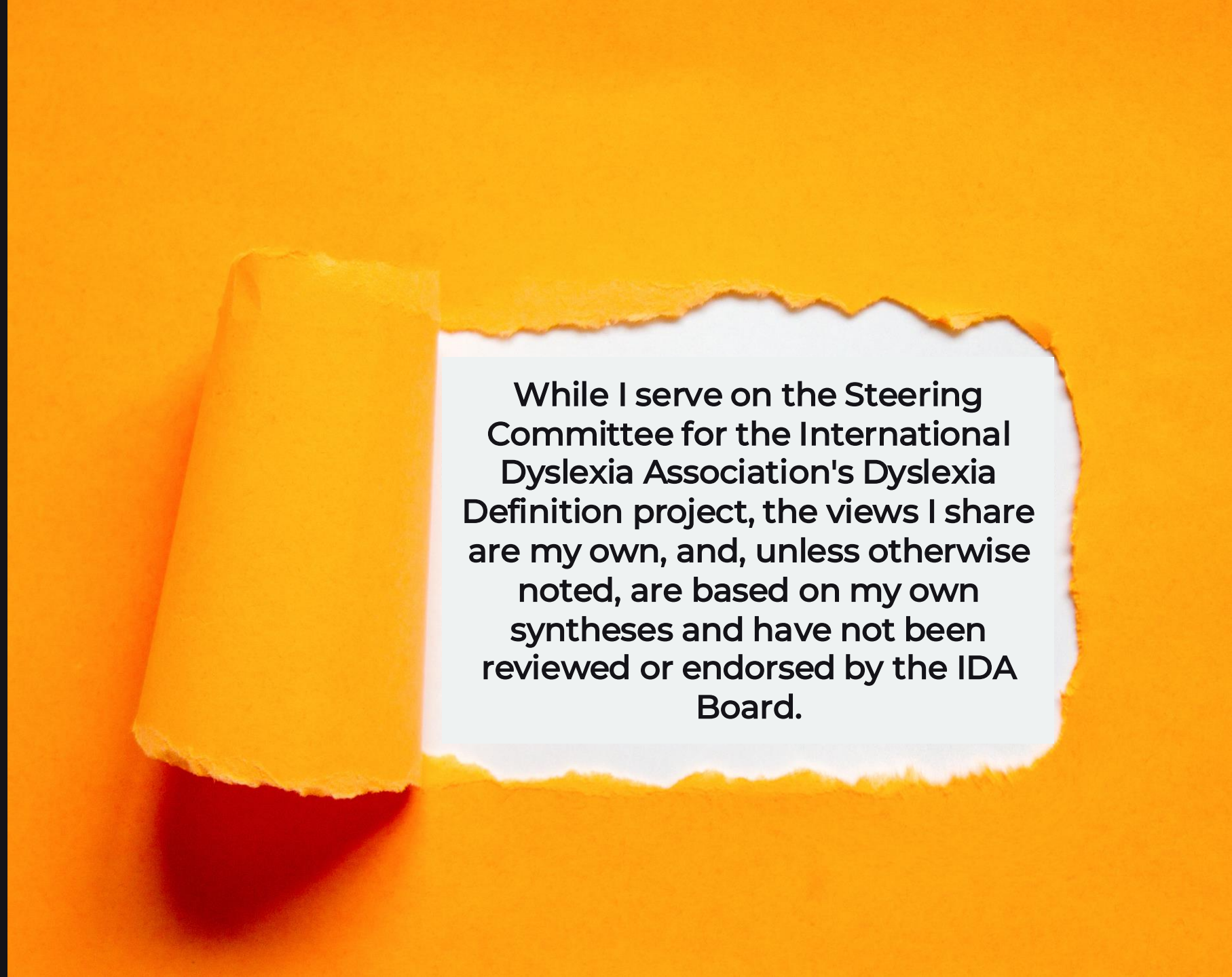
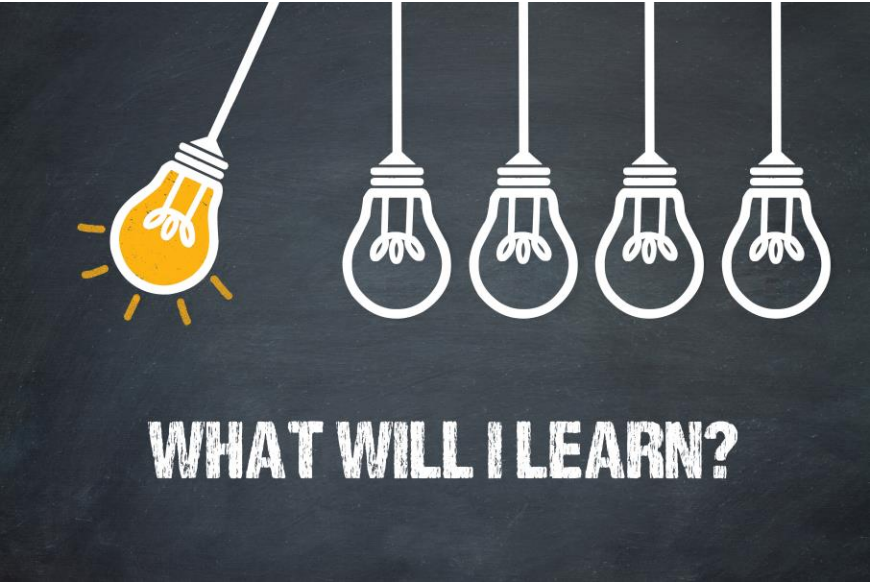
Dyslexia in the 21st Century: Revisiting the Definition of Dyslexia

Tim Odegard, Ph.D.
Professor of Psychology
Chair of Excellence in Dyslexic Studies
Middle Tennessee State University

Disclaimer

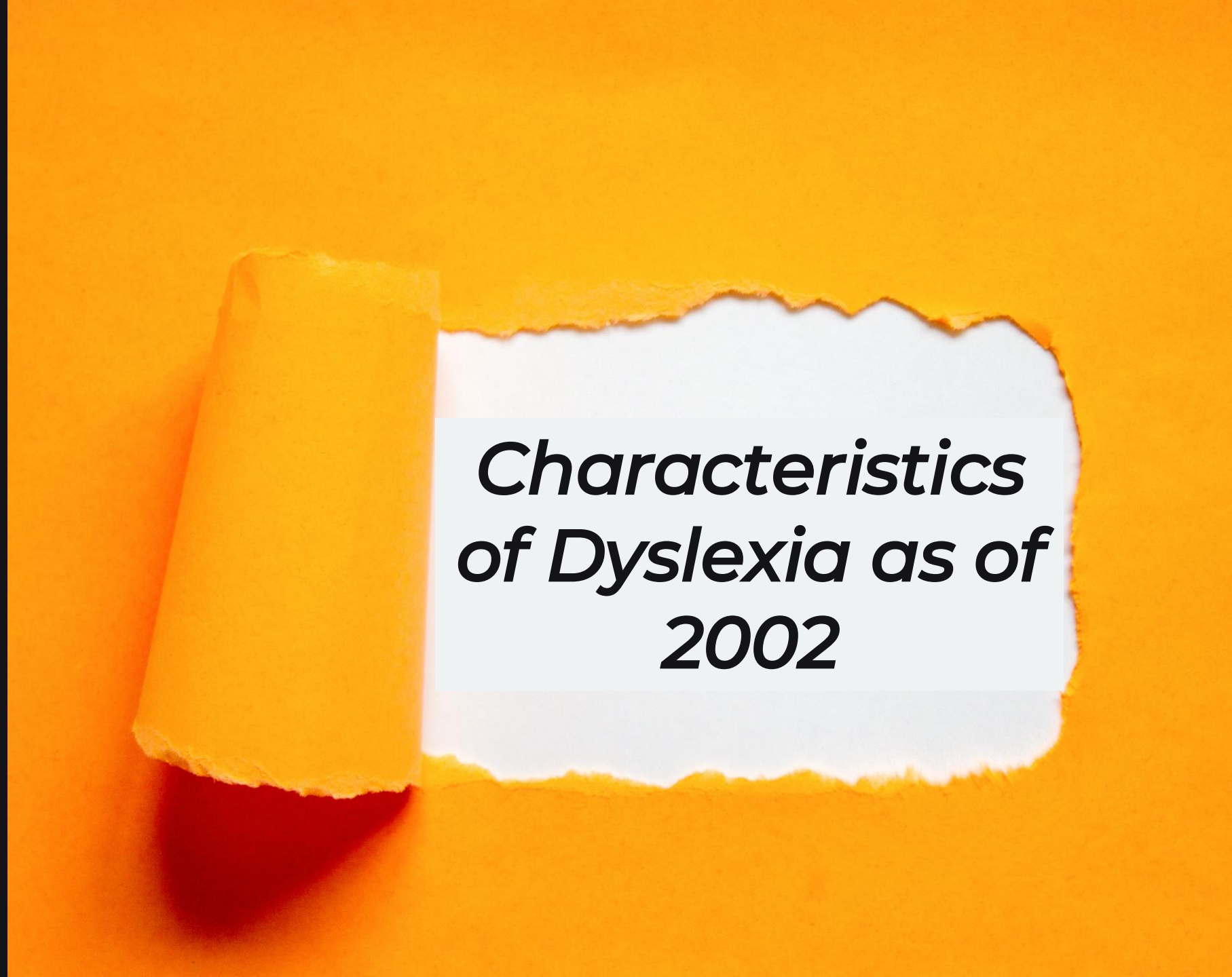

While I serve on the Steering Committee for the International Dyslexia Association's Dyslexia Definition project, the views I share are my own, and, unless otherwise noted, are based on my own syntheses and have not been reviewed or endorsed by the IDA Board.



You will learn about:

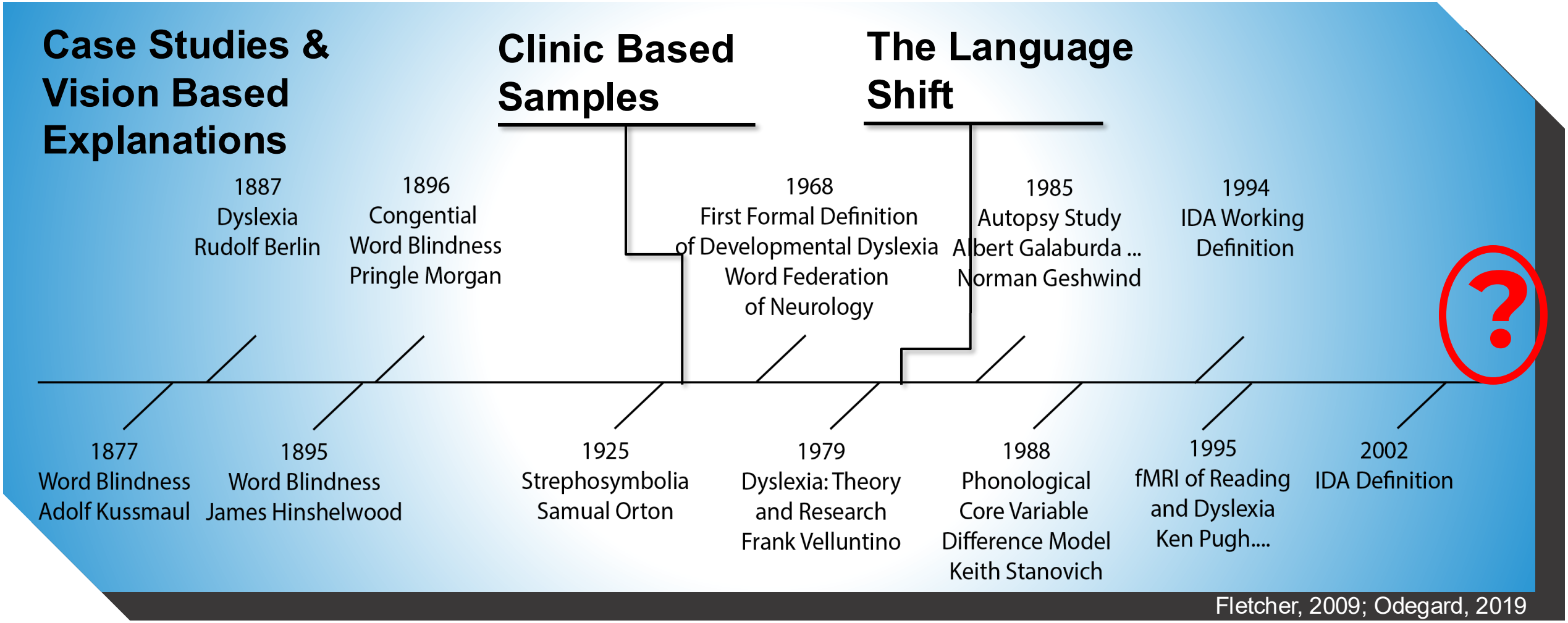
1. Characteristics of dyslexia as of 2002
2. Why are we revisiting the definition?
3. Process, goals, and next steps with revisiting the definition.
4. Contemporary Understanding of Dyslexia

Section 1



Dyslexia

The Evolution of a Construct



Fletcher, 2009; Odegard, 2019

Dyslexia Defined

2002 IDA Consensus Definition

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 the growth of vocabulary and background knowledge.

