

Summer Reading: Development, Difficulties, & Interventions

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Research Context



- **Reading disabilities** are the most commonly identified learning challenge in school-age populations
- Remediation efforts are a significant focus for **educators and clinicians**
- **Effective interventions** can help a struggling reader, whose efforts are consumed by attempts to *access* the text, to use written language as a tool for *understanding* the content
- Impact of **early** intervention is well established

Reading Disability (RD)

- DSM-V criteria for specific learning disorder (SLD) in reading:
 - Word reading accuracy
 - Reading rate or fluency
 - Reading comprehension
- Reading ability serves as the “chief foundational academic skill underlying all school-based learning” (Lyon, 1998)
 - Impacts kids across all academic content areas and throughout school & beyond

Selected Considerations:

- English Language Learners
- Developmental role
- Remediation profiles
- Cognitive features
- SES

Summer Reading: Current Status

- Every student experiences summer vacation
- Many communities offer summer reading activities and programs
- Summer slide is often assumed to occur; research on the topic has been generalized to all students
 - Research has explored this among students with specific characteristics

Summer

SETBACK SLUMP SLIDE REGRESSION
2 E L B A C K 2 E O W N S 2 F I D E M E G K E 2 2 I O N

Why do we have summer vacation?

- Common misconception:
 - Summer vacation originally was required so that children could support farming responsibilities in agricultural society.

Why do we have summer vacation?

- Clarification (Gold, 2002):
 - Schooling held during the summer months was relatively common in the early to mid 1800s.
 - Summer vacation was implemented to make rural and urban school schedules consistent

Rural/Farming
communities in school:
5-6 months

Urban
communities in school:
11-12 months

What is summer slump?

- Comparing growth on repeated assessments during two time periods, fall to spring (i.e., the school year) and spring to fall (i.e., the summer)
- Comparing readers by ability level during the summer on reading growth

What is summer slump?

- On average, students lose the equivalent of one month during the summer in **academic performance** (Cooper, Nye, Charlton, Lindsay, & Greathouse, 1996)
- Depends on academic area, SES, reading habits, grade, etc. (Cooper, Nye, et al., 1996; Hill et al., 2007)

Summer Slump: Evidence

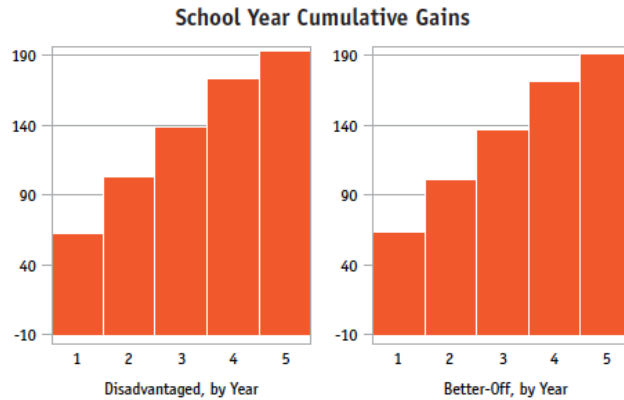
- **General student population**
 - Indirect investigations of the summer lag have shown higher gains from fall to spring (academic year) than during spring to spring (full year) time periods (Borman & D'Agostino, 1996)
- **Children receiving general special education services**
 - Lose ground and their typically developing peers continue to build reading skills, albeit at a slower rate than during the school year (Heyns, 1987; Mraz & Rasinski, 2007)

Summer Slump: Evidence

- **Students from low socioeconomic backgrounds**
 - Low SES students lose ground while middle- and high-SES peers advance during the summer (Alexander, Entwisle, & Olson, 2007a; Alexander, Entwisle, & Olson, 2007b; Burkam et al., 2004; Kim & Quinn, 2013)
- **Outcomes**
 - Achievement Gap: ~80% of the achievement difference between high-income and low-income students may be attributable to summer reading loss (Hayes & Grether, 1983)
 - Dropout rate & attendance of 4-year college differences (Alexander, Entwisle, & Olson, 2007)

