ANTI-BIOTIN

luminopia

caremap

M

commure

lupHealth

veta Health

EarlyBird

DOCK HEALTH

aiva

nuTrimedy™

THE FUTURE OF HEALTHCARE

buoy

CareDox

MIGHTIER™
by Neuromotion Labs

CIRCULATION

TriVoxHealth

MEDUMO

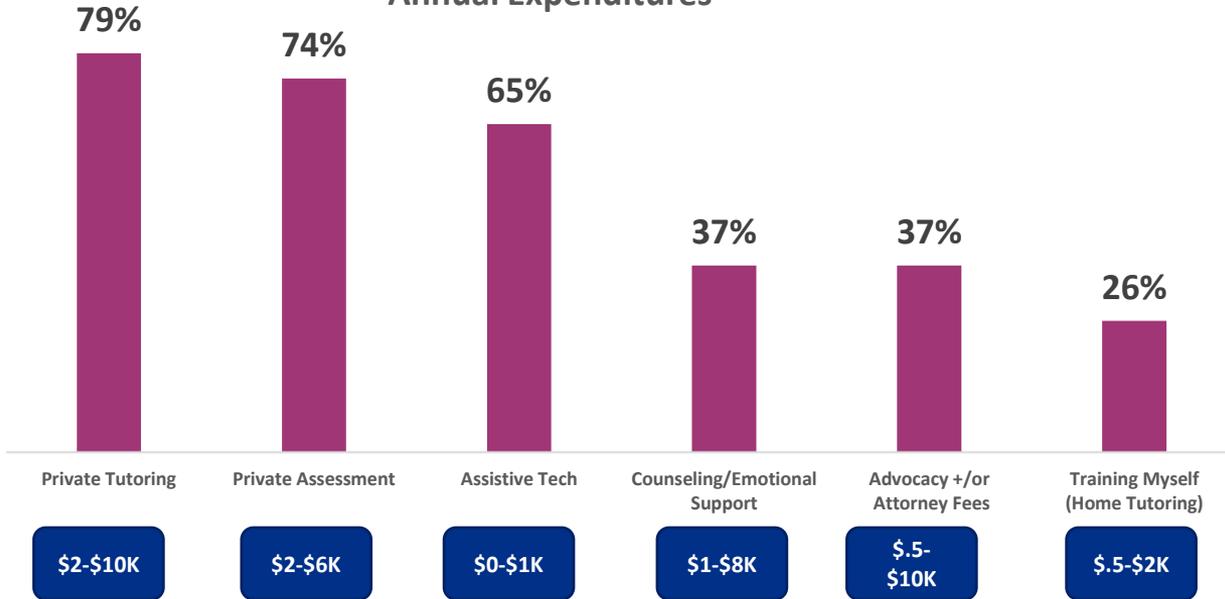
POPP



Better assessment and support to
optimize the early stages of learning

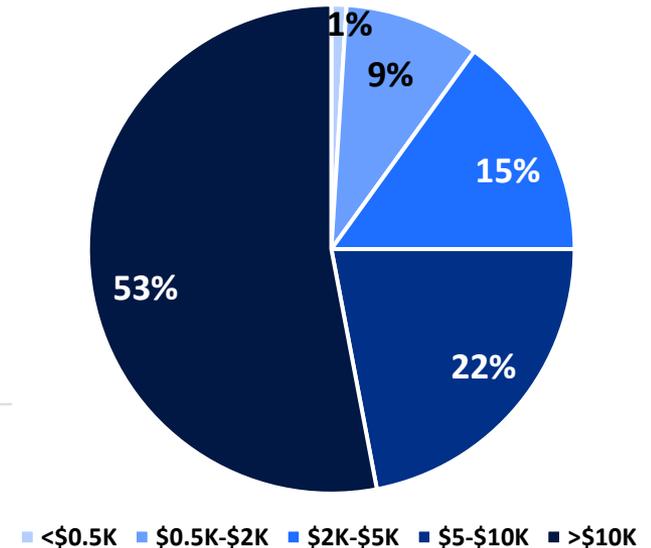
Majority of dyslexia families paying thousands out-of-pocket and navigating complex support ecosystem to ensure their children learn to read

% of Dyslexia Families Paying for Support & Typical Annual Expenditures



Typical Annual Expenditure by Support Type

% of Dyslexia Families by \$ Spent Over Past 5 Years for Support





Nadine Gaab, Ph.D



Harvard
Medical
School

- PhD from the **University of Zurich (Switzerland)** and postdoctoral training at **MIT** and **Stanford University**
- **Associate Professor of Pediatrics**, Boston Children's Hospital and Harvard Medical School
- **Member of the Faculty**, Harvard Graduate School of Education
- **Principal Investigator** of GaabLab within the Laboratories of Cognitive Neuroscience
- 2020 recipient of the **Normal Geschwind Memorial lecture award** by the **International Dyslexia Association**
- 2019 recipient of the **LDA Award (Learning Disabilities Association America)** for outstanding leadership at the national level in the learning disabilities field.
- 2018 recipient of the **Allan C. Crocker Award** for her advocacy on behalf of children with dyslexia and reading disabilities and efforts around the recent passage of the Massachusetts screening legislation (under the guidance of Decoding Dyslexia MA).
- 2017 **Alice H. Garside Award** for outstanding leadership in advancing the science and advocacy of dyslexia.
- 2012 **T. Berry Brazelton Award** for Innovation from Boston Children's Hospital
- Member of the Board of Trustees; **Landmark School** (Beverley, MA)
- Founder (former president) of the **New England Research on Dyslexia (NERDY) Society**
- Advisory Board member: **National Center on Improving Literacy (NCIL)**
- Consultant; **Massachusetts state-level literacy initiative**



