Literacy Struggles and Mental Health

Understanding the Developmental Pathways

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WHAT'S YOUR WHY?

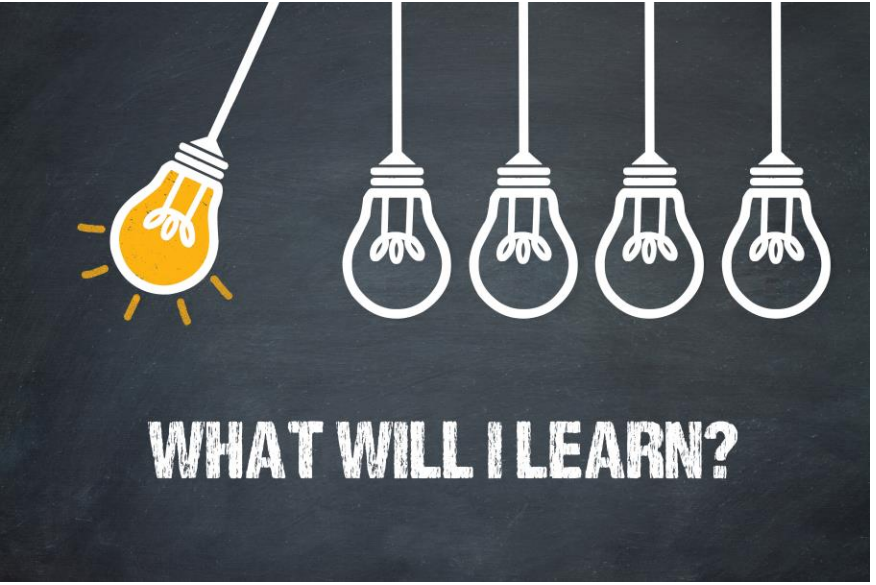
Me from Myself — to banish

Emily Dickinson

Me from Myself — *to banish* —
Had I Art —
Impregnable my Fortress
Unto All Heart —

But since Myself — *assault Me* —
How have I peace
Except by subjugating
Consciousness?

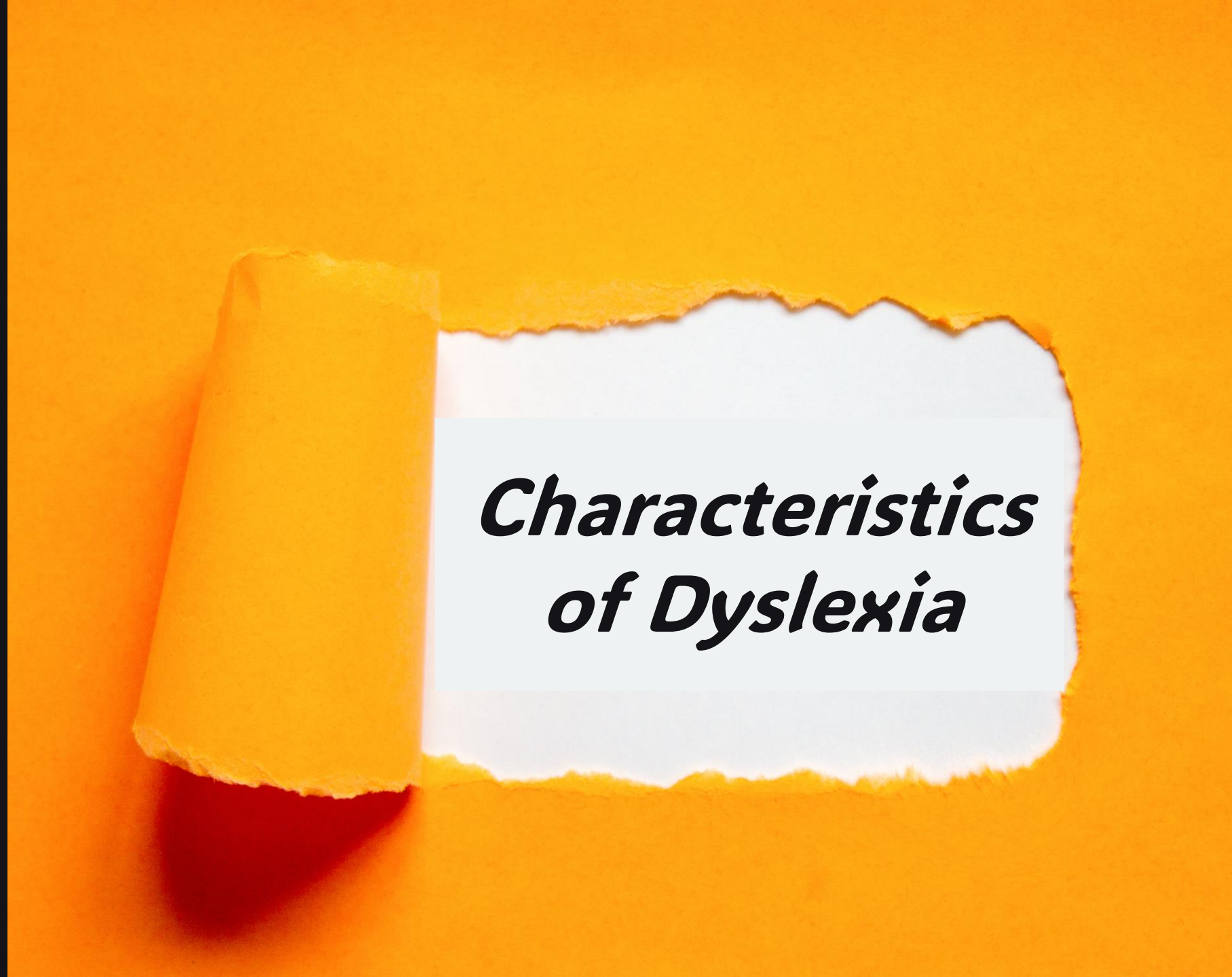
And since We're mutual Monarch
How this be
Except by Abdication —
Me — of Me