Summer Slump: Evidence

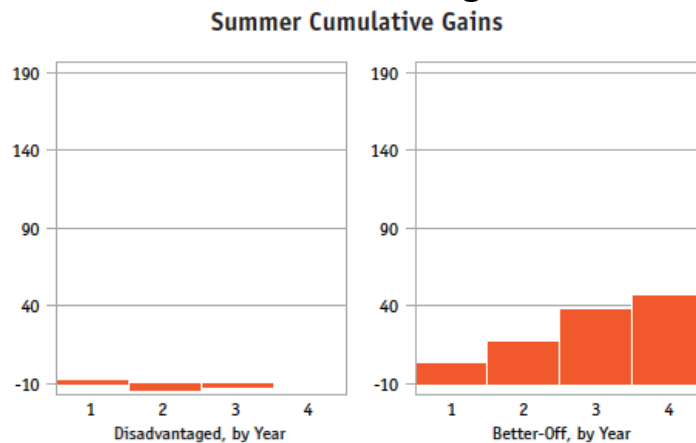
- Comparable gains **during the school year** for students of diverse SES backgrounds



(Entwisle, Alexander, & Olson, 1997)

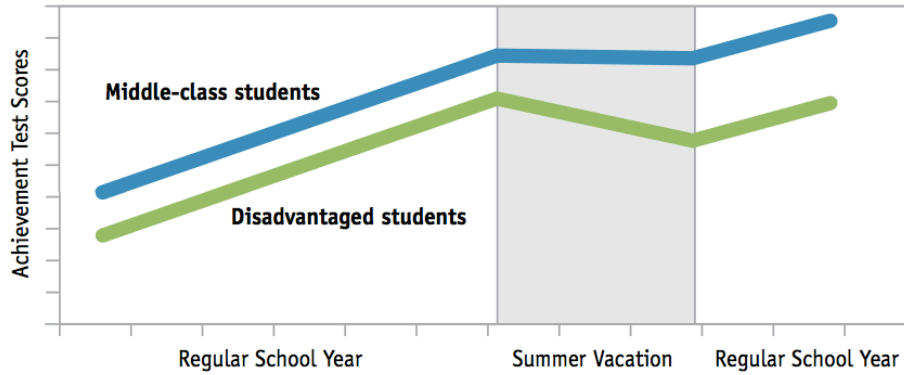
Summer Slump: Evidence

- Significant differences **during the summer** for students of diverse SES backgrounds



(Entwisle, Alexander, & Olson, 1997)

General Pattern of Reading Achievement for Students From Different Income Groups

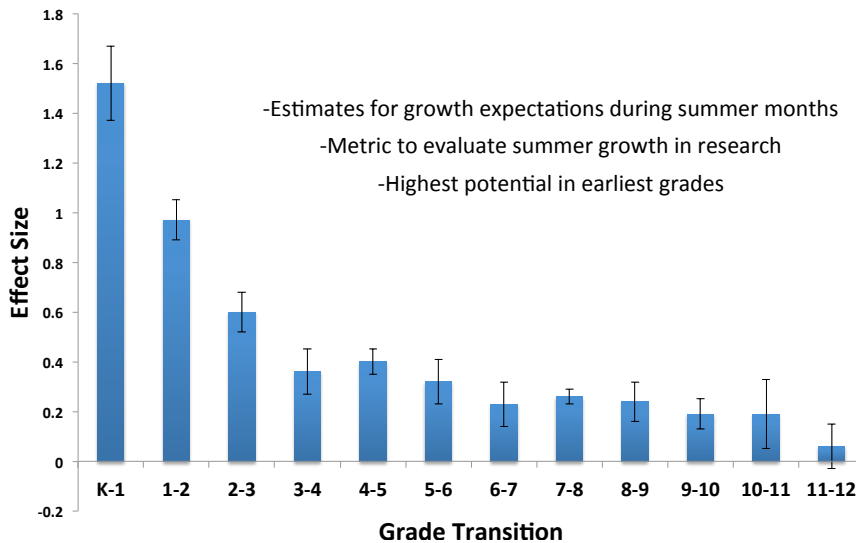


Cooper et al, conducted a meta-analysis, which is a review and synthesis of multiple research studies. They reviewed 93 evaluations of summer school programs serving grades K through 12, and also reviewed qualitative data from the program evaluations, including interviews with teachers, parents, and administrators.