The development of reading proficiency is a public health issue:

Literacy is a widely recognized determinant of health outcomes and is associated with many indices of academic, social, vocational, and economic success (Irwin et al., 2007)

National Academy of Medicine summary highlights that duration of education, which is highly dependent on reading proficiency, is a better predictor of health and long life than cigarette smoking or obesity (Johnston, 2019)

Childhood reading skills

Development of basic reading skills is one of the primary goals of elementary education:

- 65% of fourth-graders are reading below grade level (unchanged in last 25+ years); approx. 80% of those from low socio-economic backgrounds^{1,2}
- Difficulty reading at grade-level can lead to low self-esteem, feelings of shame, inadequacy, helplessness and depression in children³

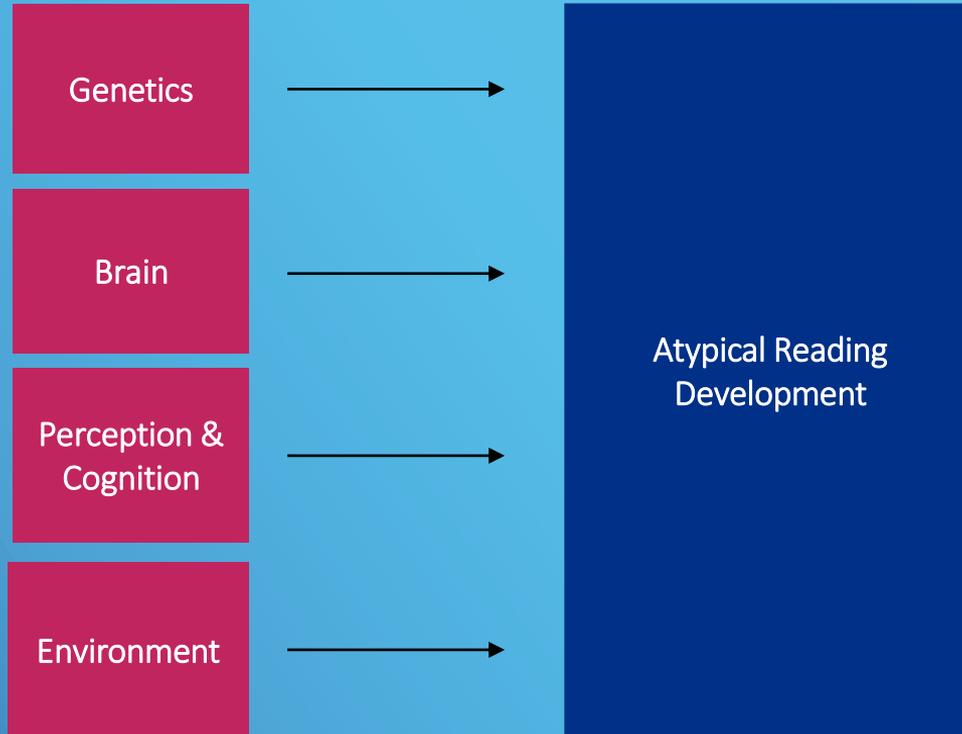
Adolescence/Adult Outcomes

- Children with learning disabilities are less likely to complete high school or pursue higher education, and are at an increased risk of entering the juvenile justice system^{4,5}
- Up to 92% of working-age adults with learning disabilities had annual incomes of less than \$50,000 within eight years of leaving high school. 67% earned \$25,000 or less⁶
- Approx. 1/3 of all adults cannot read drug labels and low literacy costs the U.S. 230 billion/year in health care costs⁷.