You will learn about:

1. **Characteristics of Dyslexia**
2. **Dyslexia and Mental Health**
3. **Improving Mental Health**

Section 1



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

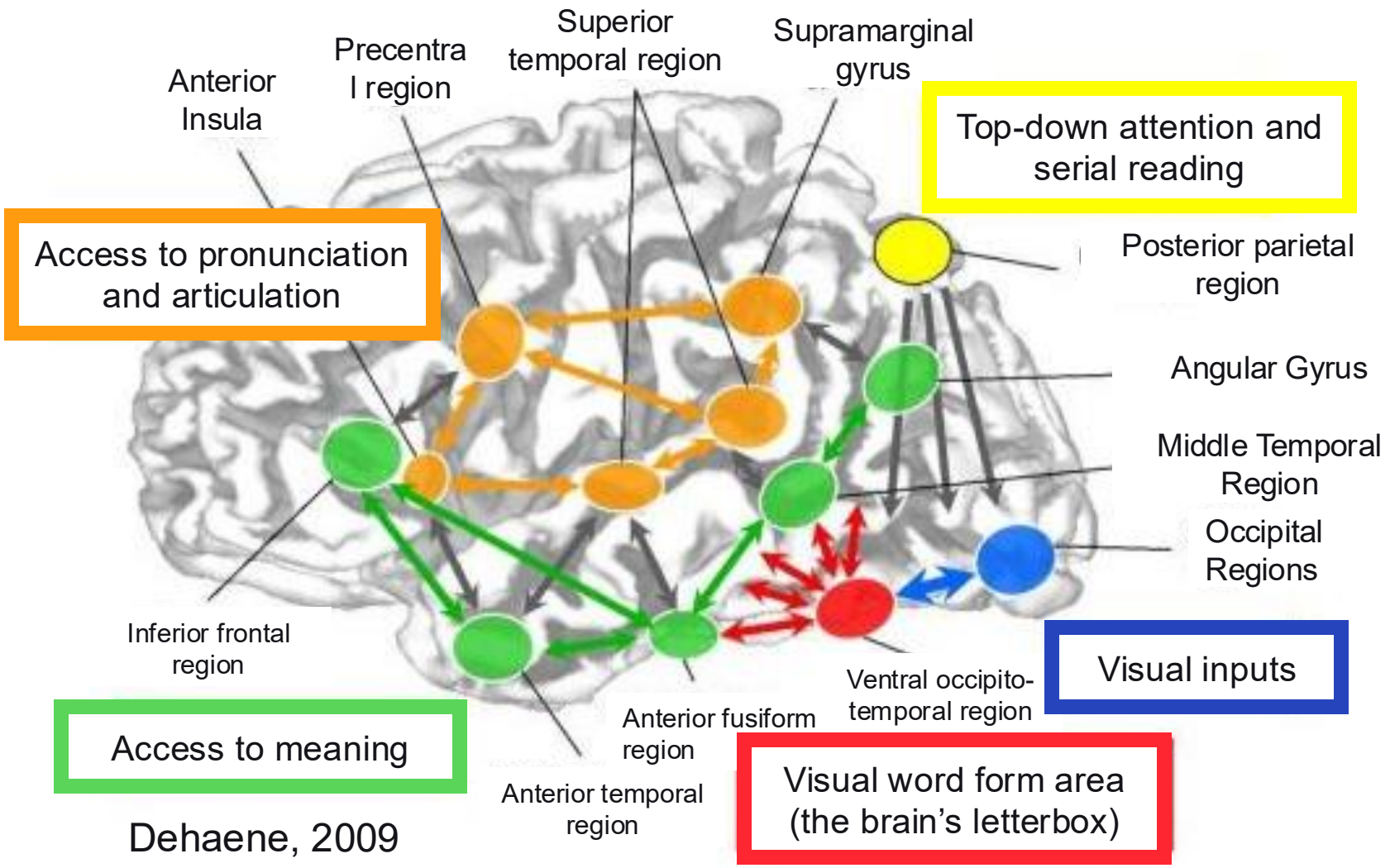
Oral language continues to develop and expand even after a child enters school, and this development interacts with reading development.