Note: The above is a generalized representation from all studies reviewed.

(Cooper, 2004)

Average Annual Reading Gains from Nationally Normed Tests



SOURCE: Hill et al., 2007, p. 3, Table 1. Used with permission.

NOTE: The table shows average annual gains in effect sizes. These estimates provide an expectation for annual growth in absence of an intervention by grade transition (e.g., for grades 1-2). It demonstrates the importance of interpreting a study's effect size in relation to grade and subject.

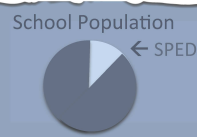
(Original Data: Hill et al., 2007)

Summer Slump: Evidence for Reading

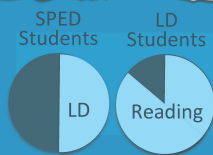
Students who are struggling readers



How widespread is dyslexia?



About **13-14%** of the school population nationwide are identified as having a handicapping condition that qualifies for Special Education (SPED) services.



One **half** of all students who are identified for special education are classified as having a learning disability (LD). About **85%** of those students have a primary learning disability in reading and language processing.



Up to **15-20%** of the population as a whole may have symptoms of dyslexia, including slow or inaccurate reading, weak spelling, and poor writing. Not all will qualify for Special Education, but most benefit from systematic, explicit instruction in reading, writing, and language (AKA, [Structured Literacy Instruction](#)).



Find solutions at the International Dyslexia Association (IDA) • ida.org
Source: IDA Fact Sheet, "[Dyslexia Basics](#)" • Moats & Dakin (© 2016 Cowen For IDA)

New Research: Summer Reading & Struggling Readers

- What is the impact of intervention for young struggling readers during the summer?



Collaborators: John Gabrieli; Jack Murtagh; Kelly Halverson;
Abigail Cyr; Pamela Hook; Patricia Chang

Summer Time Adventures in Reading & Teaching (START Study)

- Participants:
 - Ages 6-9
 - Completing grade 1 or 2
- Recruited from community
- Randomized Control Trial (RCT)
- Reader Groups
 - Struggling Readers
 - Treatment Group
 - No-Treatment Group



(Christodoulou et al., 2016)

Summer Time Adventures in Reading & Teaching (START Study)

- Treatment Group
- Instruction: 4 hours x 5 days x 6 weeks
 - Provided at no cost
 - Minimum of 100 hours
 - Academic summer months
 - Groups of 3-5 children
 - Lindamood-Bell teaching staff
- Program: Lindamood-Bell Seeing Stars



(Christodoulou et al., 2016)

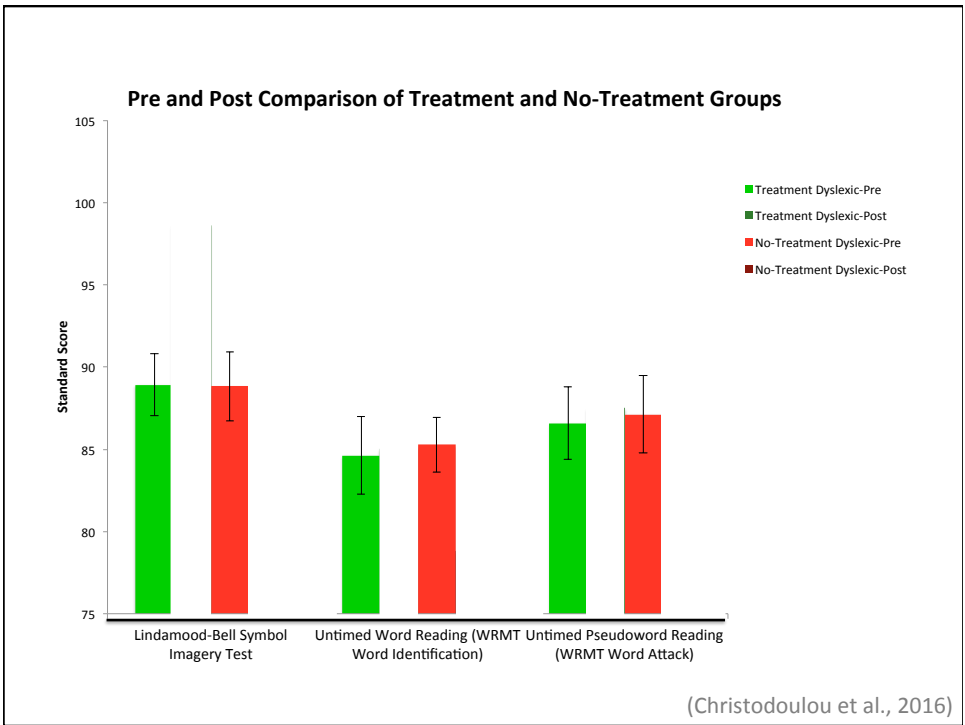
Seeing Stars: Symbol Imagery for Fluency, Orthography, Sight Words, and Spelling