Components of Skilled Reading

(A Less Simple View)

EXECUTIVE FUNCTIONING
ATTENTION / INHIBITION / WORKING MEMORY

READING COMPREHENSION

SYNTACTIC STRUCTURE

MORPHOLOGY

VOCABULARY

BACKGROUND KNOWLEDGE

READING FLUENCY

WORD RECOGNITION

DECODING/ ENCODING

LK

PA

SIGHT WORD

RAPID NAMING

AUTOMATIC

ACCURATE

Odegard, 2016

Primary Characteristics of dyslexia

READING COMPREHENSION

- SYNTACTIC STRUCTURE
- MORPHOLOGY
- VOCABULARY
- BACKGROUND KNOWLEDGE
- READING FLUENCY
- WORD RECOGNITION
- DECODING/ ENCODING
  - LK
  - PA
- SIGHT WORD
- RAPID NAMING
- AUTOMATIC
- ACCURATE

Odegard, 2016

Deficits Associated with dyslexia

READING COMPREHENSION

- SYNTACTIC STRUCTURE
- MORPHOLOGY
- VOCABULARY
- BACKGROUND KNOWLEDGE
- READING FLUENCY
- WORD RECOGNITION
- DECODING/ ENCODING
  - LK
  - PA
- SIGHT WORD
- RAPID NAMING
- AUTOMATIC
- ACCURATE

Odegard, 2016

Secondary Consequences of dyslexia

READING COMPREHENSION

- SYNTACTIC STRUCTURE
- MORPHOLOGY
- VOCABULARY
- BACKGROUND KNOWLEDGE
- READING FLUENCY
- WORD RECOGNITION
- DECODING/ ENCODING
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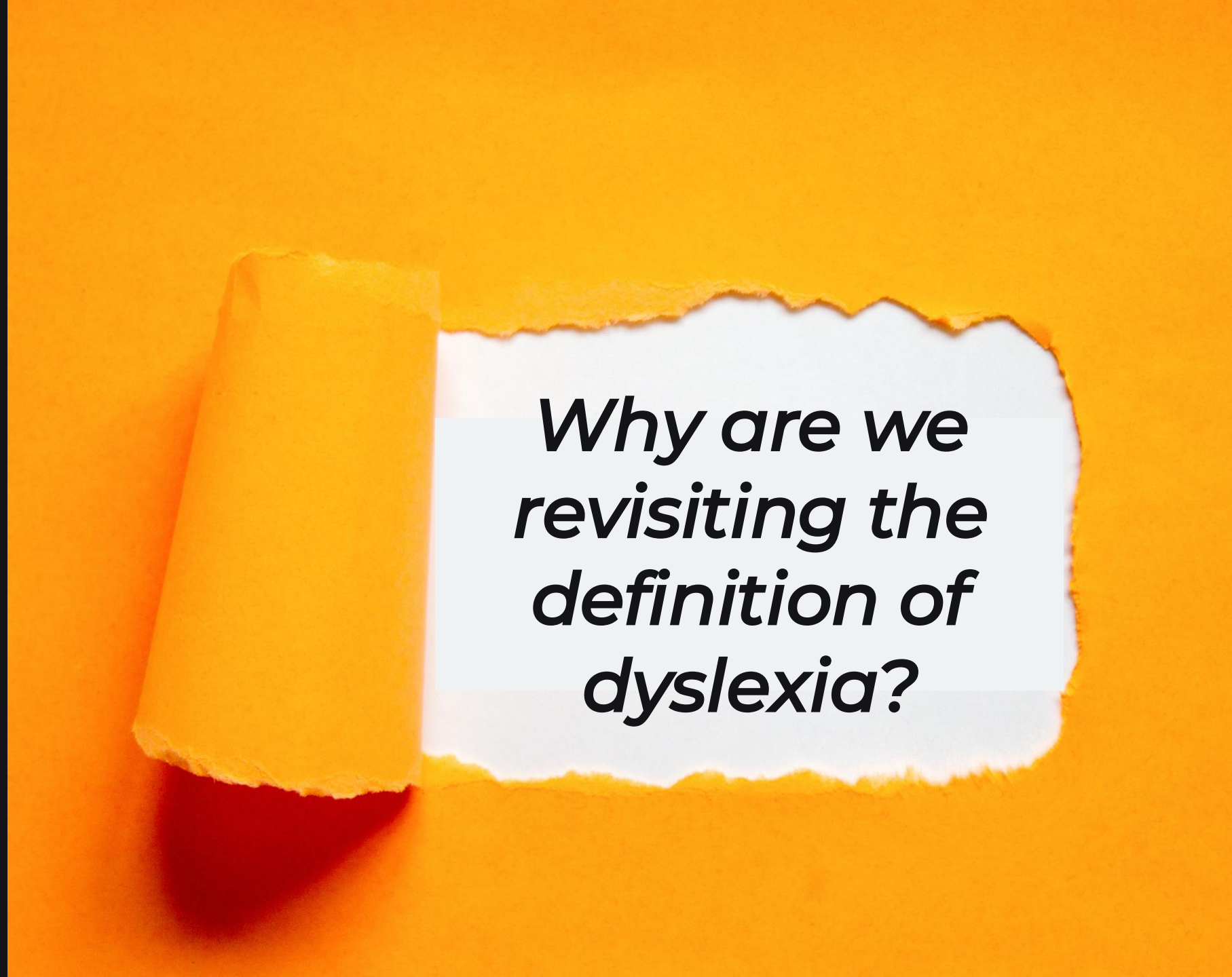
- ACCURATE

Odegard, 2016

Section 2



Dyslexia in the 21st Century

The Complexity of a Definition

Legal Definitions and Protections

A legal definition of dyslexia helps ensure individuals receive the services and accommodations they are entitled to under the law.

A clear and accessible definition ensures all students (individuals), regardless of background, get support.

Equal Protection under the Law

Personal Identity and Variability Across the Lifespan

Dyslexia can mean different things to individuals at different stages in life. It may be disabling in some contexts (like early education) but less so in others (like adulthood).

A precise definition gives researchers a common language so that when they examine dyslexia, they can know they are focusing on the same phenomenon.

Guidance for Research

CONTEXT

HOW DID WE GET HERE?

The only thing that is constant is change.

The last iteration of the International Dyslexia Association's definition of dyslexia was in 2002.

The authors of the 2002 definition anticipated the need to update it. In a white paper, they called it “a working definition.”

CONTEXT

HOW DID WE GET HERE?

As with most things, they emerge out of a social and historical context. The definition of dyslexia is no different.

A Definition of Dyslexia

G. Reid Lyon

National Institute of Child Health and Human Development
National Institutes of Health,
Bethesda, Maryland

Sally E. Shaywitz
Bennett A. Shaywitz

Yale University School of Medicine
New Haven, Connecticut

In addition to the authors, members of the working group of the International Dyslexia Association included Susan Brady, Hugh Catts, Emerson Dickman, Guinevere Eden, Jack Fletcher, Jeffrey Gilger, Robin Morris, Harley Tomey, and Thomas Viall.

This paper elaborates on the components of a working definition of developmental dyslexia. It follows the general format of a paper by Lyon published in Annals of Dyslexia *in 1995, which elaborated on a working definition proposed in 1994 (Lyon, 1995). The current definition agreed on by the work group updates and expands on the working definition from 1994.*

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"But the task is not complete. Our understanding of dyslexia is a work in progress and will continue to be just that …. One constant is that this and future definitions reflect the best that science has to offer."

WHY RECONSIDER THE DYSLEXIA DEFINITION

Since 2002, we have greatly increased our knowledge and awareness of several key factors critical to how we understand and define dyslexia.

- Challenges using a research definition in school settings
- Multiple causes of dyslexia (genetic and environmental; risk and resilience)
- Coexisting conditions (e.g., ADHD, DLD)
- Mental health consequences (e.g., anxiety, depression)
- Nature of difficulties characteristic of dyslexia:
  - Exist on a continuum on the bell-curve
  - Persist through the lifespan
- Issues of under-identification in specific communities (e.g., low socio-economic; black and Latin; MLLs in general)
- Similarities and differences in cognitive-linguistic predictors across world orthographies

WHAT

WHAT ARE WE LEARNING FROM RESEARCH?

The scientific understanding of dyslexia was summarized in a series of review papers published in IDA's flagship publication, *Annals of Dyslexia*

Dyslexia in the 21st Century: Revisiting the Consensus Definition. Tim Odegard, Emily A. Farris, & Anna E. Middleton

Revisiting the Definition of Dyslexia. Hugh Catts, Nicole Patton Terry, Christopher J. Lonigan, Donald L. Compton, Richard K. Wagner, Laura M. Steacy, Kelly Farquharson, & Yaacov Petscher

Towards a Dynamic, Comprehensive Conceptualization of Dyslexia. Maryanne Wolf, Rebecca J.M. Gotlieb, Sohyun An Kim, Veronica Pedoroza, Laura V. Rhinehart, Maria Luisa Gorno Tempini, & Sue Sears

The Critical Role of Instructional Response in Defining and Identifying Students with Dyslexia: A Case for Updating Existing Definitions. Sharon Vaughn, Jeremy Miciak, Nathan Clemens, & Jack M. Fletcher

An Interdisciplinary Perspective on the Strengths and Weaknesses of the International Dyslexia Association Definition of Dyslexia. Brian Gearin, Jessica Turtura, Kim Anderson, Samatha Durrance, Joan Mele-McCarthy, Laura Schultz, & Karleen Spitulnik

Dyslexia in the Twenty-First Century: A Commentary on the IDA Definition of Dyslexia. Maggie Snowling & Charles Hulme

Dyslexia in the Twenty-First Century: A Commentary on the IDA Definition of Dyslexia. Julian G. Elliott & Elena L. Grigorenko

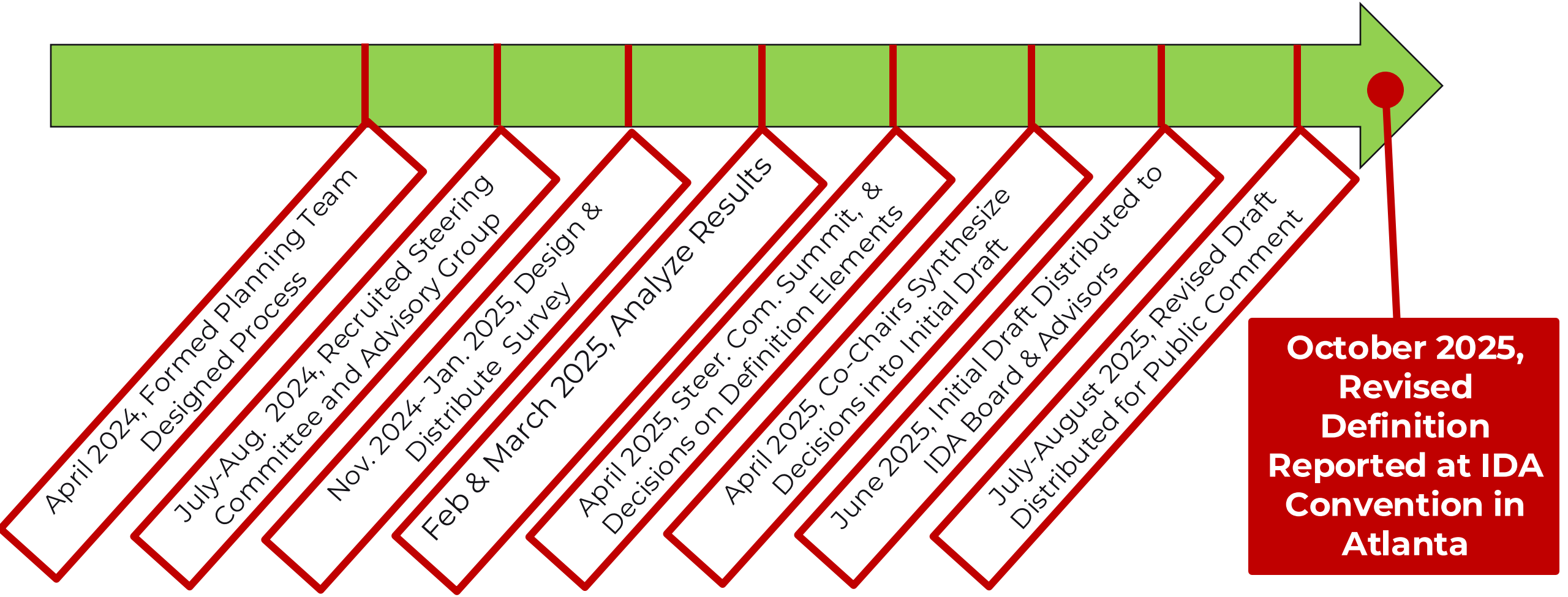
Emergent Themes Across the Special Collection

Consensus: Dyslexia is characterized by word-level reading and spelling struggles that are on a continuum of severity.