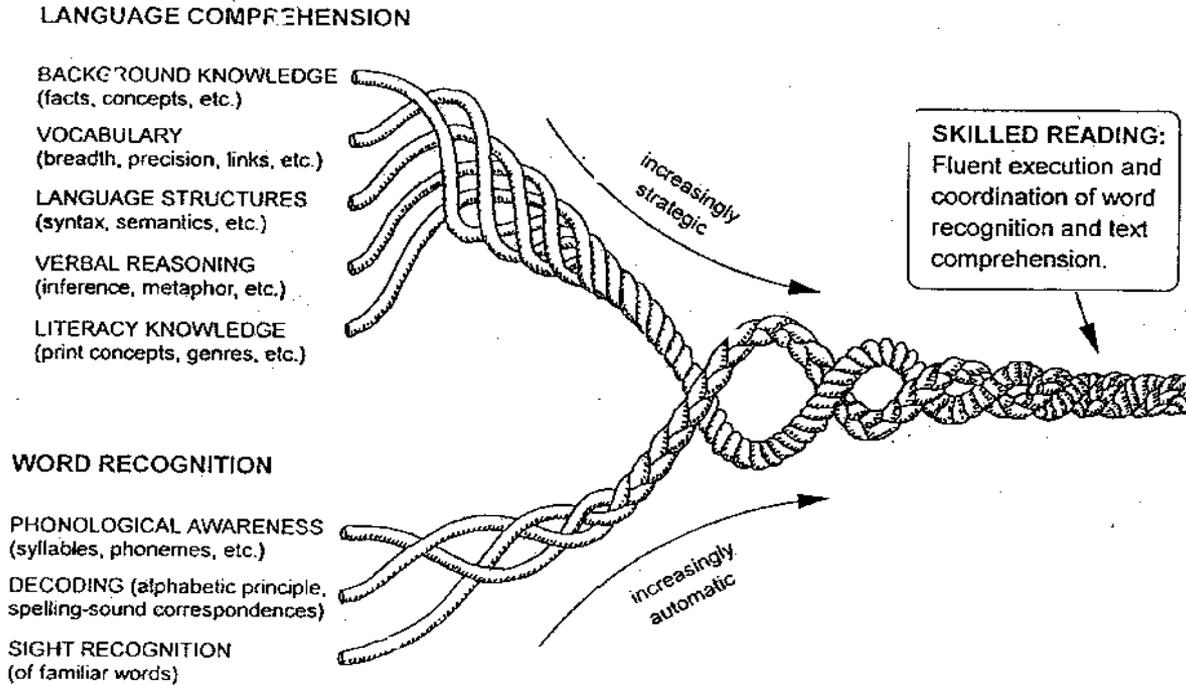
1. National Center for Education Statistics (2017). The Nation's Report Card: A First Look: 2019 Mathematics and Reading.
2. Institute of Education Sciences, U.S. Department of Education, Washington, D.C.
3. Valas, H. (1999). Students with learning disabilities and low-achieving students: Peer acceptance, loneliness, self-esteem, and depression. *Social psychology of education*, 3(3), 173-192.
4. Mallett, Christopher A., "Disparate Juvenile Court Outcomes for Disabled Delinquent Youth: A Social Work Call to Action" (2009). Social Work Faculty Publications.
5. U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, National Longitudinal Transition Study-2 (NLTS2), Wave 4 parent interview and youth interview/survey, 2007
6. Cortiella, C., & Horowitz, S. H. (2014). The state of learning disabilities: Facts, trends and emerging issues. *New York: National Center for Learning Disabilities*, 2-45.
7. U.S. Department of Health; 2003