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

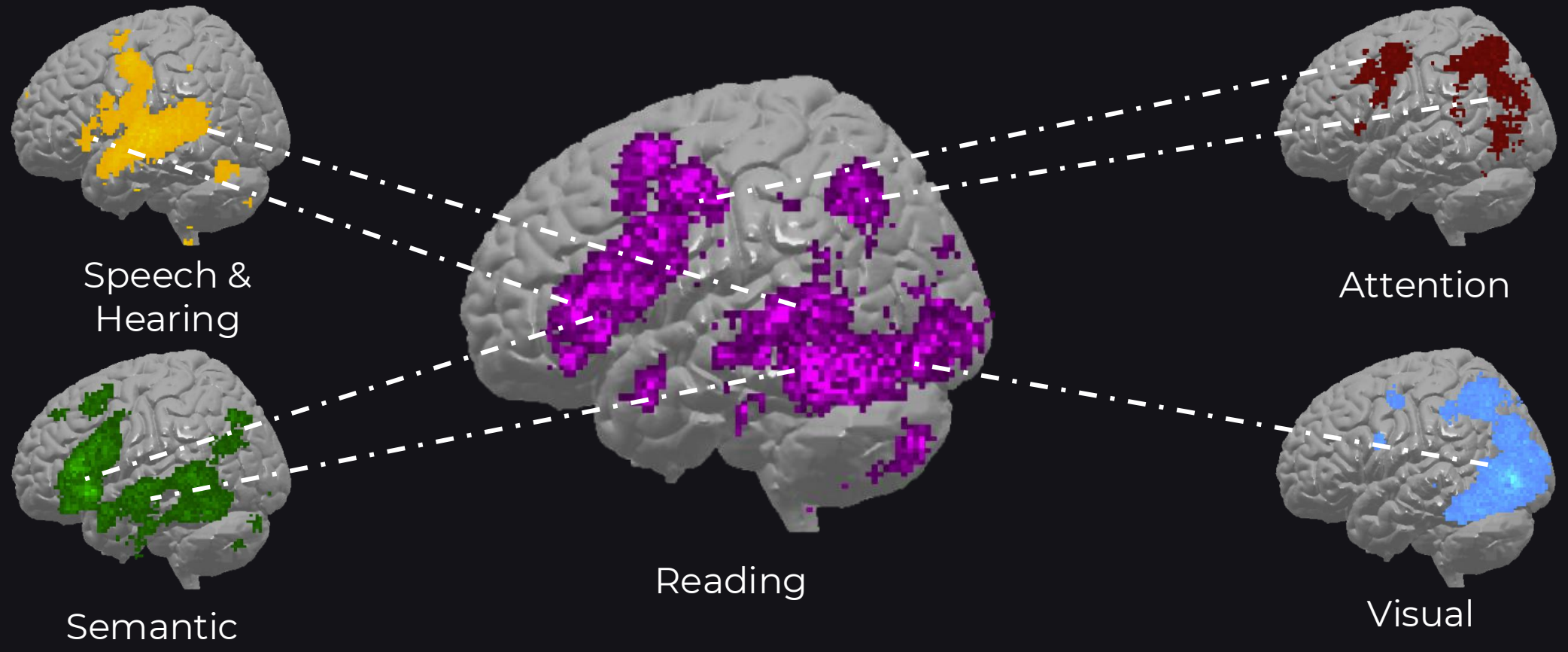
Brain Areas Involved When Reading

Reading is a compilation of many cortical brain regions

Aspects of Oral Language

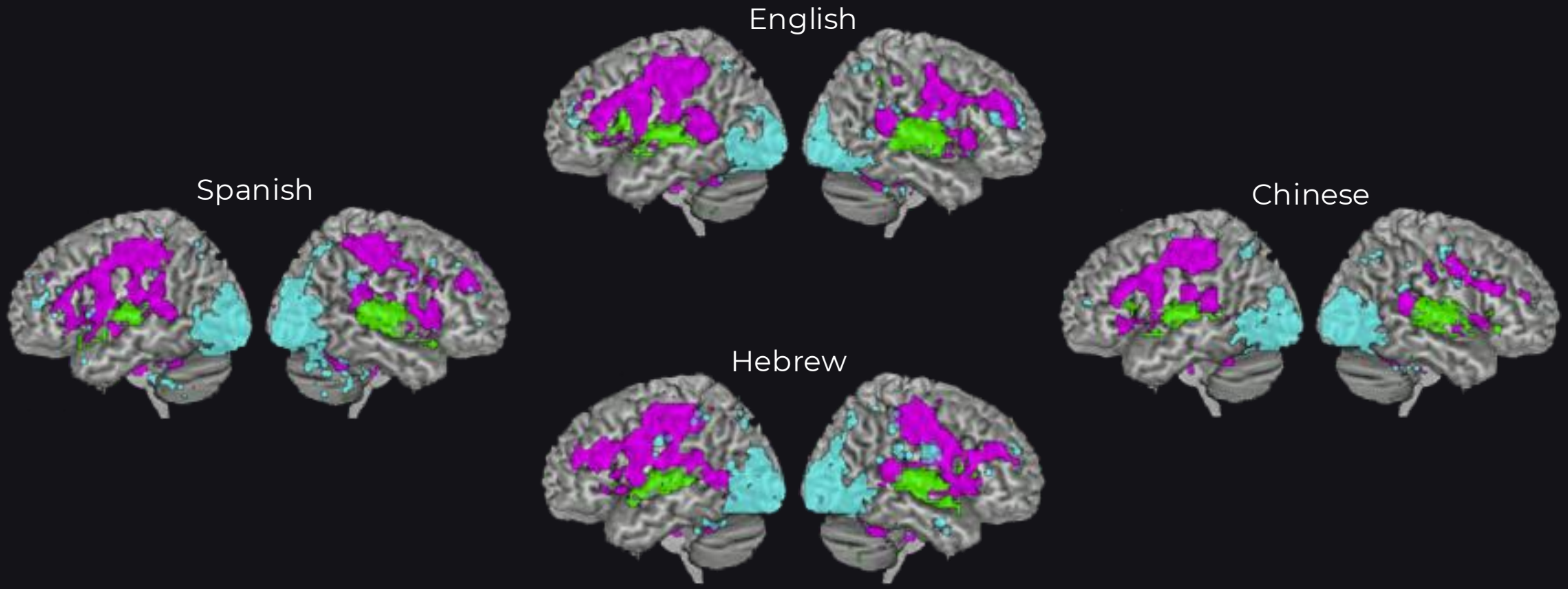
Receptive Written Language

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

Section 3

Mental Health as a Secondary Consequence

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

There is a growing awareness of the socio-emotional impact of literacy struggles generally and dyslexia and a reading disability specifically on the mental well-being of an individual.

Many studies have documented a high prevalence of anxiety and depression among children with dyslexia or who struggle to read.

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

Meta-Analysis

Several meta-analyses have explored the relationship between struggling to read, dyslexia, language differences, and mental health outcomes.

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).

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.

Donolato et al. (2022) Children with LLDs showed higher internalizing (Hedges' g = 0.36) and externalizing problems (Hedges' g = 0.42) than controls did. The group standardized difference in internalizing problems was moderated by the primary disorder, with children with language disorders (Hedges' g = 0.494) showing more internalizing problems than those with reading disorders (.310).

These findings point to an increased prevalence of mental health issues in children who struggle to read, with dyslexia, and those with language learning differences.

Developmental Epidemiological Framework

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

Psychological Well-Being

Refers to an individual's overall mental health and emotional state. It encompasses factors such as happiness, life satisfaction, positive affect, and the absence of psychological distress or mental health problems such as anxiety or depression.

DEPRESSION