1. **Causal Mechanisms** – What causes the primary characteristics of dyslexia?
2. **Importance of Purpose and Context** – What are you using the definition to do, and what is the context?
3. **Persistent Challenges with Reading and Spelling** – What makes the primary characteristics stand out?
4. **Neurobiology** – Does neurobiology inform the practical use of the definition?
5. **Mental Health** – How does dyslexia impact mental health and how can we address mental health issues?

Section 3

HOW: Timeline for our Data-Driven Process



A multi-phase approach was adopted to reconsider and potentially revise the 2002 definition of dyslexia

APPROACH Phase 1

Formation of Steering Committee & Advisors

Researchers & Researcher Practitioners, Branch Council Executive Committee Members, Global Partner Heads, Presidents of major LD organizations, including parent and teacher groups.

Development and Implementation of Survey

(1) Is editing/revision of IDA's 2002 Definition required?
(2) If so, what updates are needed? Ratings & comments on each element of definition.

This infographic depicts the process we used.

Approach Organizational Structure

International DYSLEXIA Association®

REVISITING IDA'S DYSLEXIA DEFINITION

Teams • Engagement • Process • Timeframe

PLANNING TEAM

MEMBERS
IDA Leadership & Steering Committee Co-Chairs

ROLE
Guide/define overall project & process (2024-2025)

STEERING COMMITTEE (2024-2025)

MEMBERS
Interdisciplinary experts representing diverse perspectives

ROLE
Informed by stakeholder & advisor input, determine if IDA's dyslexia definition needs updating. If so, craft an update for IDA's Board approval

ADVISORS (Phase I/Survey Design)

ROLE
Provide input & feedback via papers, presentations, findings, discussions critiques, etc. (2024-2025)

MEMBERS
Researchers & various experts & thought leaders in relevant domains

STAKEHOLDERS (Phase II)

ROLE
Provide input via surveys, town halls, focus groups, dialogue, etc. (2024-2025)

MEMBERS
Families/individuals with dyslexia, practitioners working with those dyslexia

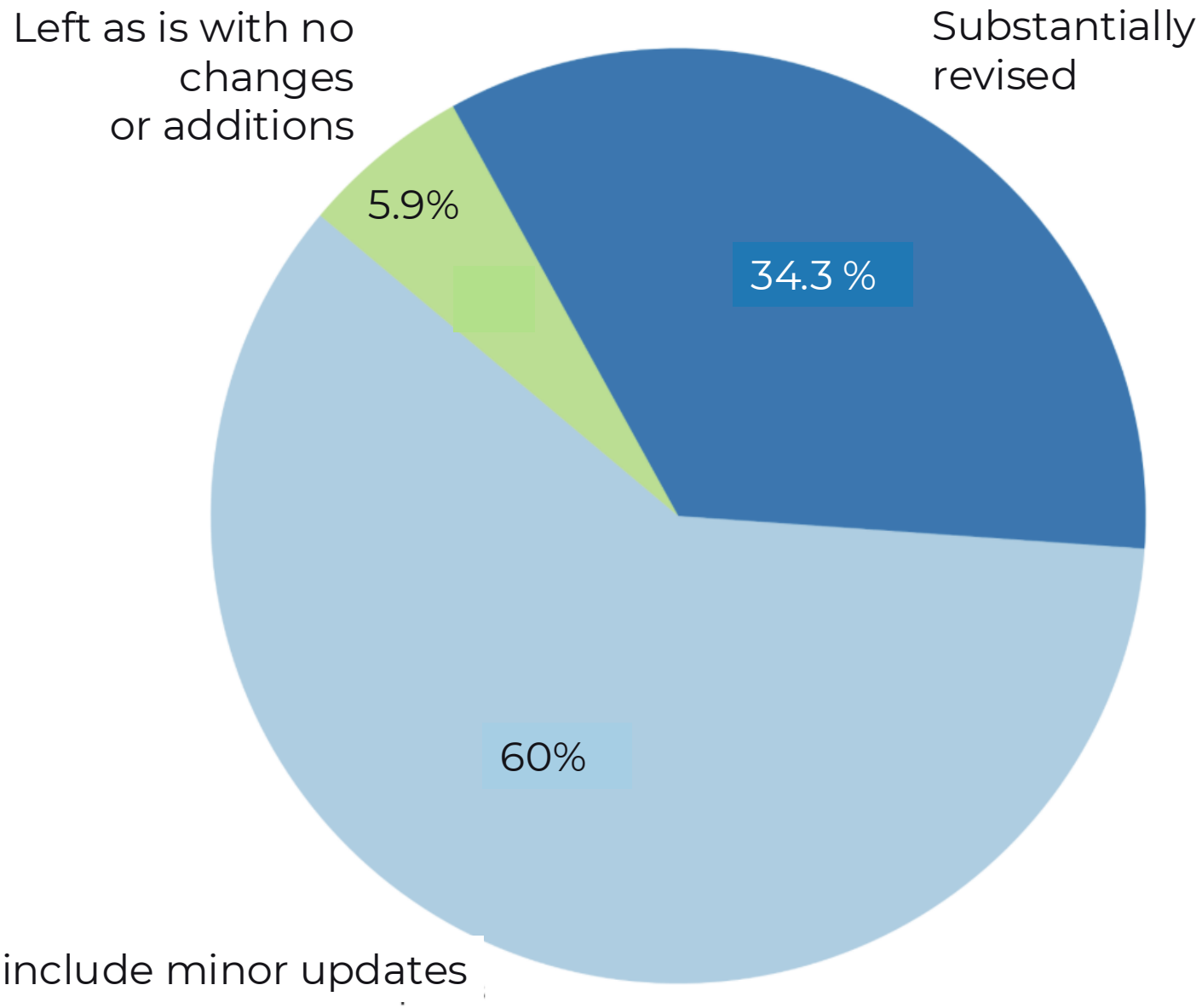
IDA BOARD
Approve any revised definition before end of 2025

APPROACH Phase 1

Our first goal was to survey selected leaders in the dyslexia community if a change in the IDA 2002 definition was needed.

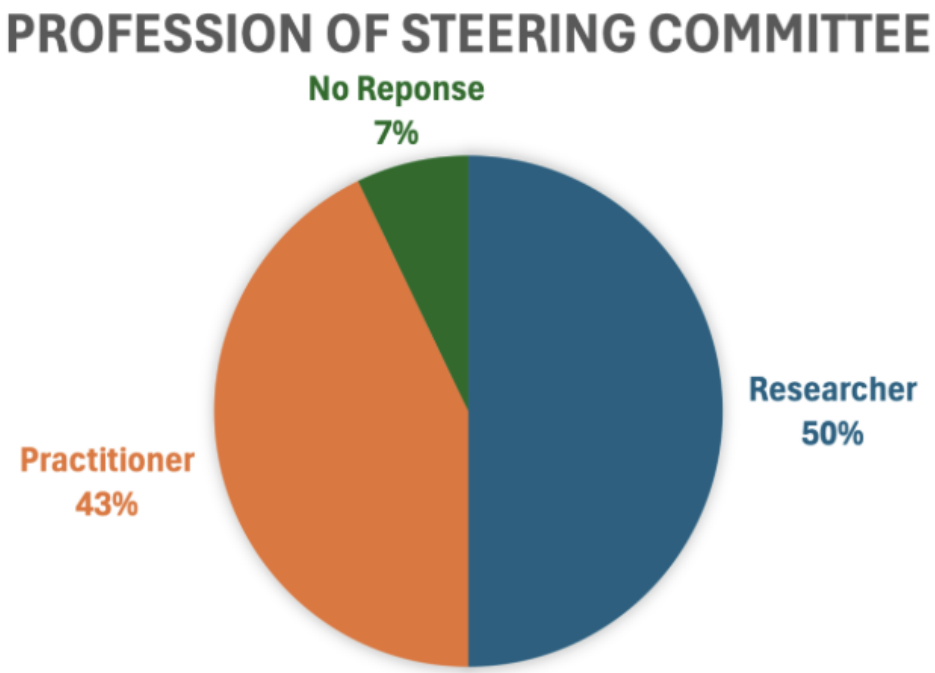
- Formation of Steering Committee (N=14) and Advisors Committee (N=74) *Cross-groups emphasis on including diverse representation of perspectives (racial, ethnic, linguistic, parent, schools, individuals with dyslexia) across groups*
- After surveying them on detailed elements of the definition, they had to respond to this item:
  In general, the wording of IDA's 2002 definition should be: (choose the one response that best applies):
  1) *Left as is with no changes,*
  2) *Edited to include minor updates, or*
  3) *Substantially revised*

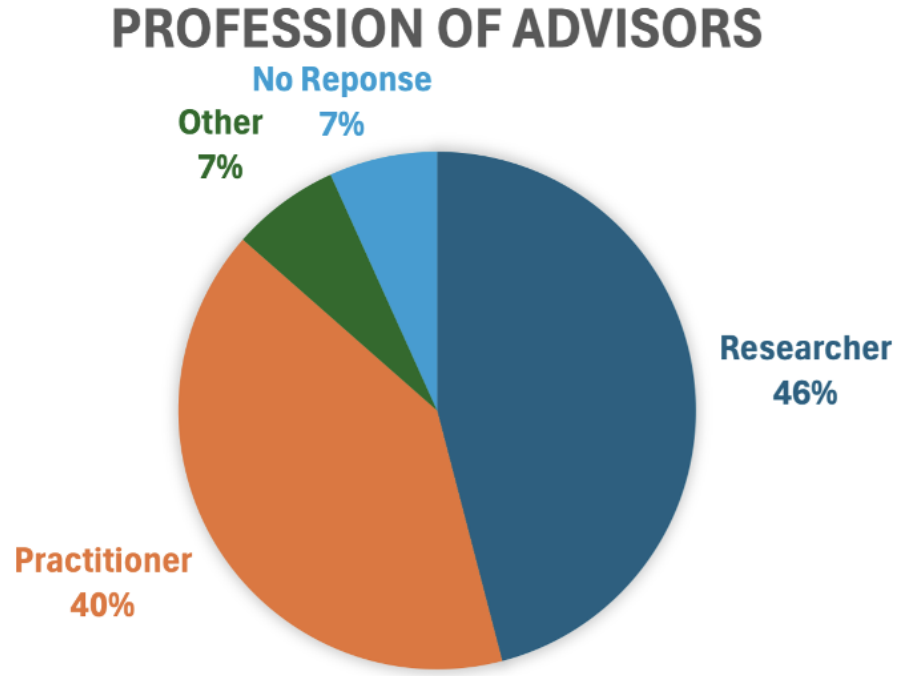
All (Advisors & Steering Committee) (N=88)