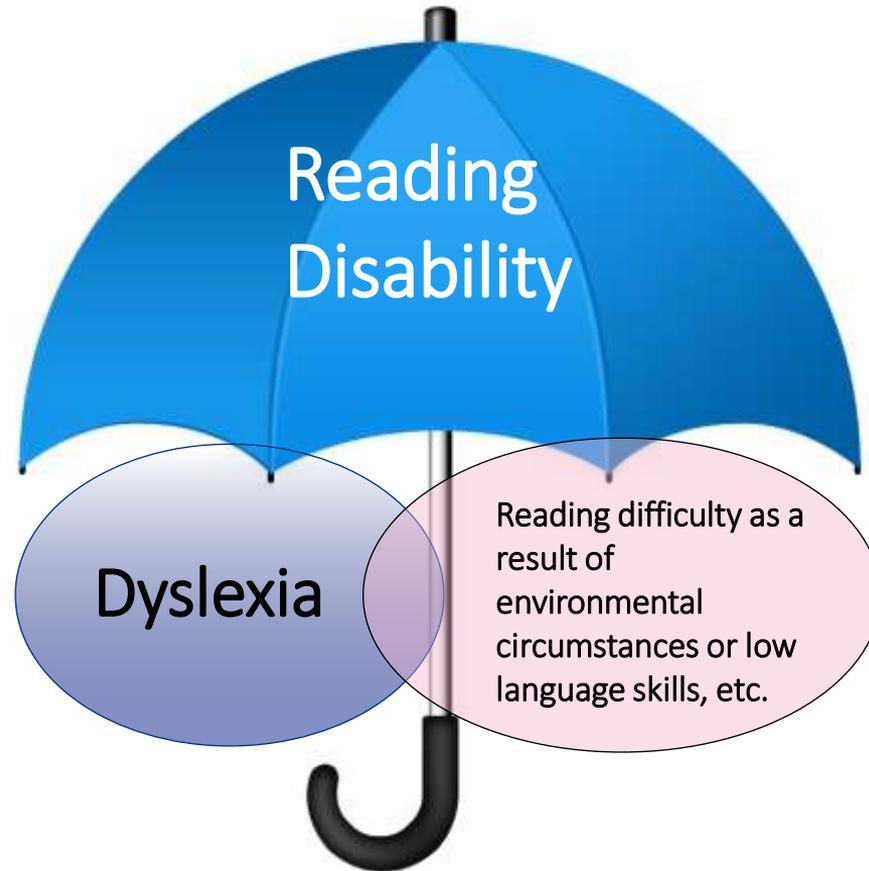


Factors contributing to atypical reading development



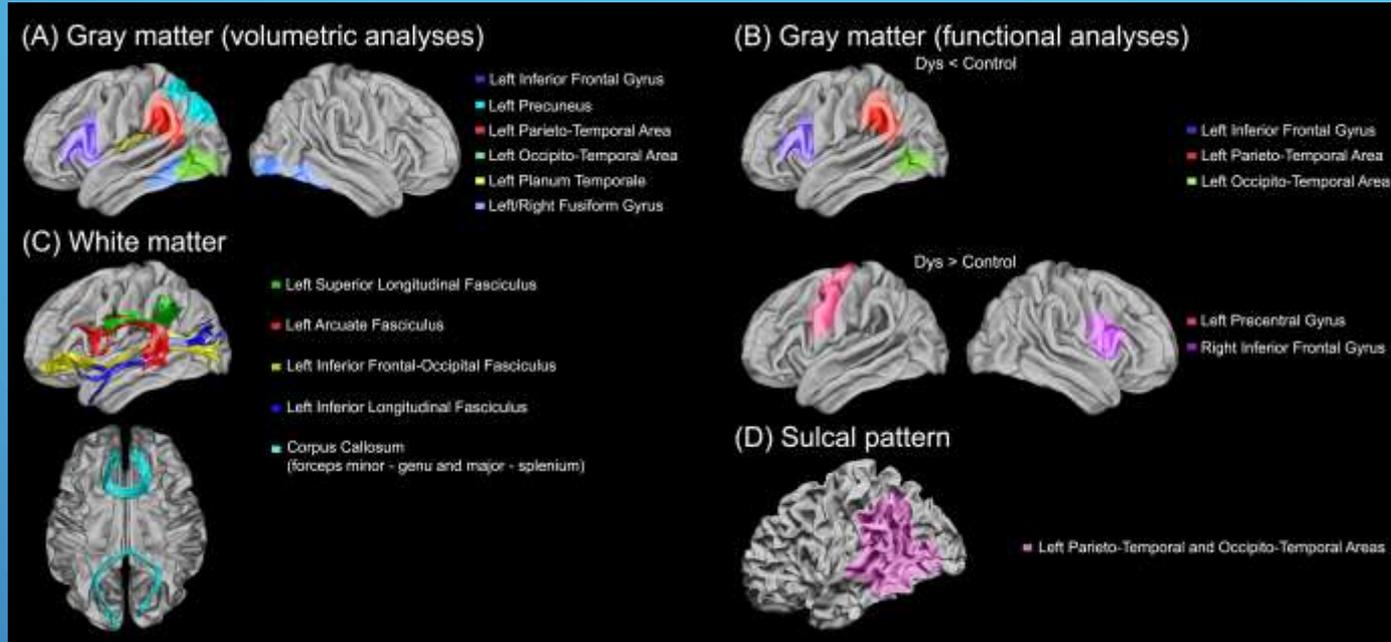
The Many Strands that are Woven into Skilled Reading (Scarborough, 2001)