ANXIETY

Social Adaption (*Adaptive, Maladaptive*)

Refers to an individual's ability to effectively function and thrive within their social environment. It encompasses a range of social skills, behaviors, and interactions that enable individuals to navigate social situations, form relationships, and participate in social roles and activities.

READING / SPELLING DEFICITS

Maladaptation at a particular developmental level reflects a failure to resolve the social task demands that are most salient.

Development happens within a larger ecological system. Reading and writing are defined by people with the ability to do so as being important to do within a societal context (e.g., parents, teachers, peers).

Developmental Epidemiological Framework

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

ANTECEDENT → **OUTCOME** → **CONSEQUENCE**

DEPRESSION ANXIETY → READING / SPELLING DEFICITS → SCHOOL ACHIEVEMENT

ANTECEDENT → **OUTCOME** → **CONSEQUENCE**

READING / SPELLING DEFICITS → SCHOOL ACHIEVEMENT → DEPRESSION ANXIETY

Developmental Epidemiological Framework

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ANTECEDENT

READING/ SPELLING DEFICTS

OUTCOME

SCHOOL ACHIEVEMENT

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

The nature of the relationship between mental health challenges and reading struggles

Do mental health issues predict reading struggles?

Do reading struggles predict mental health issues?

McArthur et al. (2022)

Measure	MCS	ECLS:98	ECLS:10	ELVS	Total
From Early Emotional health (5) to Reading (7)	N=7870	N=8001	N=7160	N=768	
Peer Relationships	No	Yes	No	No	1/4
Depression/Internalizing	No	No	No	No	0/4
Externalizing	Yes	Yes	No	Yes	3/4
Attention			Yes		1/1
Anxiety	No			No	0/2
From Reading (7) to later emotional health (9/11)					
Peer Relationships	Yes	Yes	Yes	Yes	4/4
Depression/Internalizing	Yes	Yes	Yes	Yes	4/4
Externalizing	Yes	Yes	Yes	Yes	4/4
Attention			Yes		1/1
Anxiety	Yes			Yes	2/2
Bullying			Yes		1/1
Reading self-concept		Yes	Yes		2/2

What are we learning?