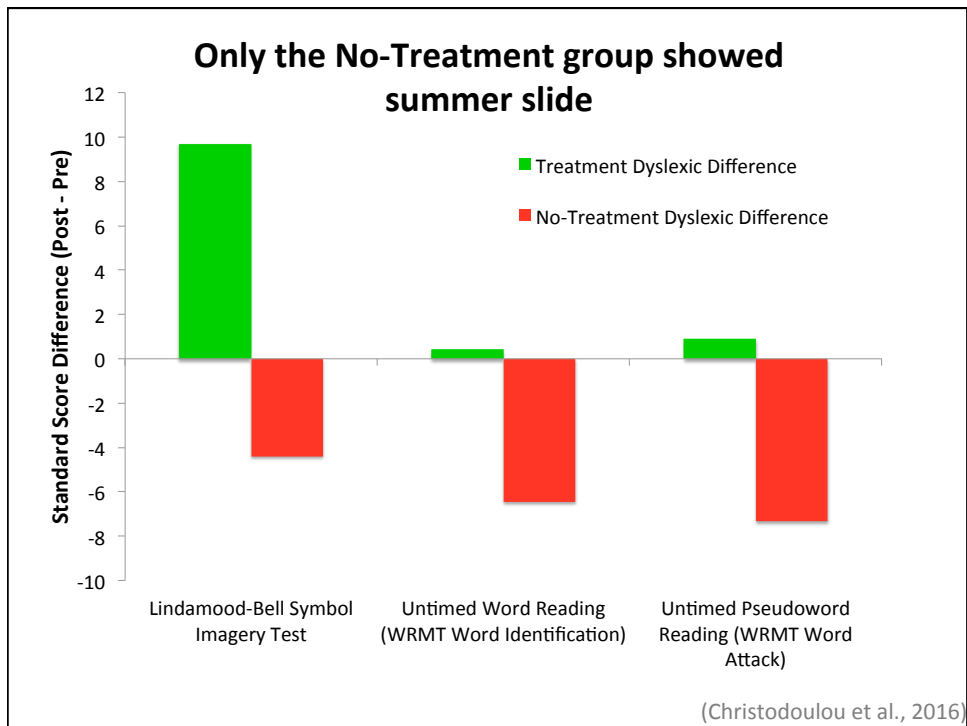
- Orthographic and visual processing training, and consequently phonological training
- Visualize:
 - Letters
 - Syllables
 - Words
 - Connected text
(Semantic information)
- *Just as the stars are parts of the sky, letters are parts of words*

	Treatment - Struggling (n=24)	No-Treatment Struggling (n=25)	
Age in years (SD)	7.73 (.59)	7.74 (.69)	matched
Gender	15 M, 9 F	17 M, 8 F	balanced
Non-Verbal Cognitive Abilities (SD)	105.5 (12.10)	103.9 (14.50)	matched

Matched: Socioeconomic Status

(Christodoulou et al., 2016)





Findings Not Attributable to:

- Attention or ADHD dx
- Executive Functions
- Nonverbal cognitive abilities
- Expressive language
- Processing speed
- Externalizing/Internalizing problems
- Behavioral symptoms

No group differences on measures sampling these areas

Converging Evidence for Program Efficacy

Previous research:

School Year



Current study:

Summer



Treatment group showed relative word level benefits in:

Untimed real word reading
Untimed pseudoword reading

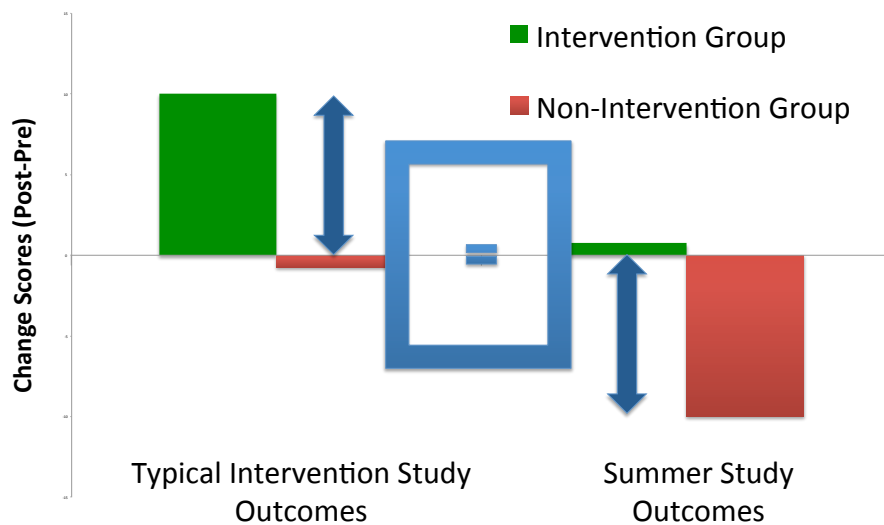


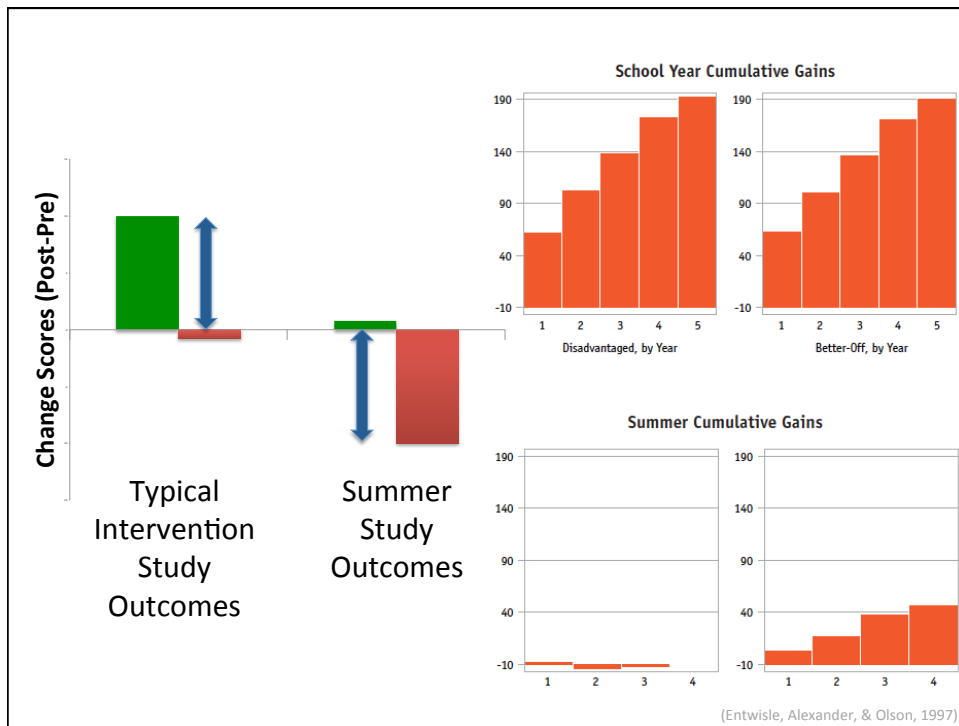
Tx group: **Increased** scores
No-Tx group: No Change

Tx group: No Change
No-Tx group: **Decreased** Scores

(Krafnick et al., 2010; Olulade et al., 2013)

Intervention Effects Example: School year vs. Summer





Summary of Results

- Direct evidence for widening differences between students with reading difficulties who do and do not receive intensive summer reading instruction
- Convergence with studies of other vulnerable student populations for summer reading outcomes

(Christodoulou et al., 2016)

Effects of Reading Intervention

- Inform our definition of a successful intervention
- Prevention of academic summer regression
- Improvement of outcomes



New Research: Summer Reading & SES

- How does socioeconomic status relate to literacy skills & response to summer reading intervention?