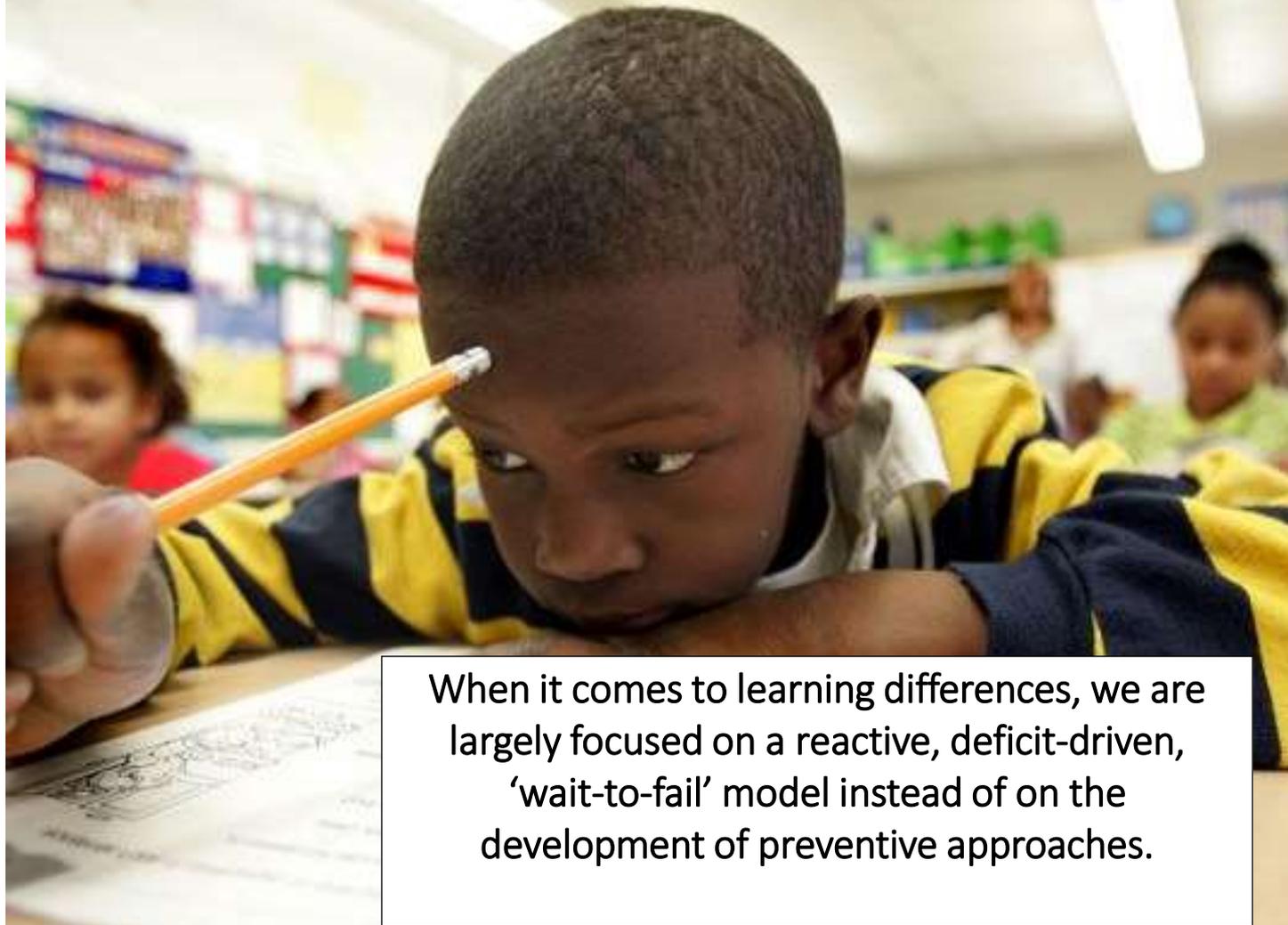


Structural and functional brain alterations in struggling readers

Ozernov-Palchik et al; 2016



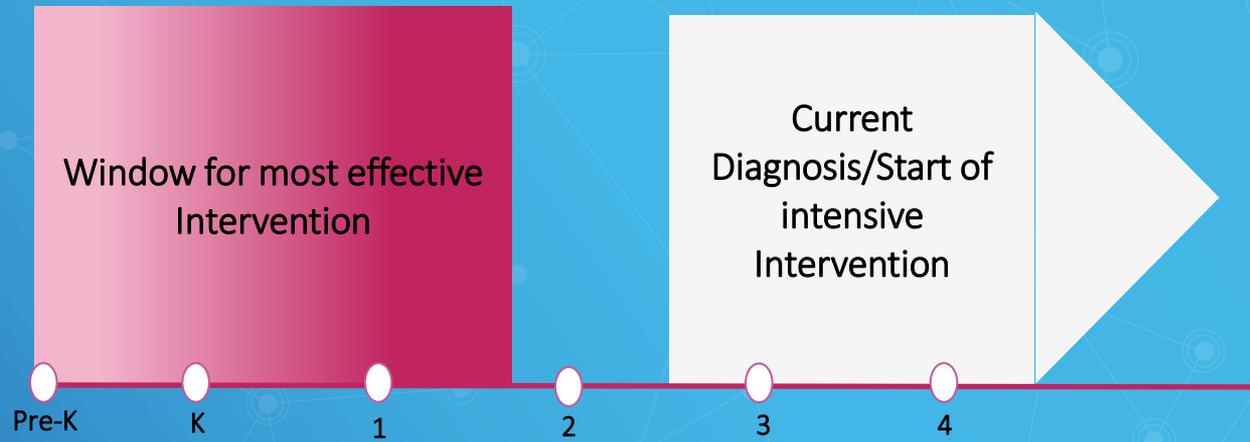
[e.g., see Meta-analyses: Richlan et al., 2011, 2013; Linkerdoerfer et al., 2012, Martin et al., 20015]



When it comes to learning differences, we are largely focused on a reactive, deficit-driven, 'wait-to-fail' model instead of on the development of preventive approaches.

The 'Dyslexia' Paradox (“the wait to fail approach”)

A reading disability is generally diagnosed after the most effective intervention window

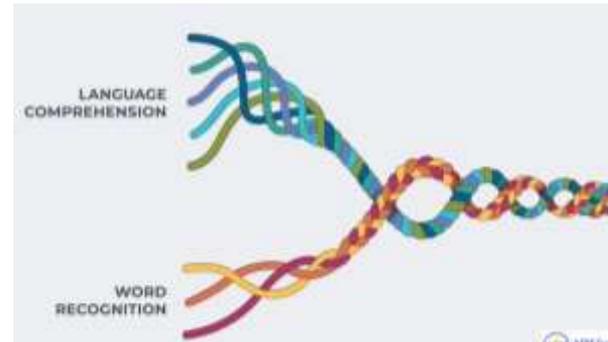


Ozernov-Palchik, et al., 2016

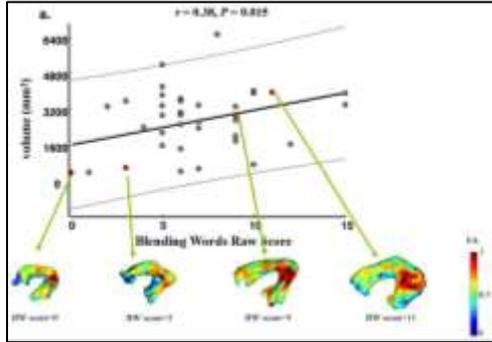
Early behavioral predictors of reading difficulties/dyslexia

Key childhood predictors of reading problems (e.g., Elbro et al., 1998; Scarborough, 1998, O'Connor & Jenkins, 1999; Lyytinen et al., 2001; Catts et al., 2001, 2015; Schatschneider et al., 2004, Pennington et al., 2001; Compton et al., 2006; Stanley et al., 2018):