(Special thanks for survey data analyses to Juan Quinonez and Jialin Lai of Texas A & M University)

Our Dyslexia Definition Survey Included Researcher & Practitioner Perspectives (Steering Committee, N=14; Advisors Group, N=74)

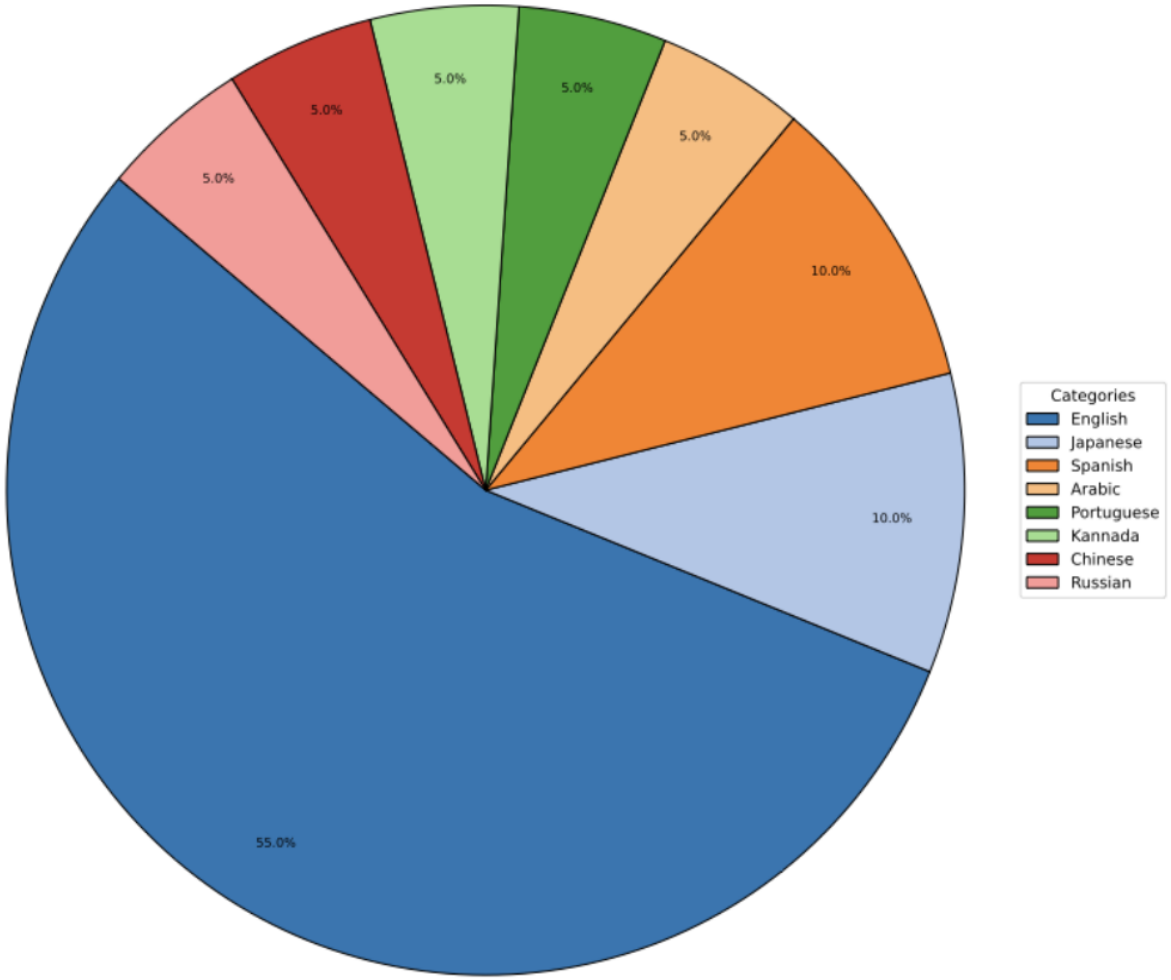




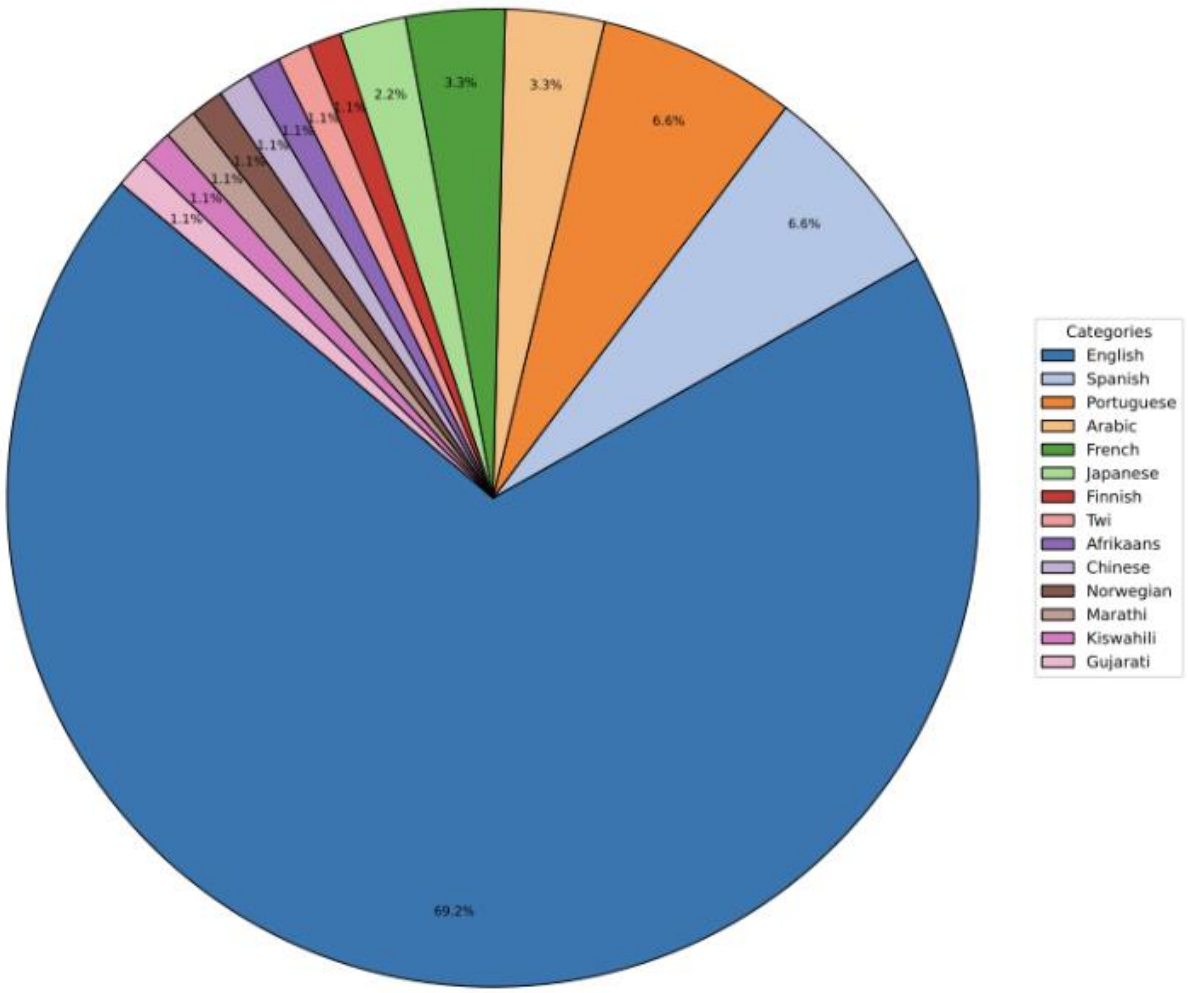
(Acknowledgments for analyses and figures to Juan Quinonez and Jialin Lai of Texas A & M University)

We Surveyed People Who Speak a Variety of World Languages
(Steering Committee, N=14; Advisors Group, N=74)

Language Distribution – Steering Committee

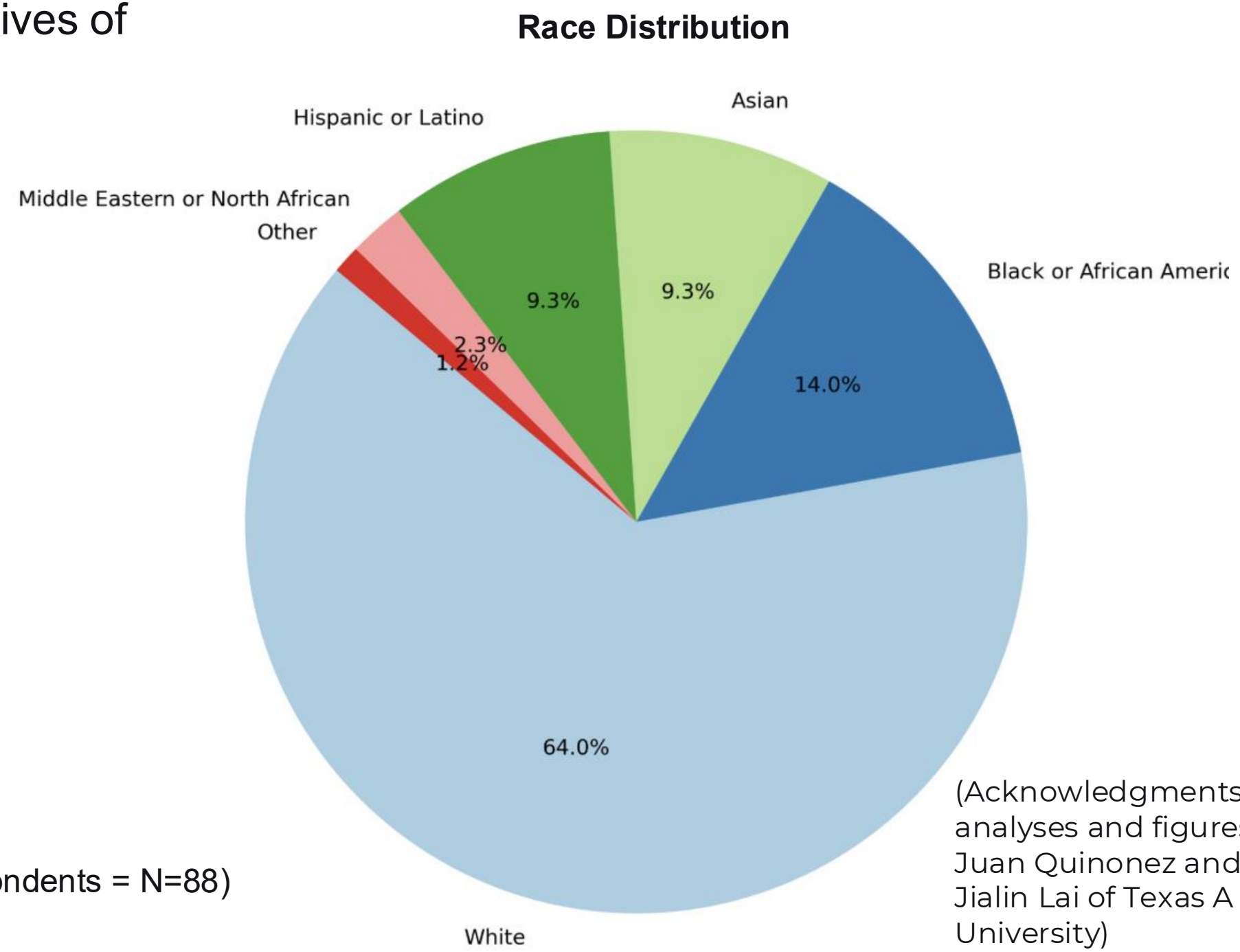


Language Distribution – Advisors Group



(Acknowledgments for analyses and figures to Juan Quinonez and Jialin Lai of Texas A & M University)

We Included Perspectives of People of Different Races/Ethnicities



(Total N of Respondents = N=88)

(Acknowledgments for analyses and figures to Juan Quinonez and Jialin Lai of Texas A & M University)

Steering Committee Summit, Houston, April 9 &10

A multi-phase approach is being adopted to revise the current 2020 definition of dyslexia

APPROACH Phase 2

Goals

1) Engage the Advisors group, IDA Board, and the broader dyslexia and LD community in responding to the updated definition.
2) Foster broad awareness of the new working definition.