Collaborators: Rachel Romeo (supported by NIH 5T32DC000038); John Gabrieli; Kelly Halverson; Abigail Cyr; Jack Murtagh; Patricia Chang; Pamela Hook

Socioeconomic Status (SES)

“An individual's access to **economic and social resources**, as well as the benefits and **social standing** that come from these resources; often measured by **educational attainment, income, and/or occupation.**”

- Strong predictor of academic achievement and cognitive skill in childhood & throughout life (Bradley & Corwyn, 2002)
 - “Achievement gap” grows with age (Lee & Burkam, 2002)
- Disproportionate effect on language and literacy skills (Noble et al., 2005; Noble et al., 2012)

(Romeo, Christodoulou, et al., in prep.)

SES & Reading Disability

- Low-income students have a disproportionately higher rate of RD diagnosis (Shifrer *et al.*, 2010; Fluss *et al.*, 2009)
- Studies of SES & cognition are typically conducted on “typically developing” children with scores in the average range.
- Studies of RD are typically conducted on mid-to-high-SES convenience samples.

“Decreased access to resources may amplify cognitive risk factors for poor decoding” (Noble *et al.*, 2006)

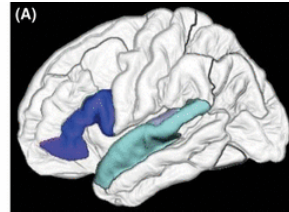
(Romeo, Christodoulou, et al., in prep.)

Socioeconomic Status & Language

- Strong predictor of brain structure, with a disproportionate effect on the canonical **“language areas”**

(Raizada *et al.*, 2008; Noble *et al.*, 2012)

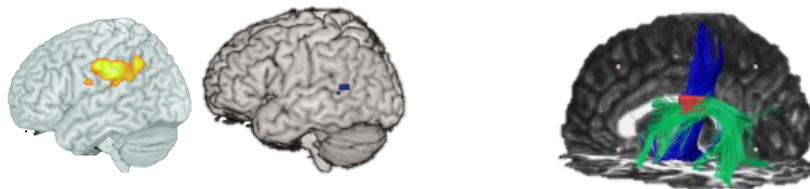
- To date, these studies have largely been done in **“typically”** developing readers



(Noble *et al.*, 2012)

Reading Disability

- Structural brain differences include:
 - Reduced grey matter in left temporo-parietal cortical regions (Hoeft *et al.*, 2007; Richlan *et al.*, 2012)
 - Reduced cerebral white matter in the “reading pathway” (left arcuate fasciculus) (Vandermosten *et al.*, 2012)



Study Goals

1. How is SES related to language and literacy performance in children with RD?
2. Does the brain structure of students with RD vary by SES? If so, how?
3. Are there SES-related differences in children's response to reading intervention, at the level of behavior and/or brain?

Study Goals

- 1. How is SES related to language and literacy performance in children with RD?**
2. Does the brain structure of students with RD vary by SES? If so, how?
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Summary of Results

How is SES related to language and literacy performance in children with RD?

SES was positively correlated with pre-intervention scores on tests of nonverbal cognition, oral language, nonword decoding, and orthographic imagery.

Study Goals

1. How is SES related to language and literacy performance in children with RD?
2. **Does the brain structure of students with RD vary by SES? If so, how?**
 - **Which is a stronger predictor of anatomy: SES or reading ability?**
3. Are there SES-related differences in children's response to reading intervention, at the level of behavior and/or brain?

Summary of Results

- Does the brain structure of students with reading disability vary by SES?
 - Yes, maternal SES predicts the thickness and volume of Broca’s area.
 - The SES-Broca’s relationship is stronger than the anatomical effect of individual reading performance.
 - This extends traditional SES brain structure results to a clinical population (with deficits in the neurocognitive areas most affected by SES).
- Which is a stronger predictor of anatomy: SES or reading ability?
 - There is *no significant relationship* between the size of Broca’s area and reading performance within this population.