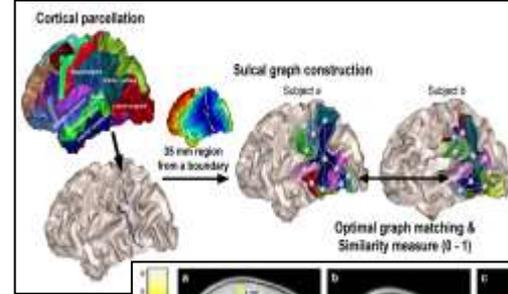
- Phonological awareness
- Pseudoword repetition
- Rapid automatized naming
- Letter (sound) knowledge
- Expressive/receptive vocabulary
- Oral listening comprehension



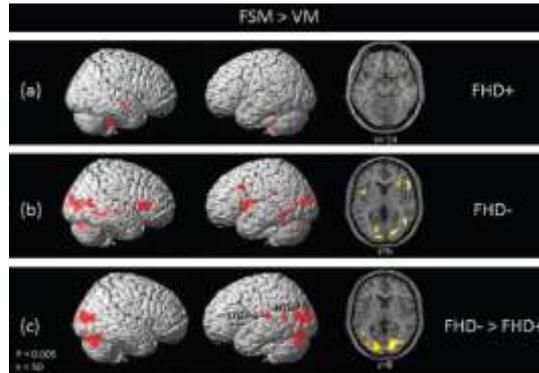
Brain alterations predate formal literacy instruction



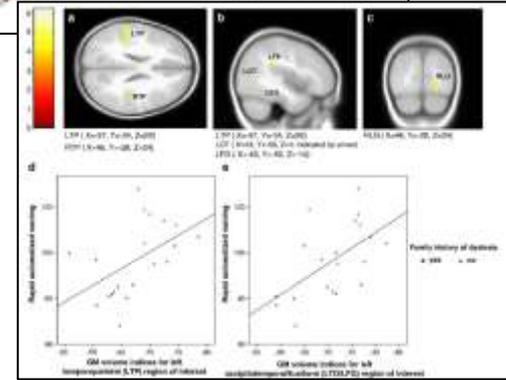
Saygin et al., 2013



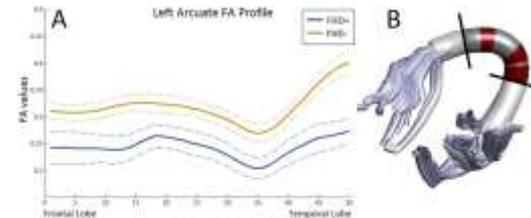
Im et al., 2015



Raschle et al., 2012



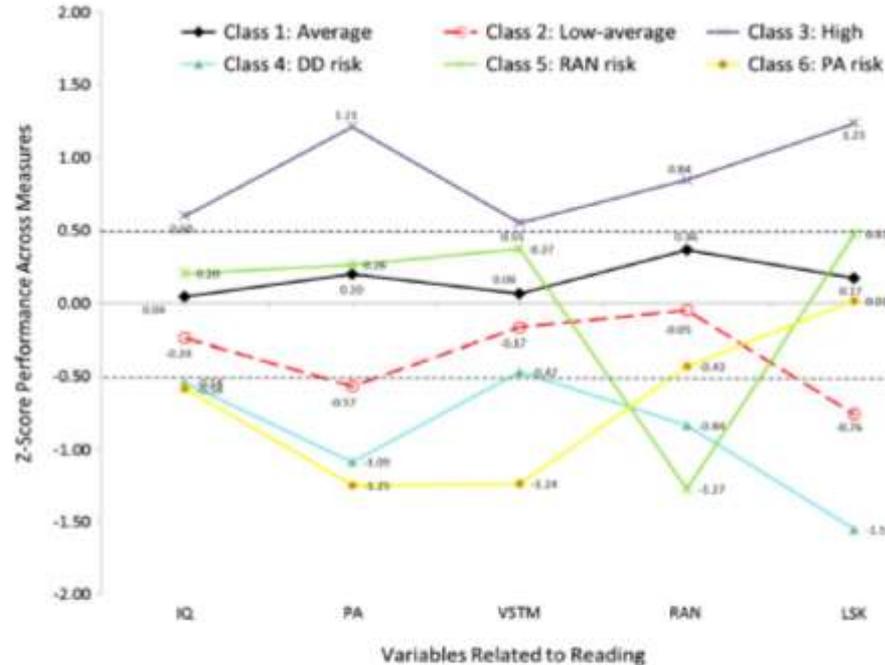
Raschle et al., 2010



Langer et al., 2016

Six Distinct Cognitive Profiles of Early Reading

Ozernov-Palchik et al., 2017



[n = 1,215 children]

54% Caucasian

23% African-American

15% Hispanic

5% Asian

3% Other

Figure 1 Latent Profile Analysis model for the identification of reading subgroups: optimal solution. Raw scores were transformed to z-scores on all variables. PA: phonological awareness, VSTM: verbal short-term memory, RAN: rapid automatized naming, LSK: letter sound knowledge.