ACEs in Early Childhood Predict Future Reading Ability

Adverse childhood events are predictive of future reading ability – particularly exposure to extreme levels of violence and symptoms of trauma. These same things are also predictive of negative mental health outcomes. Most children do not experience these levels, and the prevalence of high levels is not evenly distributed across the country or among different groups. This increases the risk of reading struggles due to these factors in specific groups and regions.

Reading Struggles Predict Future Mental Health and Peer Relations

Compelling evidence from large-scale developmental studies across multiple nations demonstrates reading struggles in the early grades to predict mental health challenges and issues with social adaption in the later grades. These data compel us to consider providing quality literacy instruction and intervention as a protective factor for a child's mental well-being.

Section 4

Developmental Epidemiological Framework

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

ANTECEDENT

READING / SPELLING DEFICITS

OUTCOME

SCHOOL ACHIEVEMENT

CONSEQUENCE

DEPRESSION ANXIETY

INSTRUCTION AND INTERVENTION

Prevention Based Approaches

Some researchers have attempted to use academic instruction and intervention to reduce mental health symptoms in young children.

Kellam et al., (1994) Provided a reading intervention to first grade students as part of a randomized controlled study. Overall observed students who responded well to the reading intervention did not develop as many depressive symptoms as did students who did not respond as well to the intervention.

Traficante et al. (2017). Provided a reading intervention to second-grade students as part of a controlled study. Overall, they observed that students who received the intervention from teachers experienced gains in general well-being and school well-being. The students who received a computerized decoding intervention or no intervention did not make similar gains.

Grills et al. (2023) Provided tier-2 intervention to second grade students as part of a randomized controlled study. Students who responded better to the tier-2 instruction experienced a greater decline in their internalizing symptoms. Evidence was found that students with greater internalizing symptoms at the beginning of the year did not respond as well to Tier 2 instruction.

Research that monitors internalizing and externalizing mental health outcomes as a function of response to literacy instruction and intervention demonstrates a causal role of preventive intensified reading instruction and intervention to improve mental health outcomes.

Developmental Epidemiological Framework

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

ANTECEDENT

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CONSEQUENCE

DEPRESSION ANXIETY

PEER RELATIONS

SOCIAL STIGMA

SELF CONCEPT

SELF ESTEEM

Developmental Epidemiological Framework

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PEER RELATIONS

SELF ESTEEM

PEER MENTORSHIP

Near Peer Mentoring

Research has explored the impact of near-peer mentoring on the psychological well-being of neurominorities, such as dyslexia and ADHD.

Haft et al., (2019) Conducted a trial of a near mentoring program (eye-to-eye) with elementary and middle school students (age 8-16 years). The study included typically developing control students (n=84), non-mentored students with LD/ADHD (n=51), and mentored students with LD/ADHD (n=99). Measures of self-esteem, interpersonal relations, depression, and anxiety were obtained in the fall and spring. Mentored students received 18 peer-mentorship sessions.

Change in Outcomes measures from fall to spring

	TD-Control	NM-LD/ADHD	Mentored-LD/AHDH
Self-esteem	No Change	Decreased	Increased
Interpersonal Relations	Decreased	Decreased	No Change
Depression	No Change	Increased	Decreased
Anxiety	No Change	No Change	No Change

In this initial study, near-peer mentorship showed promise in supporting the psychological well-being of students with LD, ADHD, or both.

What are we learning?

ANTECEDENT

READING / SPELLING DEFICITS

Intervening to prevent reading and writing deficits should happen early in development.
And it supports mental health.