Study Goals

1. How is SES related to language and literacy performance in children with RD?
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- 3. Are there SES-related differences in children’s response to reading intervention, at the level of behavior and/or brain?**

Summary of Results

- Are there SES-related differences in children's response to reading intervention at the level of behavior and/or brain?
 - Yes, more lower-SES children exhibited improvement than higher-SES peers, even when controlling for initial scores.
 - Lower-SES children also exhibited greater cortical thickness growth in an auditory processing area near Wernicke's area.
 - **This suggests that intensive reading intervention might be even more effective for these dually at-risk children (especially in the summer).**

New Research: Summer Reading Attitudes & Activities

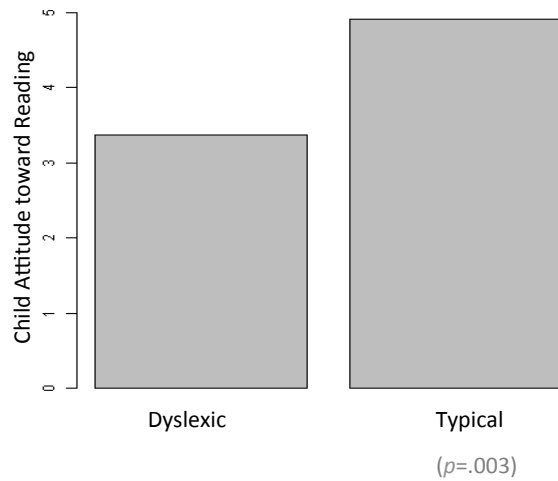
- Are there differences between typical and struggling readers in:
 - Reading attitudes during the summer?
 - Summer literacy activities?



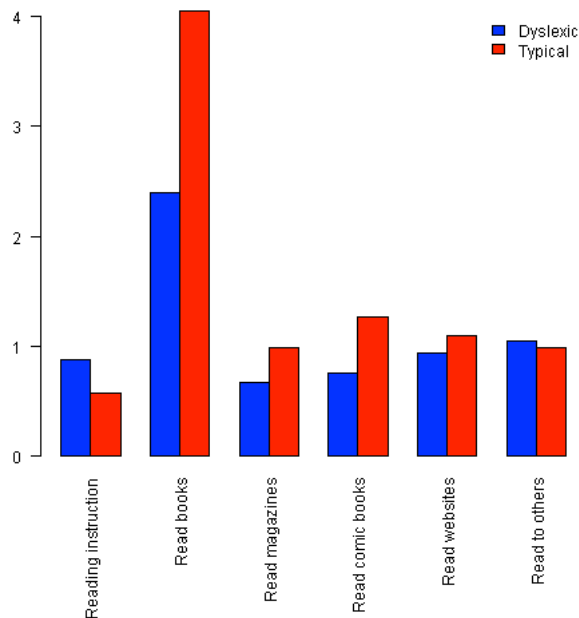
Collaborators: Kelly Halverson; Joseph McIntyre; Emily Holding; Theresa Cheng; Sydney Kagan; Maria Varella; Dalya Umans; Megan Pattee; Nicole Ashby

Typical Readers have a more positive attitude toward reading than struggling readers

- My child enjoys reading books to others
- My child is a motivated reader
- My child enjoys reading books to himself/herself.
- My child reads without being asked.
- My child likes to read.



Summer Literacy Activities



Differences in Formal Instruction:
25% typical vs 55% of RD

Differences in Book Reading:
Typical: read more print
RD: read less print

Differences in Reading Enjoyment (self/other):
Typical: enjoy it more
RD: enjoy it less

Differences in Reading Motivation & Independent Reading:
Typical > RD

Activity Type Varies Most

- Across reader ability levels:
 - We did **not find** conclusive evidence for a **quantitative difference** in the amount of time spent on literacy activities over the summer
 - Evidence for a **qualitative difference**, which can have implications for the preservation and development of reading skills over the summer



Outcomes

- **Attitude/Motivation:**
 - Children with RD were less motivated and enjoyed reading less than typical readers ($p < .05$).
- **Activities:**
 - This difference, however, did not impact the total time spent on literacy activities.
 - The RD group was more likely to engage in obligatory formal literacy activities while typical readers were more likely to engage in voluntary leisure reading.