**Identify
who is at
risk**



**Provide tools
for the “What’s
next”**

EarlyBird

Screen



Action Plan



Support



EarlyBird Screener



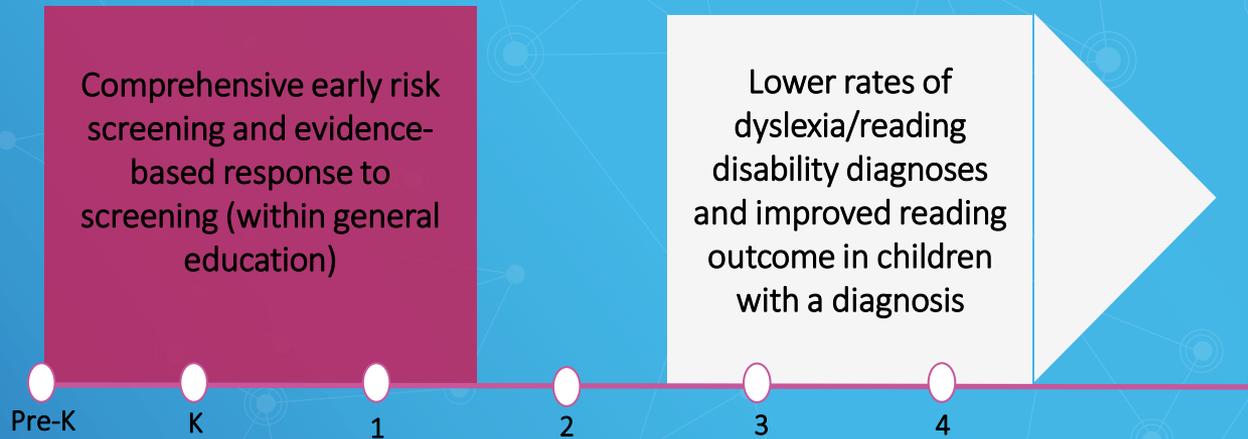
- Engaging game experience
- Child Self-Administered
- 20 minutes
- Tablet-based, touch screen
- Auto-Scoring
- Appropriate for pre-readers
- Evidence Based





Solving the Dyslexia Paradox

Replacing “the wait to fail approach” with a support model



Schools recognize and appreciate EarlyBird advantages

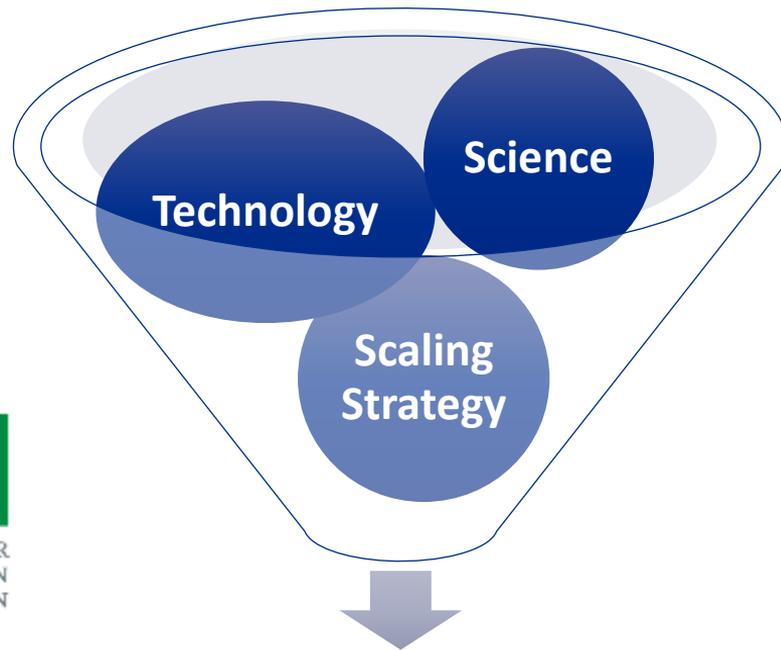
- Assesses child, and saves teacher time
 - *“1:1 is so difficult, I can administer this in groups of 5 students and screen my whole class in less than 2 hours”*
- Comprehensive – dyslexia and general word reading
 - *#1 advantage seen by administrators – trying to streamline the multitude of screeners, tools and checklists using now*
- Engaging
 - *“The children liked PIP and the pacing was good. It’s so much more engaging than what we are currently using.”*



Boston Children's Hospital's Approach to Developing the Early Literacy Screener



The Leventhal Fund





For Parents
& Families

For Schools
& Districts

For State
Agencies

Tools &
Resources

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State of Dyslexia

Explore dyslexia legislation and related initiatives in the United States of America.



Select a state from the map or the drop-down for an overview of legislation, requirements, and initiatives.

Select a State

HAS DYSLEXIA

LEGISLATION

REQUIREMENTS

- Screening
- Pre-service
- In-service
- Intervention
- All of the above

HAS LITERACY SIMR



SCREENED

What should early screening look like?

We recommend eight key characteristics when determining an optimal screening battery for an individual classroom, school, or district.

- **S**hort
- **C**omprehensive
- **R**esourceful
- **E**arly
- **E**SL/Dialect Inclusion
- **N**eurobiology/Genetics
- **E**vidence-based response to screening
- **D**evelopmentally appropriate



Important factors to consider when selecting a screener

SCREENING AND ASSESSMENT

Screening is a process for identifying students who may have learning difficulties. Assessment is a process for identifying students who are at risk for academic difficulties or who need special services.