INSTRUCTION AND INTERVENTION

OUTCOME

SCHOOL ACHIEVEMENT

It is never too late to intervene to remediate reading and writing deficits

CONSEQUENCE

DEPRESSION

PEER RELATIONS

SELF ESTEEM

PEER MENTORSHIP

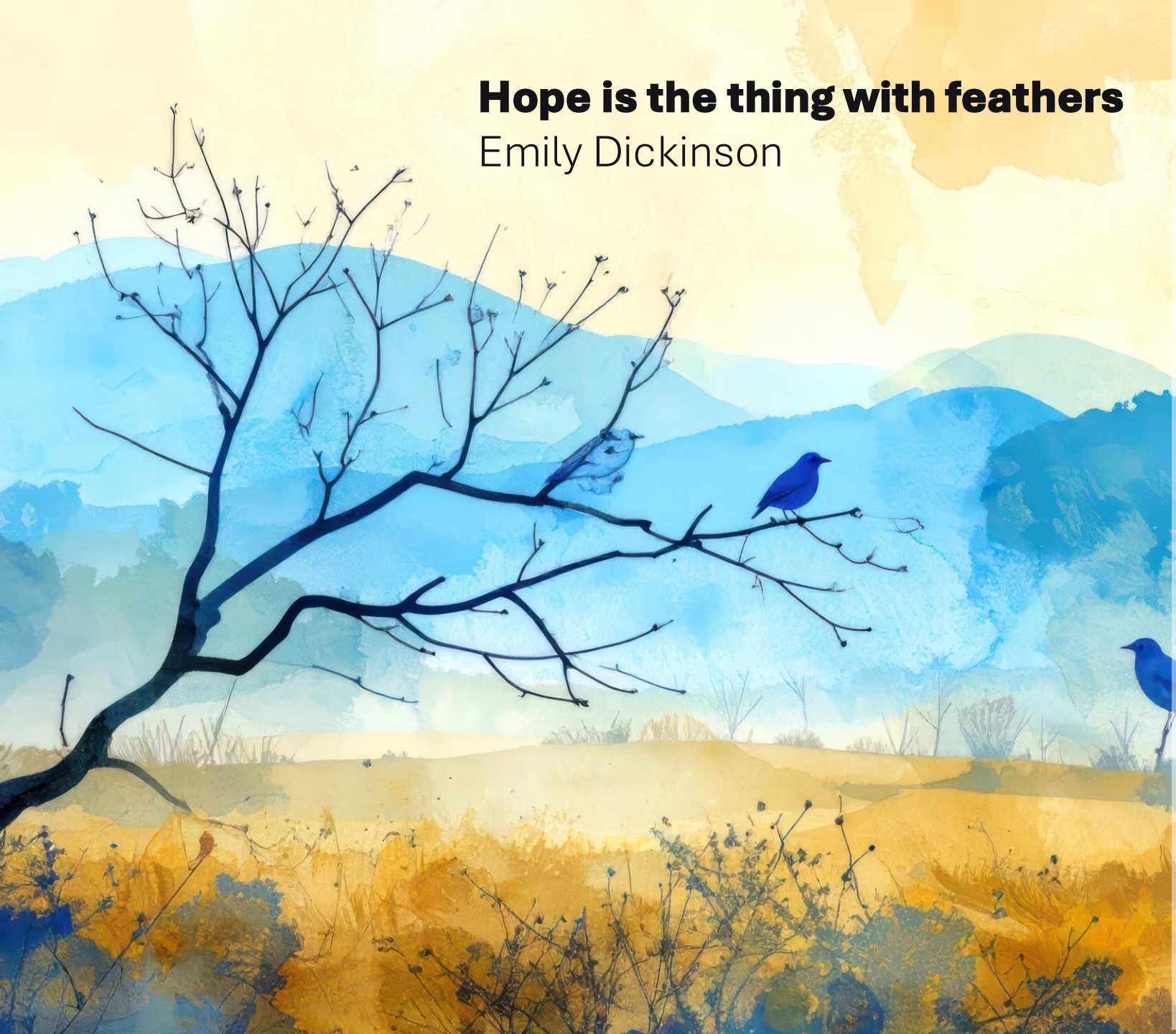
Fostering opportunities to allow individuals to support each other and grow a support network can positively impact their psychological well-being.
Research is needed to see if this also allows them to benefit more from literacy intervention.

Key Takeaways
Putting it all together

A strong academic MTSS framework with quality literacy instruction and intervention is crucial for well being.

- Reduces academic frustration & failure, reducing stress
- Supports emotional resilience through success
- Functions as an early mental health protective factor
- Improves literacy and life outcomes for all learners.

Near-peer mentorship serves as a protective factor by creating an understanding of oneself and supportive social relationships.