Mechanisms

- Continue to recruit diverse participation to examine the updated Working Definition
- Provide a public comment period for the updated Working Definition
- Disseminate the final version of the Working Definition at the IDA conference and via digital and print media

APPROACH Phase 3

Develop Accompanying Resources (papers, videos, graphics)

1) Make the new *working* definition accessible to teachers, parents, and policymakers by providing a guide and accompanying documentation to support and expand on the definition
2) Provide a paper with scientific rationales for changes to be published in the *Annals of Dyslexia*

Section 4

PSYCHOLOGICAL

LANGUAGE
COGNITION

ATTITUDES

EMOTIONS

SOCIAL

BIOLOGICAL

GENETICS

BRAIN

FAMILY

SCHOOL

POLICY

LANGUAGE BASICS

Figure developed based on the American Speech-Language-Hearing Association (ASHA) definition of language.

ORAL AND WRITTEN LANGUAGE

1 Oral Language came first

We have used spoken language to communicate for a long time, around 240,000 years.

Highly integrated brain networks have evolved to allow for oral language.

Reading is a newer human invention (5000 years). It is the interaction of attention, language, vision, and knowledge.

2 Reading Must be Taught & Practiced

Children learn to understand and produce oral language from exposure.

Children must be directly taught how to read and write written language.

It takes practice to become automatic readers and writers.

Individual differences exist in how much instruction and practice is required to become proficient readers and writers.

3 Oral Language is ever present

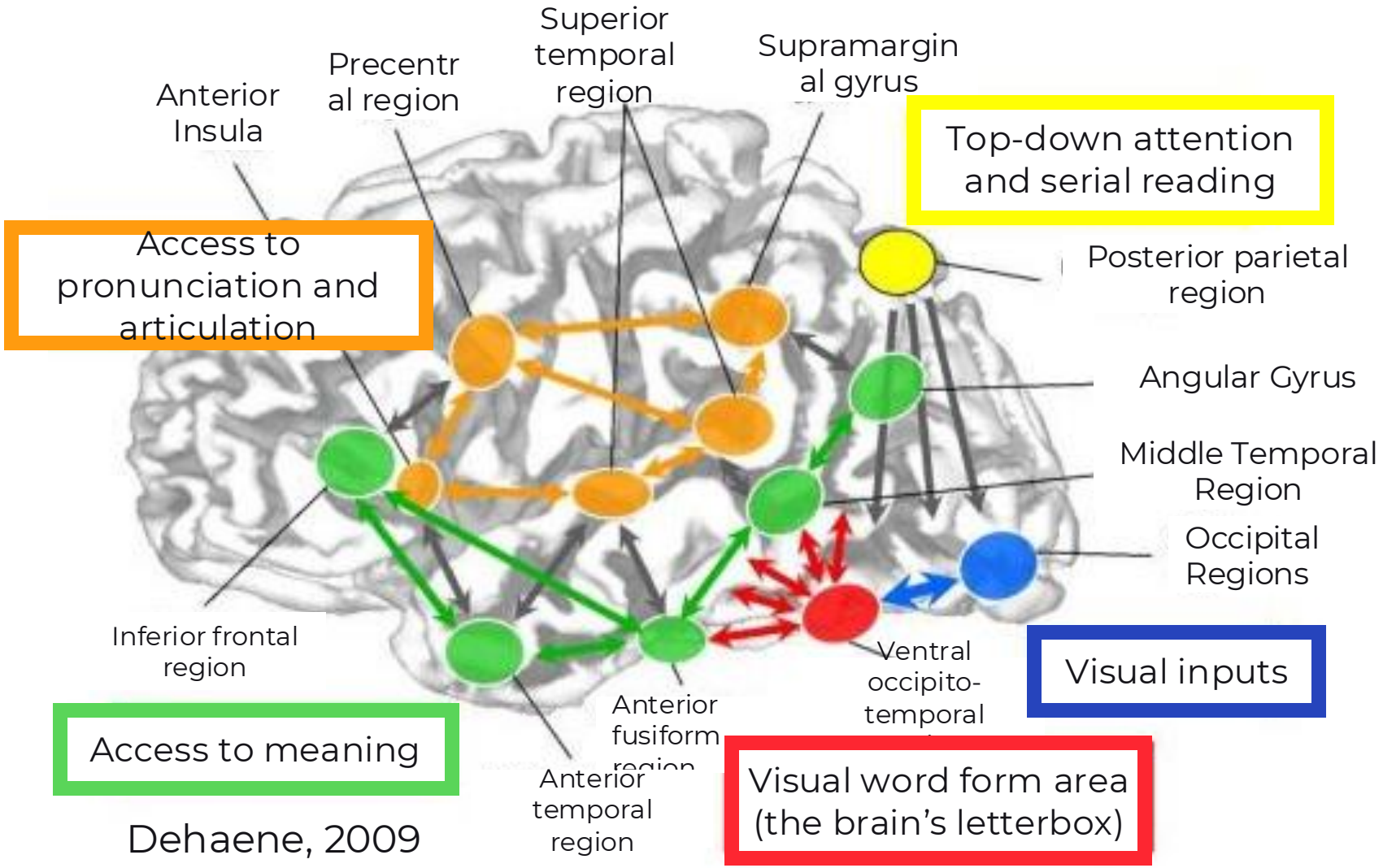
Oral language continues to develop and expand even after a child enters school, and this development interacts with reading development.

Engaging meaningfully and deeply with text fosters vocabulary, background knowledge, creativity, and innovation.

Dehaene, 2009; Pugh et al., 2010; Wolf, 2007

“My firm conviction is that every teacher should have some notion of how reading operates in the child’s brain.”
-Dehaene

CORTICAL MODEL OF READING



Dehaene, 2009

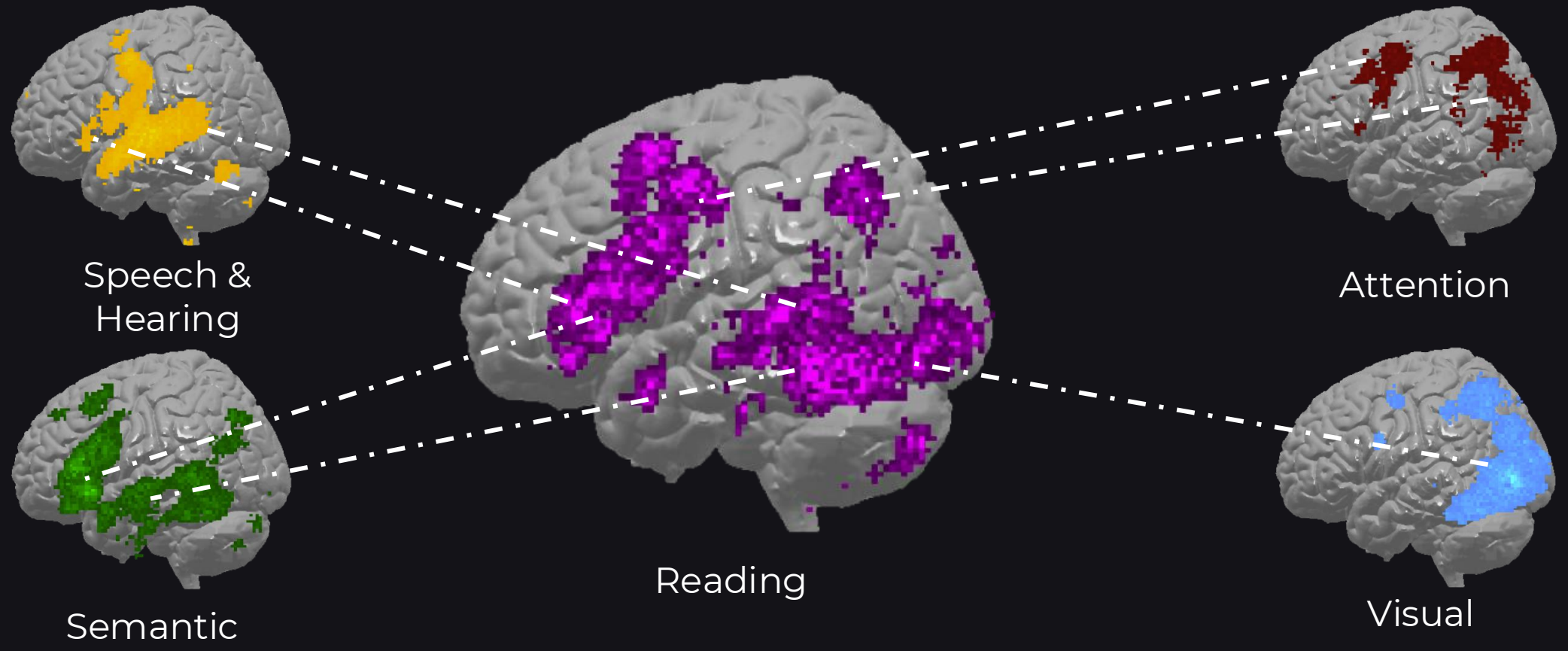
Brain Areas Involved When Reading

Reading taps many cortical regions

Aspects of Oral Language

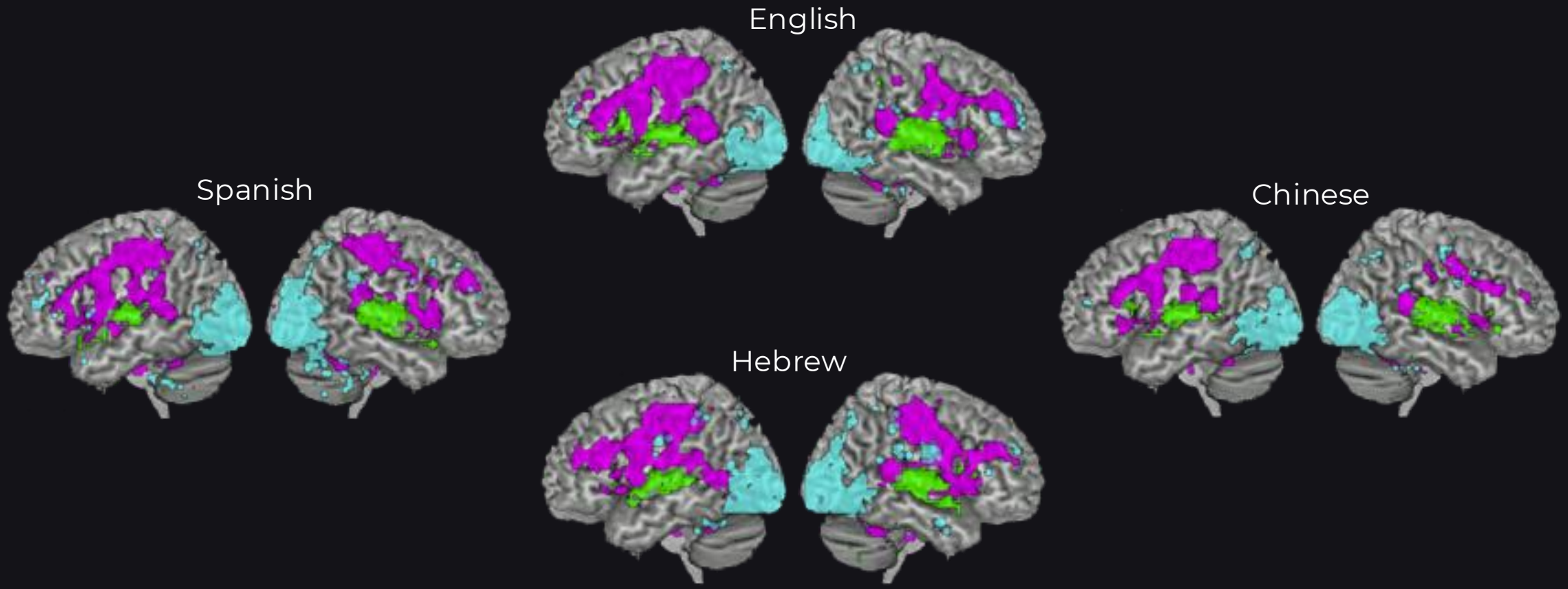
Receptive Written Language

Supporting Processes



UNIVERSALITIES ACROSS ORTHOGRAPHIES?