Screening assessments are the assessments you use to identify students who are at risk for academic difficulties or who need special services. They should be easy to use and should be valid. For example, if you use a test that the doctor is likely to give you, you can be sure that if you get the test, then the doctor will use the test for your eye and you'll get the same screening.



Parents and caregivers: Talk with teachers about the screening process in your child's school to learn more. If you have questions about your child's screening results, ask to have them explained to you.

RELIABILITY

WHAT IS RELIABILITY?

Reliability is an important aspect of high-quality instruments used to measure academic progress. It is the consistency of a set of scores that are designed to measure the same skills.

Reliability is like using the produce scale at the supermarket.

A child can't be sure the scale is giving a consistent reading if the different produce scale is being used for the scale. You need to know the reliability, or consistency, of the scale to provide for your child's needs.

When using produce as an assessment, there's typically an assessment that the same produce. But this is usually not a student's ability, so there's a little to be sure in the scale.



There are many kinds of reliability in reading screens:

- Internal consistency: Items on the same test measure the same skill.
- Alternate forms: Two tests that measure the same skill but use different items.
- Test-retest: Two tests that measure the same skill but are given to the same student at different times.
- Inter-rater: Two tests that measure the same skill but are given to different students by different people.

VALIDITY

WHAT IS VALIDITY?

Validity is an important aspect of high-quality instruments used to measure academic progress. It is how well a test measures what it's supposed to measure.

The concept of validity may be illustrated with a simple example of the ice cream personality test.

In the test, individuals first select their top six cream preferences from a list of six flavors. Then, they identify which of the six personality descriptions best fits their personality.

If a cream preference is associated with a personality description, a prediction is made that a person who chooses that cream preference would provide an answer that the test is valid.

Five forms of construct validity:

- Content validity:** The items on the test are representative of the construct being measured.
- Criterion validity:** The items on the test are related to other measures of the same construct.
- Concurrent validity:** The items on the test are related to other measures of the same construct at the same time.
- Predictive validity:** The items on the test are related to other measures of the same construct at a later time.
- Face validity:** The items on the test appear to measure the construct being measured.



SAMPLE REPRESENTATIVENESS

WHAT IS SAMPLE REPRESENTATIVENESS?

Sample representativeness is an important aspect of high-quality instruments used to measure academic progress. It is ensuring that the sample used to validate the test is representative of your population of interest.

For example, if you're using a reading test to measure reading skills, then the sample demographics should be similar to the demographics of the population you're testing.

The same principles apply when you're evaluating the quality of a screening assessment.



- A population validity is high in a sample or a small group of students.
- A sample validity is high in a sample or a small group of students.
- Sample representativeness is high in a sample or a small group of students.
- A test that is valid in a sample or a small group of students is likely to be valid in the population of interest.
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- A test that is valid in a sample or a small group of students is likely to be valid in the population of interest.

CLASSIFICATION ACCURACY

WHAT IS CLASSIFICATION ACCURACY?

Classification accuracy is an important aspect of high-quality instruments used to measure academic progress. It is ensuring that the test is able to correctly identify students who have a reading difficulty from students who do not.

Classification accuracy is like a Transportation Security Administration (TSA) airport line.

TREAT POSITIVE	FALSE POSITIVE	TRUE NEGATIVE	FALSE NEGATIVE
When a student who is not a TSA member is treated as a TSA member, this is a false positive.	When a student who is a TSA member is treated as a TSA member, this is a true negative.	When a student who is not a TSA member is treated as a TSA member, this is a false negative.	When a student who is a TSA member is treated as a TSA member, this is a true positive.



A screening assessment that is able to correctly identify students who have a reading difficulty from students who do not is a high-quality screening assessment.



National Center on Improving Literacy

<https://improvingliteracy.org/brief>



Jennifer Curtis-Whipple, Ed.D.
Superintendent



Weymouth Public Schools

- Suburban Boston, MA
- 6,000 students
- One Preschool and 8 Primary Schools

Extensive Education Leadership Experience

- Superintendent - 4 years; Assistant Superintendent - 2 years
- Former Principal, Academy Primary School, Weymouth
- Ed.D., Northeastern University, Curriculum
- Adjunct Professor, Curry College

Specialized background in Literacy

- Literacy Coordinator, Special Ed and General K-2 Teacher
- Advanced Certification in Orton-Gillingham, Lindamood-Bell, Telian

Ways to engage:

- School Districts and teachers can raise their hands for the next cycle of Early Bird pilots
- Funders can support ongoing research and evaluation
- Investors can consider early venture opportunities

Thank you!

www.earlybirdeeducation.com

@EarlyBirdLearn



Questions & Discussion

Upcoming GLR Learning Tuesdays Webinars

SPECIAL WEBINAR

Bringing Noggin to Local Communities: A Special Opportunity for GLR Communities
Tuesday, May 12, 12:30 p.m. ET/9:30 a.m. PT

EMERGING MODELS WEBINAR

Early Childhood Innovation for Impact in a Crisis: A Show+Tell Pop Up with Promise
Tuesday, May 12, 3 p.m. ET/12 p.m. PT

PARTNERS WEBINAR

The Science of Reading, Part 2: Applying the Science in the Classroom
Tuesday, May 19, 3 p.m. ET/12 p.m. PT