Hope is the thing with feathers

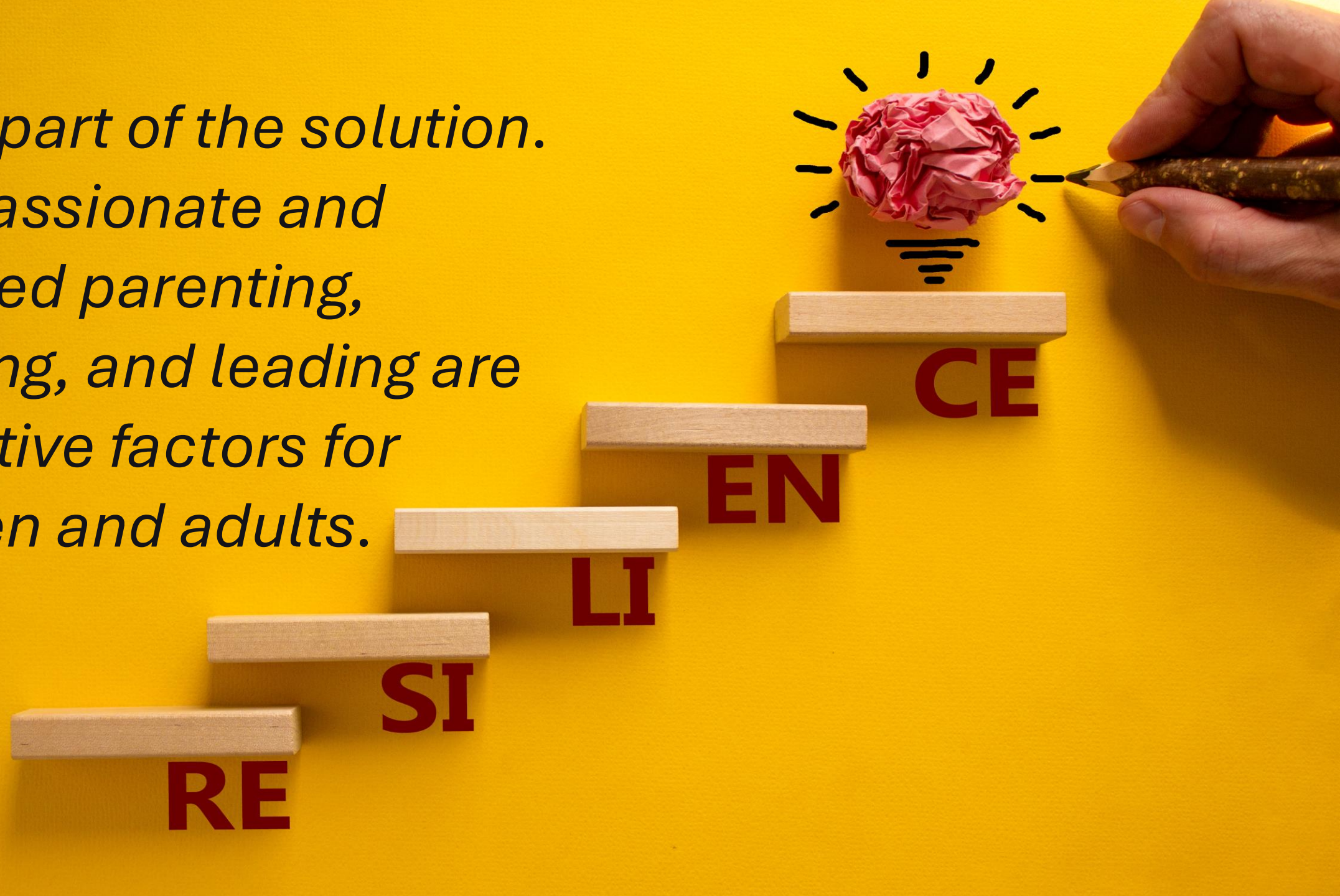
Emily Dickinson

“Hope” is the thing with feathers -
That perches in the soul -
And sings the tune without the words -
And never stops - at all -

And sweetest - in the Gale - is heard -
And sore must be the storm -
That could abash the little Bird
That kept so many warm -

I’ve heard it in the chillest land -
And on the strangest Sea -
Yet - never - in Extremity,
It asked a crumb - of me.

You're part of the solution. Compassionate and informed parenting, teaching, and leading are protective factors for children and adults.



References

Bethell C, Jones J, Gombojav N, Linkenbach J, Sege R. (2019). Positive Childhood Experiences and Adult Mental and Relational Health in a Statewide Sample: Associations Across Adverse Childhood Experiences Levels. JAMA Pediatr, 173(11):e193007. doi:10.1001/jamapediatrics.2019.3007

Burenkova, O. V., Naumova, O. Y., & Grigorenko, E. L. (2021). Stress in the onset and aggravation of learning disabilities. *Developmental Review: DR, 61*, 100968. https://doi.org/10.1016/j.dr.2021.100968

Carioti, D. et al. (2021). Orthographic depth and developmental dyslexia: a meta-analytic study. *Annals of dyslexia*, *71*(3), 399–438. https://doi.org/10.1007/s11881-021-00226-0

Catts, H.W., et al. Revisiting the definition of dyslexia. Ann. of Dyslexia (2024). https://doi.org/10.1007/s11881- 023-00295-3

Cohen, S. (2004). Social Relationships and Health. American Psychologist, 59(8), 676-684. https://doi.org/10.1037/0003-066X.59.8.676

Dehaene, S. (2009). Reading in the Brain: The New Science of How We Read. Penguin Books.