Similar brain networks are engaged when reading



Adapted from Rueckl et al., 2015
Figure 1

Abridged Contemporary Model of Dyslexia

Intrinsic Protective and Risk Factors

Behavioral Presentation

Inaccurate/Inefficient Word Reading, Inaccurate/Inefficient Decoding, Spelling Deficits, Persistently Slow Learning Rate

Proximal Causes

Phonological Processing Deficits, Sound-Symbol Correspondences Deficits, Lack of Automaticity in Accessing Phonology and Orthography

Distal Causes

Neuro-biological (genetics, brain structure, brain function, brain connectivity)

Environmental Protective and Risk Factors

Graphic was developed based on the conceptual understanding of learning disabilities outlined in Fletcher et al., 2019. A similar and expanded understanding of dyslexia is described in Catts & Petscher, 2021.

Odegard et al., 2020

Expanded Contemporary Model of Dyslexia

ENVIRONMENTAL FACTORS

BEHAVIORAL PHENOTYPES

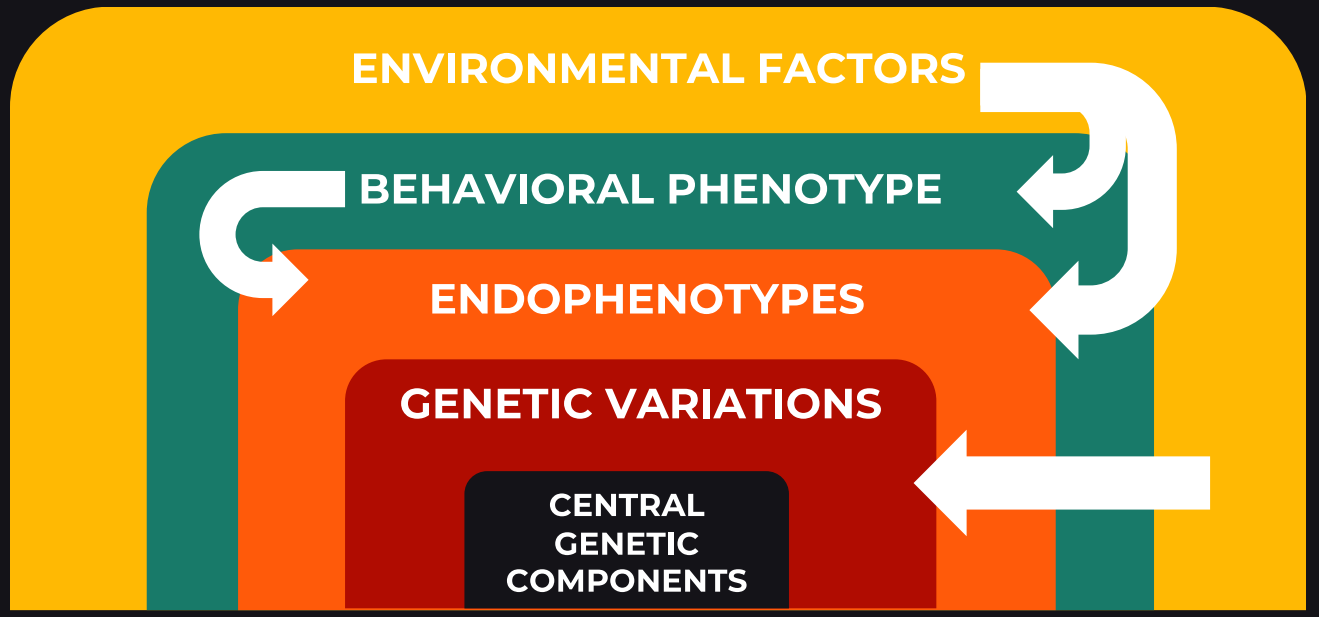
ENDOPHENOTYPES

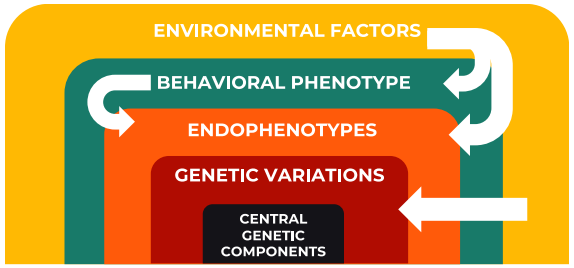
GENETIC VARIATIONS

CENTRAL GENETIC COMPONENTS

Genetic Variations

Genetic variations, occurring across multiple genes (i.e., polygenetic), play a crucial role in shaping the behavioral presentation of dyslexia. This level of specificity acknowledges the diversity in genetic influences, particularly those related to language processing.





Candidate Genes

Understanding genetic variations provides insight into the polygenetic nature of dyslexia and the potential influence of candidate genes on individual differences in language development and reading abilities.

1. **DCD2 –** This gene is involved in brain development and is associated with neuronal migration, a process crucial for the formation of functional neural circuits.

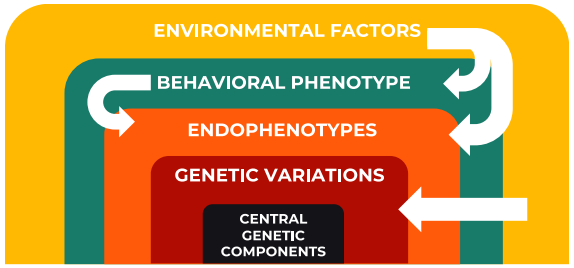
2. **DYX1C1**– This gene is located in a region on chromosome 15 and is involved in neuronal migration and has been associated with reading and language impairments.

3. **KIAA0319** – This gene is involved in brain development and is associated with phonological processing (e.g., RAN, auditory cortex).

4. **FOXP2** – While primarily associated with language development, variations in FOXP2 have been investigated in the context of dyslexia due to its role in speech and language.

5. **ROBO1** – ROBO1 is involved in neural development and has been associated with reading and language skills.

6. **CNTNAP2** – This gene is involved in neural development and has been associated with language-related difficulties, including aspects of dyslexia.



Candidate Endophenotypes

Several endophenotypes have been proposed and studied in the context of dyslexia.

1. **Phonological Awareness Deficits** – Individuals with dyslexia often struggle with phonological awareness, which involves the ability to recognize and manipulate the sounds of spoken language.

2. **Rapid Automatized Naming (RAN)** – RAN tasks involve quickly naming a series of familiar items (e.g., colors, objects). Deficits in rapid naming have been suggested as a potential endophenotype.

3. **Orthographic Processing** – Individuals with dyslexia can experience challenges in processing and recognizing written words and their corresponding orthographic features.

4. **Neuroanatomical Differences** – Structural brain imaging has identified differences in the anatomy of brain regions, (e.g., left temporoparietal region) in individuals with dyslexia.

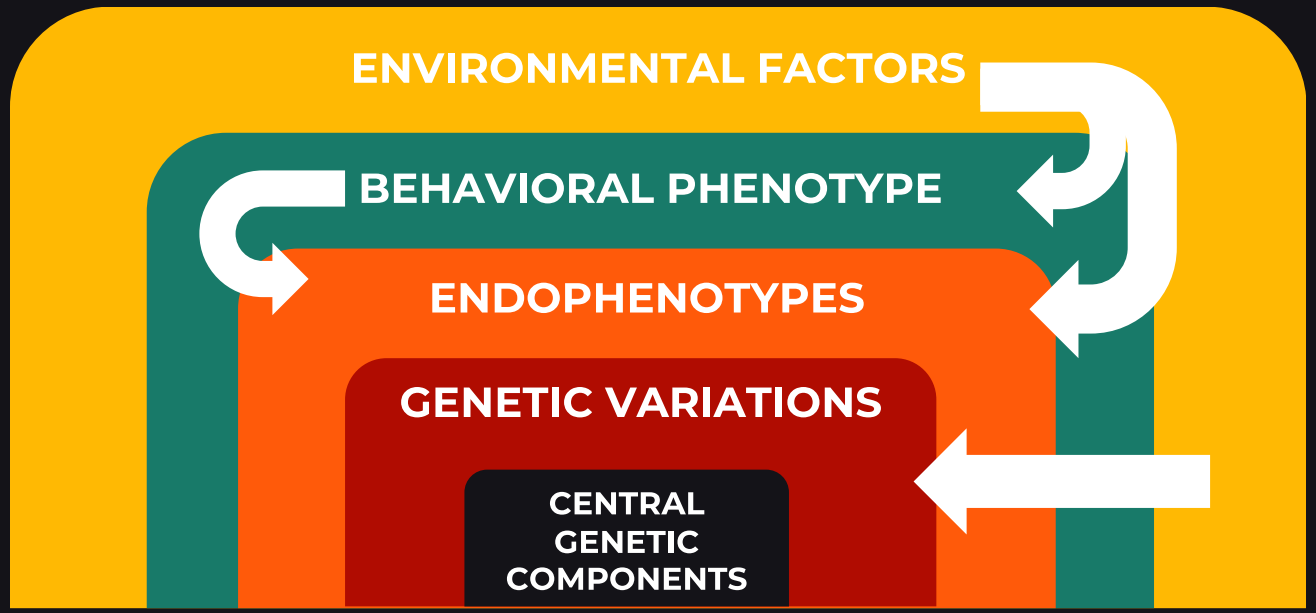
5. **Visual Attention** – Some studies have explored endophenotypes related to visual attention, as individuals with dyslexia may exhibit difficulties in these areas.

6. **Working Memory** – Some research suggests that working memory deficits, particularly in tasks involving verbal information, could be associated with dyslexia.

Behavioral Phenotype

Behavioral Phenotype of Dyslexia

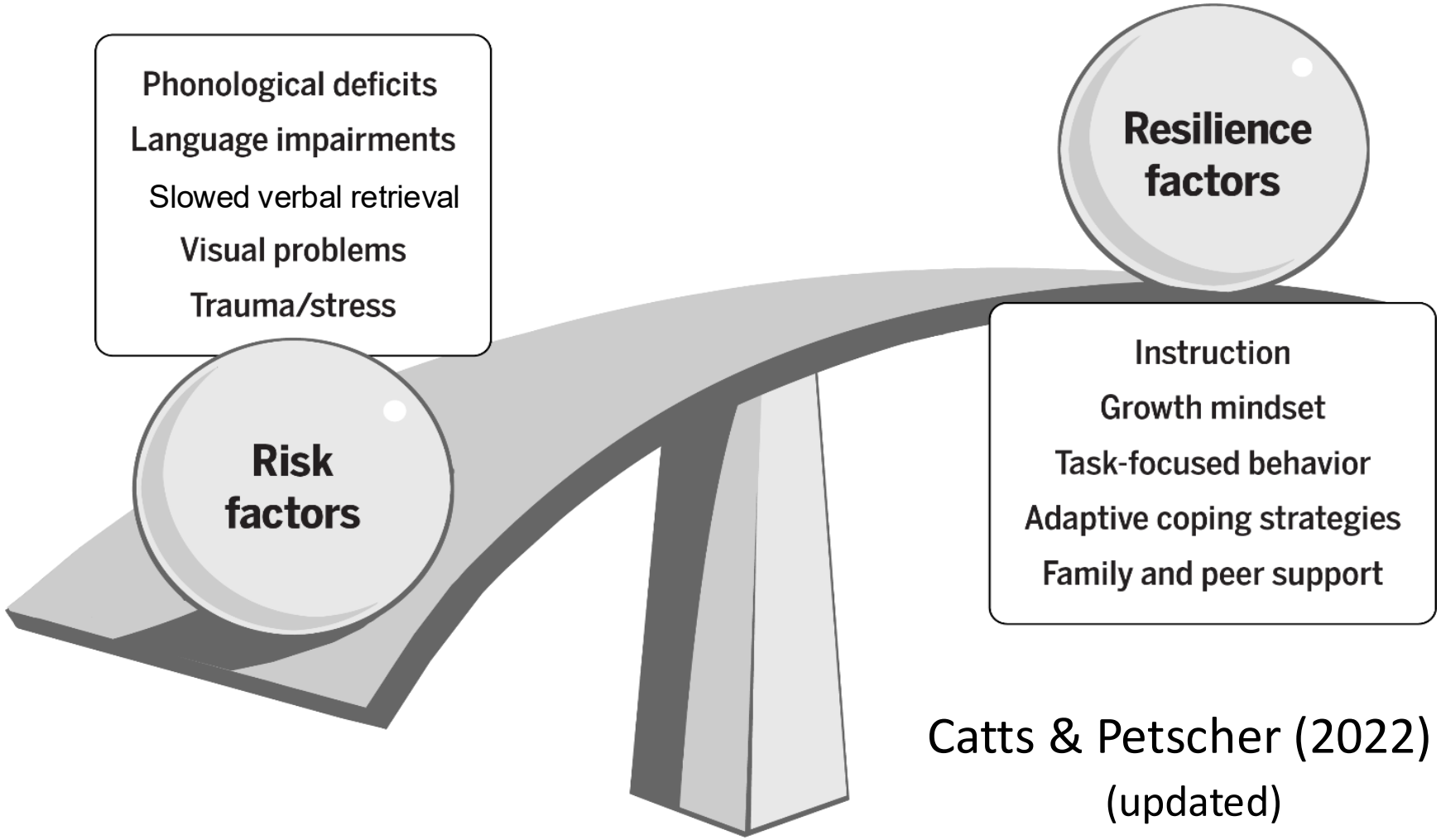
Inaccurate and/or inefficient word reading and spelling that is slow to remediate, even with intervention.