Types of Summer Literacy Programs

- **Specific reading intervention programs:** (Cornelius & Semmel, 1982; Graham et al., 2011; Jackoway, 1971; Johnston et al., 2015; Strahler, 2013; Zvoch & Stevens, 2015)
- **Books** (Kim, 2007)
- **Parent tutoring (parents provide intervention):** (Gortmaker et al., 2007; Pagan & Senechal, 2014)
- **Teacher/parent scaffolding (pre-summer lessons, parents talk about reading strategies with kids):** (Kim & Guryan, 2010; Kim & White, 2008; White et al., 2013)
- **Library “Summer Reading Club”** (Justice et al., 2013)
- **General summer camp, with integrated reading component** (Garst & Ozier, 2015)

Promoting Healthy Summer Reading Growth

- **33% of families enroll children in a summer learning program** (Afterschool Alliance, 2014)
- **Summer reading programs have the potential to prevent or reduce summer slump in students with a variety of risk factors:**
 - **Reading or learning disabilities** (Christodoulou et al., 2015; Cornelius & Semmel, 1982)
 - **Low SES** (Johnston, Riley, Ryan, & Kelly-Vance, 2014; Kim & Quinn, 2013)
 - **Low performance relative to a variety of literacy benchmarks** (Zvoch & Stevens, 2011, 2013)
- **Positive gains for many summer programs**
 - **Mandatory** (for students who would otherwise be retained in the same grade)
 - **Voluntary programs that are home-based or school-based** (McCombs, 2011)

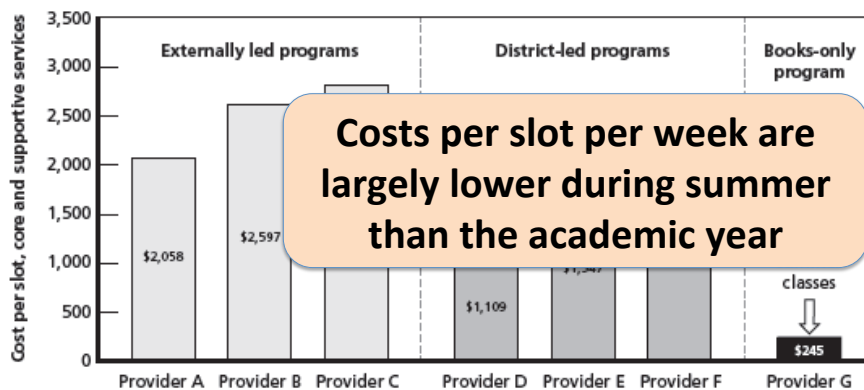
Characteristics of Strong Summer Literacy Programs

- Small class sizes (maximum size of 20 students)
- Individualized instruction
- High-quality instruction
- Curricula consistent with academic goals
- Engaging and rigorous programming
- Maximized participation and attendance
- Sufficient duration
- Involved parents
- Evaluations of effectiveness

RAND Corporation report (McCombs et al., 2011)

42 Making Summer Count: How Summer Programs Can Boost Children's Learning

Figure 4.1
Cost Estimates for Selected Summer Learning Programs, per Slot per Summer, 2009



NOTE: The hourly rate for core services was applied to a hypothetical 25-day summer schedule of six hours per day. The total also includes uniform, imputed values for food, transportation, and facilities. Costs adjusted to U.S. national average to account for regional differences in the price of labor.

RAND MS120-4.1

RAND Corporation report (McCombs et al., 2011)

Final Considerations

- Summers are an opportunity for intervention critical for struggling readers
- Summer intervention efficacy may present as absence of decline rather than presence of growth in reading skills
- Effective and early treatment may relieve reliance on compensatory mechanisms for reading
- Attitude/motivation of children with reading difficulties may be lower than in peers; more likely to engage in obligatory formal literacy activities while typical readers were more likely to engage in voluntary leisure reading.

Acknowledgements



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Brain, Education & Mind



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