Delaney-Black V, Covington C, Ondersma SJ, et al. (2002). Violence Exposure, Trauma, and IQ and/or Reading Deficits Among Urban Children. Arch Pediatr Adolesc Med, 156(3):280–285. doi:10.1001/archpedi.156.3.280

Donolato, E. et al. (2022). Research Review: Language and specific learning disorders in children and their co-occurrence with internalizing and externalizing problems: a systematic review and meta-analysis. *Journal of child psychology and psychiatry, and allied disciplines, 63*(5), 507–518. https://doi.org/10.1111/jcpp.13536

Eden, G. F. et al. (2004). Neural changes following remediation in adult developmental dyslexia. *Neuron*, *44*(3), 411–422. https://doi.org/10.1016/j.neuron.2004.10.019

Felitti, V. J., et a. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACE) Study. American Journal of Preventive Medicine, 14(4), 245–258. https://doi.org/10.1016/S0749-3797(98)00017-8

References

Francis, D. A., Caruana, N., Hudson, J. L., & McArthur, G. M. (2019). The association between poor reading and internalising problems: A systematic review and meta-analysis. *Clinical Psychology Review, 67*, 45–60. https://doi.org/10.1016/j.cpr.2018.09.002

Grills, A. E., et al.(2023). Internalizing Symptoms and Reading Difficulties Among Early Elementary School Students. *Child psychiatry and human development, 54*(4), 1064–1074. https://doi.org/10.1007/s10578-022-01315-w

Haft, S. L. et al. (2019). Impact of mentoring on socio-emotional and mental health outcomes of youth with learning disabilities and attention-deficit hyperactivity disorder. *Child and Adolescent Mental Health, 24*(4), 318–328. https://doi.org/10.1111/camh.12331

Hall, C. et la. (2023), Forty Years of Reading Intervention Research for Elementary Students with or at Risk for Dyslexia: A Systematic Review and Meta-Analysis. *Reading Research Quarterly, 58*, 285-312. https://doi.org/10.1002/rrq.477

Kellam, S. G., & Rebok, G. W. (1992). Building developmental and etiological theory through epidemiologically based preventive intervention trials. In J. McCord & R. E. Tremblay (Eds.), Preventing antisocial behavior: Interventions from birth through adolescence (pp. 162–195). Guilford Press.

Kellam, S. G., et al. (1994). Depressive symptoms over first grade and their response to a developmental epidemiologically based preventive trial aimed at improving achievement. *Development and Psychopathology, 6*(3), 463–481. https://doi.org/10.1017/S0954579400006052

Martin, A. et al. (2015). Reading in the brain of children and adults: a meta-analysis of 40 functional magnetic resonance imaging studies. Human brain mapping, 36(5), 1963–1981. https://doi.org/10.1002/hbm.22749

McArthur, G., et al.(2022). Tracking the relations between children's reading and emotional health across time: Evidence from four large longitudinal studies. Reading Research Quarterly, 57(2), 555–585. https://doi.org/10.1002/rrq.426

Odegard, T. N., et al. (2008). Differentiating the neural response to intervention in children with developmental dyslexia. *Annals of dyslexia*, *58*(1), 1–14. https://doi.org/10.1007/s11881-008-0014-5

References

Odegard, T. N. et al. (2020). Characteristics of Students Identified With Dyslexia Within the Context of State Legislation. Journal of learning disabilities, 53(5), 366–379. https://doi.org/10.1177/0022219420914551

Odegard, T.N., Farris, E.A. & Middleton, A.E. Dyslexia in the 21st century: revisiting the consensus definition. Ann. of Dyslexia 74, 273–281 (2024). https://doi.org/10.1007/s11881-024-00316-9

Pagel, M. (2017). Q&A: What is human language, when did it evolve and why should we care?. *BMC Biology, 15*, 64. https://doi.org/10.1186/s12915-017-0405-3

Rueckl, J. G., et al. (2015). Universal brain signature of proficient reading: Evidence from four contrasting languages. *Proceedings of the National Academy of Sciences of the United States of America, 112*(50), 15510–15515. https://doi.org/10.1073/pnas.1509321112

Sacks & Murphey (2018). The prevalence of adverse childhood experiences, nationally, by state, and by race or ethnicity. Child Welfare.

Traficante, D. et al. (2017). Literacy abilities and well-being in children: Findings from the application of EUREKA, the Italian adaptation of the RAVE-O Program. Form@re - Open Journal Per La Formazione in Rete, 17(2), 12–38. https://doi.org/10.13128/formare-21015

Uchino, B.N. Social Support and Health: A Review of Physiological Processes Potentially Underlying Links to Disease Outcomes. Journal of Behavioral Medicine, 29, 377–387 (2006). https://doi.org/10.1007/s10865-006-9056-5

US Department of Commerce (2016) National Survey of Children's Health (NSCH)

Vaughn, S. et al. (2024). The critical role of instructional response in defining and identifying students with dyslexia: a case for updating existing definitions. *Annals of Dyslexia* https://doi.org/10.1007/s11881-024-00303-0

Vieira, A. P. Aet al. (2024). Internalizing problems in individuals with reading, mathematics and unspecified learning difficulties: A systematic review and meta-analysis. *Annals of Dyslexia, 74*(1), 4–26. https://doi.org/10.1007/s11881-023-00294-4

Wolf, M. (2007). Proust and the Squid: The Story and Science of the Reading Brain. HarperCollins.