Behavioral phenotype refers to the observable and measurable behaviors associated with the condition. The complex behavioral phenotype of dyslexia results from the interaction between genetic expression into endophenotypes and environmental factors.

Cumulative Risk Resilience Model

Within the cumulative risk resilience framework, both risk and resilience factors intrinsic and extrinsic to the individual interact to give rise to a risk for dyslexia, the occurrence of dyslexia, and its severity.



Catts & Petscher (2022)
(updated)

Dyslexia Risk, Prevention, and Reduction of Severity

A Contemporary Developmental Perspective

Risk of Dyslexia can be documented before a child is expected to read and spell words

Birth – 2 years of Age

Risk of Dyslexia Indicators
Family History of Dyslexia
Delayed onset of speaking

3 – 5 years of Age

Risk of Dyslexia Indicators
Weak Phonological Processing
Weak Letter Knowledge

6 – 8 years of Age

Primary Characteristics of Dyslexia
Weak Decoding (1 syllable words)
Weak Word Recognition (1 syllable words)
Weak Spelling (1 syllable words)
Slow rate of learning print skills

9 – 18 years of Age

Primary Characteristics of Dyslexia Observable
Weak Decoding (multi-syllable words)
Weak Word Recognition (multi-syllable words)
Weak Spelling (multi-syllable words)
Dysfluent and choppy reading of text passages
Slow rate of learning print skills

Primary Characteristics of Dyslexia can be documented when word reading and spelling are developmentally expected

A contemporary understanding of dyslexia (and conditions like ADHD) frames them in terms of risk models rather than fixed conditions present from birth. Rather than viewing them as constitutional in origin, we intervene early to prevent or reduce severity, especially when a child is at increased risk due to family history, early language abilities, or response to early reading instruction in kindergarten and first grade.

When early preventative efforts (K-1) fall short, persistent word reading and spelling deficits require high-dose, sustained, multi-component intervention.

Intervention Effects

Addressing the Risk of Dyslexia and Dyslexia

Outcome Domain	ES
Phonological awareness	.40
Word reading & Spelling	.33
Reading Comprehension	.25
Text Reading	.26

Moderator Analysis

Dosage (t=2.3, df=12.24, p=.04)

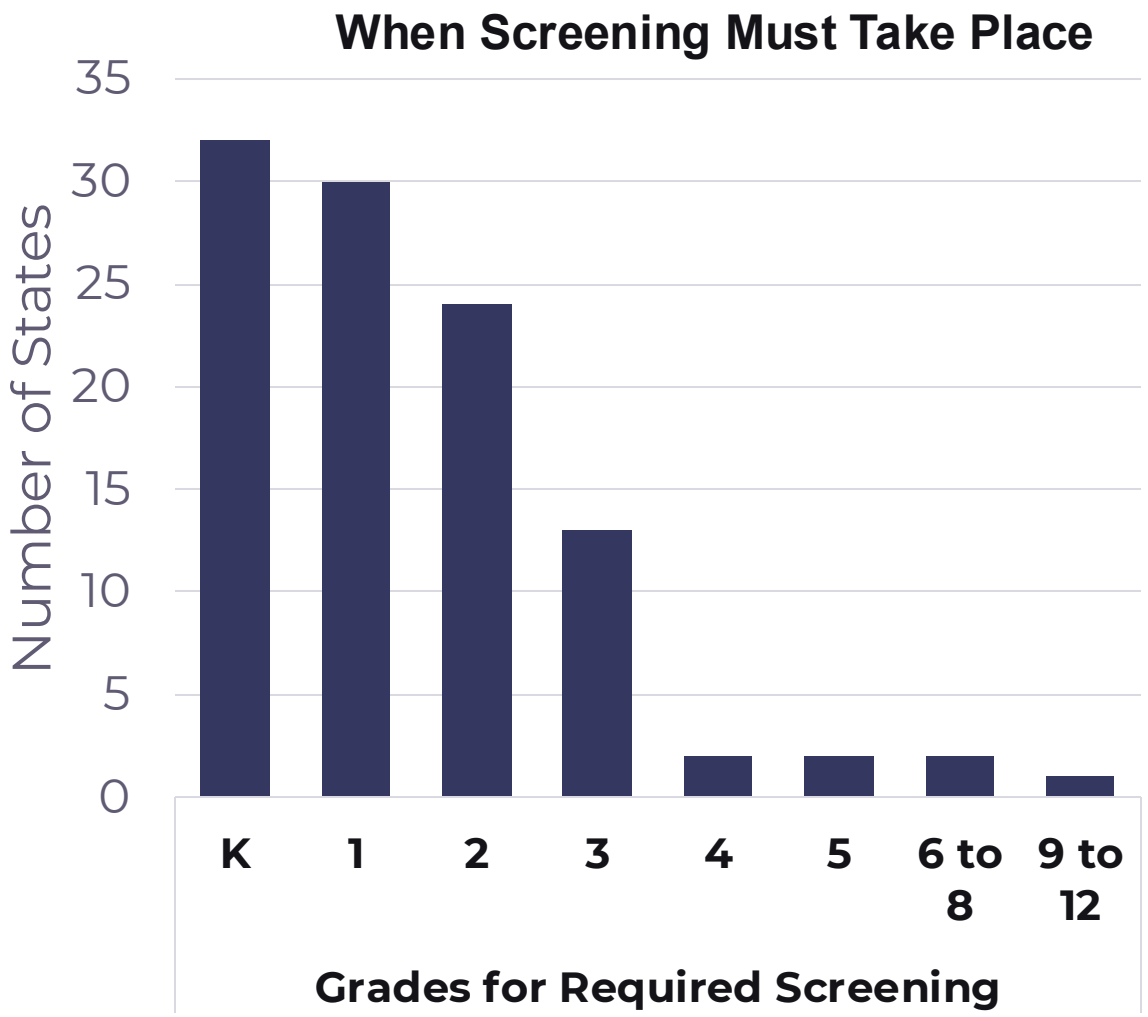
Outcome domain (F=3.83, df=3, 21.9, p=.02)

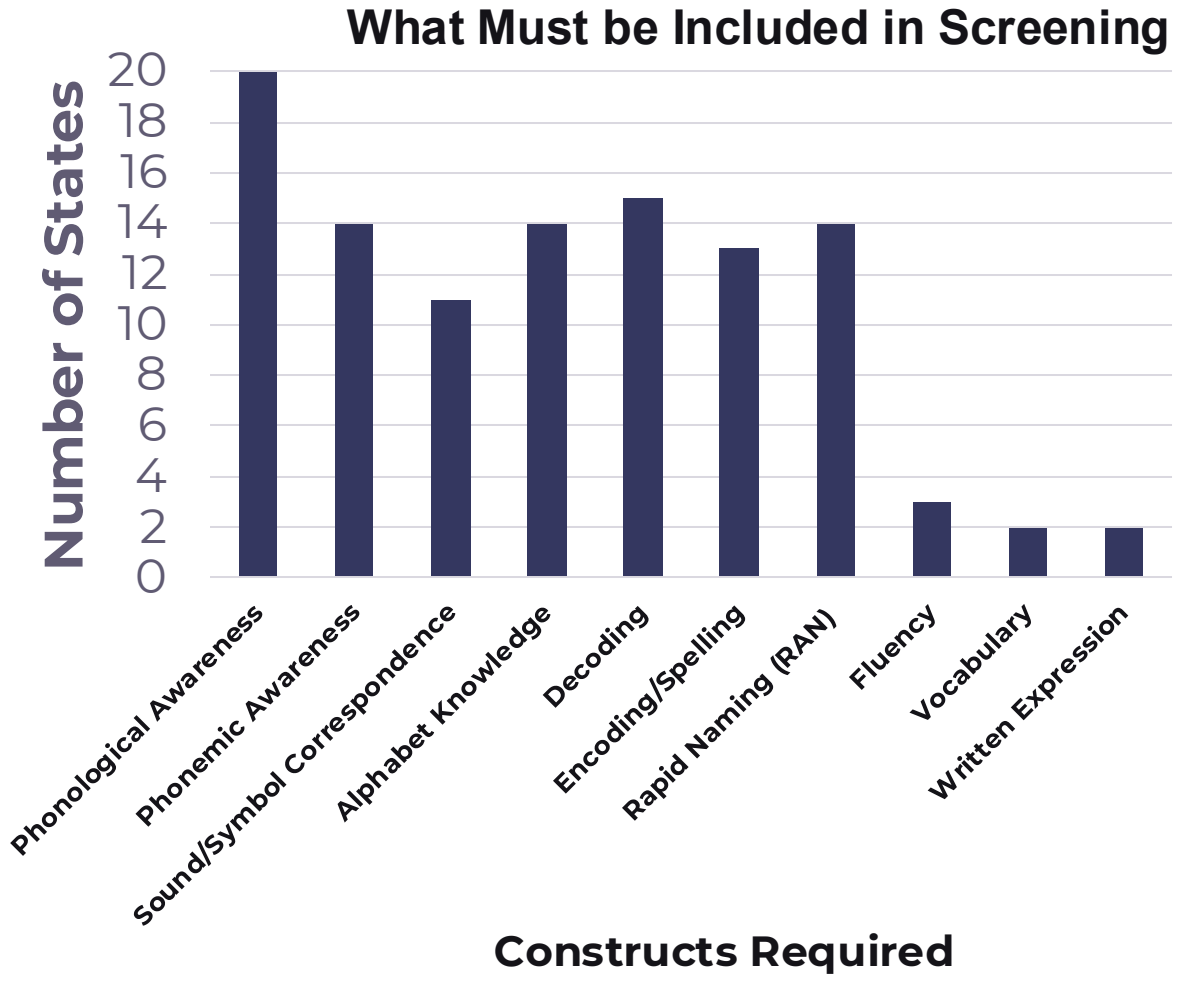
Significant, positive effect on norm-referenced reading outcomes (g = 0.33, p <.001) for K-5 students with or at risk for dyslexia.

Hall et al., 2022

Dyslexia Legislation

Screening for Dyslexia

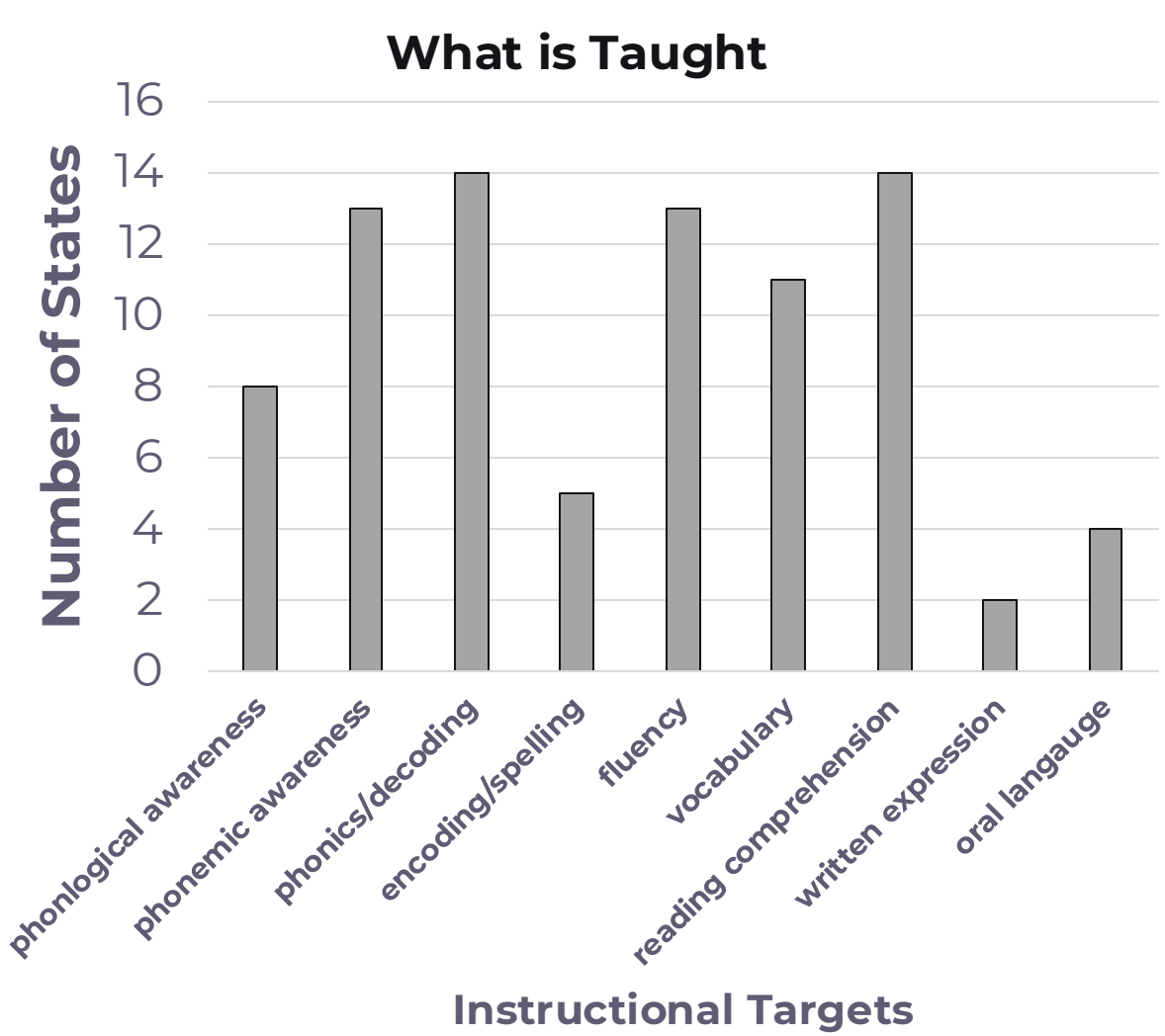


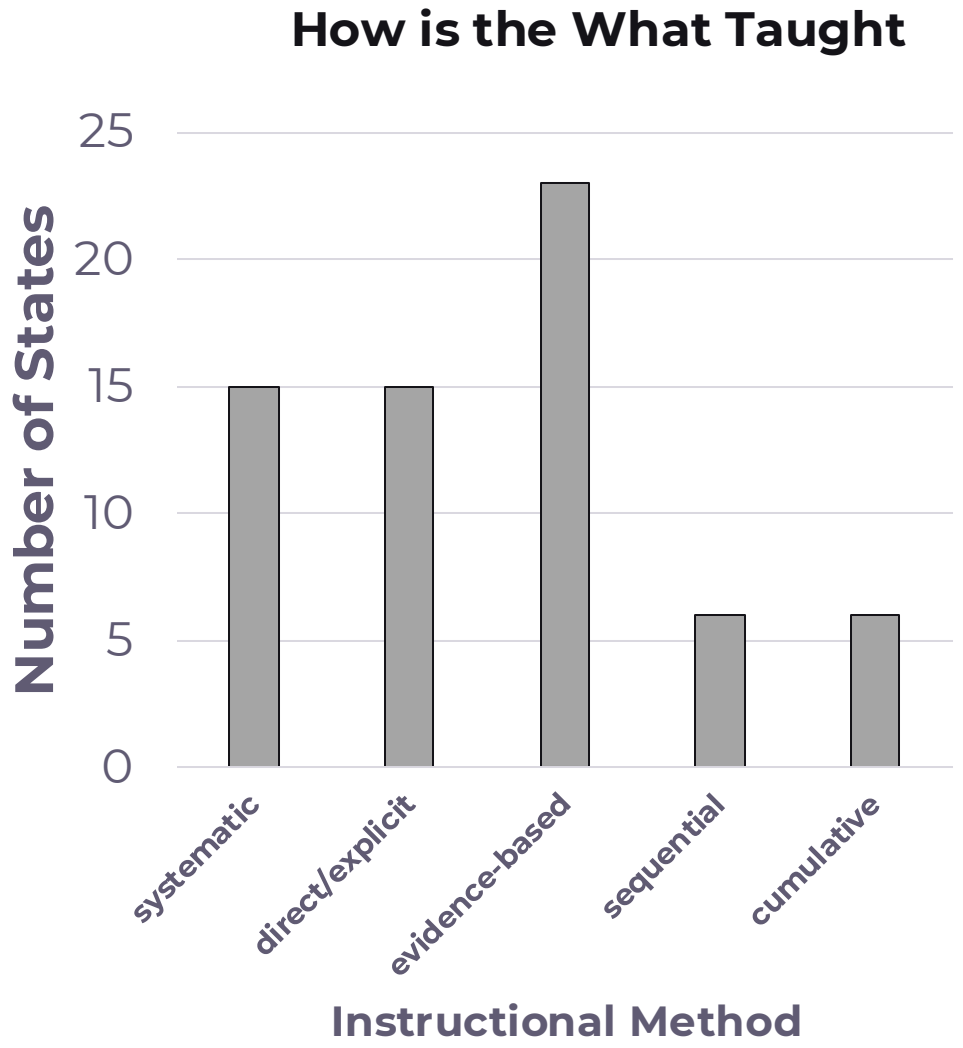


Odegard, Farris, Middleton, Rimrodt-Frierson, & Washington (2026). Recent Trends in Dyslexia Legislation. Handbook of Learning Disabilities. Third Edition.

Dyslexia Legislation

The What and the How of Dyslexia Intervention





Odegard, Farris, Middleton, Rimrodt-Frierson, & Washington (2026). Recent Trends in Dyslexia Legislation. Handbook of Learning Disabilities. Third Edition.

Bridging the Gap Between Research, Policy, and Practice

While most U.S. state laws reference the 2002 consensus definition of dyslexia, my systematic review of state legislation (Odegard et al., 2026) reveals that these laws are largely framed within a risk-prevention model. Requirements to screen for dyslexia typically occur in grades K–2, when children are just beginning to learn to read, particularly in kindergarten and first grade. In these grades (i.e., K and 1), the goal is to identify those at risk for developing dyslexia and provide early intervention to prevent it or reduce its severity. These findings suggest that a revised definition, aligned with a developmental and risk-based framework, will better support and clarify existing dyslexia legislation nationwide.

Reading Profiles

Prevalence of Different Reading Risk Profiles in Public Schools

Second Grade Reading Risk Profile	School Grade Assigned by State DOE							
	A		B		C		D and F	
Dyslexia	11.8%		13.7%		15.4%		14.7%	
Comprehension	2.1%		3.5%		4.2%		5.2%	
Mixed Type	15.9%		18.3%		23.4%		32.3%	
Total Tier 3	29.8%		35.5%		43%		52.1%	
School-assigned dyslexia	27.7	14.3%	32.0	12.5%	38.8	10.8%	47.0	7%

Odegard et al. (2020)

School Characteristics

Student Characteristics in Schools based on School Grades

	School Grade Assigned by State DOE			
Student Characteristics	A	B	C	D and F
Caucasian	74.6%	73.7%	66.3%	31.5%
African American	4.9%	4.1%	11.7%	52.0%
Hispanic	12.3%	13.2%	13.9%	10.0%
Other	8.2%	8.9%	8.1%	6.5%
Free Reduced Lunch	50.6%	62.2%	71.9%	96.4%
ELL	12.2%	10.7%	12.4%	9.5%
Days Absent (Q1-Q3)	6 days	7 days	7 days	7 days

N = 6445; *Schools* = 119

Mental Health Matters:

The Emotional Toll of Dyslexia

Catts et al. (2024); Odegard et al. (2024)

There is a growing awareness of the socio-emotional impact of dyslexia (and literacy struggles) on the mental well-being of an individual.

Many studies have observed a higher prevalence of anxiety and depression among children with dyslexia than among individuals without reading struggles.

(Francis et al., 2019 Vierira et al., 2024)

Meta-Analysis

Several meta-analyses have explored the relationship between dyslexia and a specific learning disability in reading and mental health outcomes.

Vieira et al. (2024) A random-effects model revealed a moderate overall effect size (Hedge's g = .54). Individuals with reading disability experience more internalizing problems than their chronological-age (CA) controls.

Francis et al. (2019) observed statistically significant differences between poor readers and typical readers on general measures of internalizing problems (d=0.41), anxiety (d=0.41) , and depression (d=0.23).

Donolato et al. (2022) observed children with LLDs to have higher internalizing (Hedges' g = 0.36) and externalizing symptoms (Hedges' g = 0.42) than controls. The group standardized difference in internalizing problems was moderated by the primary disorder, with children with language disorders (Hedges' g = 0.49) showing more internalizing problems than those with reading disorders (.31).

Overall, prior research has explored internalizing issues more than externalizing issues. However, Donolato et al. (2022) found both internalizing and externalizing issues to be more prominent in children with a reading disability. These findings point to a relationship between dyslexia and an increased prevalence of mental health symptoms.

Developmental Epidemiological Framework

Kellam & Rebok, 1992; Kellam et al., 1994

ANTECEDENT

READING/ SPELLING DEFICTS

OUTCOME

Academic Underachievement

CONSEQUENCE

DEPRESSION ANXIETY

Failure to adequately respond early in life makes later social adaption and integration more difficult and can lead to internalizing symptoms or vulnerabilities.

Kellam et al. 1994

Developmental Epidemiological Framework

Kellam & Rebok, 1992; Kellam et al., 1994

ANTECEDENT

READING/ SPELLING DEFICTS

OUTCOME

Academic Underachievement

CONSEQUENCE

DEPRESSION ANXIETY

INSTRUCTION AND INTERVENTION

A Contemporary Framework for Understanding and Addressing Dyslexia

Nature

A contemporary understanding of dyslexia frames it in terms of a risk model. Some children are at an increased risk of developing struggles to learn to read and/or spell words accurately and/or efficiently.

Prognosis

A risk of dyslexia does not mean that a child will develop persistent, extremely hard to remediate difficulties with reading and/or spelling words.

Prevention

Early identification of risk can allow for early intervention in oral and written language development. This can prevent or reduce the severity of word reading and spelling deficits.

Intervention

Sustained, high-dosage multi-component intervention will be needed for those students who do not respond as well to early preventive intervention in K-1.

Persistent

A small number of students will exhibit persistently slow responses to high-dose, sustained, multi-component interventions. These kids are learning but at a slower rate.

We have shared with you:

1) Evolving nature of the definition of dyslexia
2) IDA's efforts to employ a data-driven inclusive process, and
3) Current dyslexia research shaping our understanding

Our Shared Commitment

Together, as individuals with dyslexia, educators, leaders, researchers, policymakers, advocates, and parents, we can reframe how we define, identify, and support individuals with dyslexia by starting early, staying informed, and centering on well-being and always remembering:
it is never too late.