Striving for Balance: Using Rigorous Methods to Challenge Insignificant Findings

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Motivation behind MSRP

• 25% of this city’s adults lack a HS diploma
• Fewer than 9% have a BA or higher
• 95% of this district’s 196 schools are Title I
• Of the district’s 116,000 students
  – More than 70% are eligible for FRL
  – 87% are African American
  – More than 70% of students in grades 6 – 8 scored below the 50th percentile on the state test in ELA
Targeted Intervention
Research Objectives

To determine:

- Effects of READ 180 (targeted intervention) on struggling readers’ reading achievement

- Effects of READ 180 on struggling readers’ achievement in core subjects
Design for Estimating Impact of the Targeted Intervention

- **READ 180 Enterprise Edition (Scholastic, Inc.)**
  - 90 minute instructional model
  - Used in addition to regular ELA instruction
  - Intended as a 2-year intervention

- Random assignment of struggling readers from eligible pool (bottom quartile on state reading test)

- 2-level HLM used to estimate impact on 3 DVs:
  - ITBS Total Reading, Vocabulary, Comprehension
## ITT Analytic Samples

<table>
<thead>
<tr>
<th>Treatment Duration</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6th</td>
<td>7th</td>
<td>8th</td>
<td>6th</td>
</tr>
<tr>
<td>1 year of treatment (N = 3,427)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>1 year of treatment (N = 2,318)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>2 years of treatment (N = 1,601)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 year of treatment (N = 497)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 years of treatment (N = 312)</td>
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</tbody>
</table>
Other Variables in Analytic Models

- IV = READ 180 participation (Yes = 1; No = 0)

- Covariates

<table>
<thead>
<tr>
<th>Student Level</th>
<th>School Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline score on 3 DVs (ITBS)</td>
<td>Percentage Female</td>
</tr>
<tr>
<td>Gender</td>
<td>Percentage African American</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>Percentage Special Ed</td>
</tr>
<tr>
<td>FRL</td>
<td>Percentage FRL</td>
</tr>
<tr>
<td>ELL</td>
<td>Percentage ELL</td>
</tr>
<tr>
<td>Grade 7 (Y1)</td>
<td>School Enrollment</td>
</tr>
<tr>
<td>Grade 8 (Y1/Y2)</td>
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</tbody>
</table>

# Preliminary Year 4 HLM Results

<table>
<thead>
<tr>
<th>Treatment Sample</th>
<th>ITBS Total Reading</th>
<th>ITBS Comprehension</th>
<th>ITBS Vocabulary</th>
</tr>
</thead>
</table>
| 1 year, All Years: All Grades | ES = -.04  
  \( p = .32 \) | ES = -.01  
  \( p = .79 \) | ES = -.02  
  \( p = .59 \) |
| 1 year, All Years: 6\(^{th}\) grade only | ES = -.03  
  \( p = .53 \) | ES = -.01  
  \( p = .81 \) | ES = .00  
  \( p = .98 \) |
| 2 years, Ys 2–4:  
  Y2—7th & 8th grades  
  Ys 3 & 4—7\(^{th}\) grade | ES = .02  
  \( p = .77 \) | ES = -.01  
  \( p = .88 \) | ES = .06  
  \( P = .29 \) |
| 1 year, Y4: 6\(^{th}\) grade only | ES = .05  
  \( p = .62 \) | ES = .17  
  \( p = .09 \) | ES = -.05  
  \( p = .58 \) |
| 2 years, Y4: 7\(^{th}\) grade only | ES = .10  
  \( p = .36 \) | ES = .22  
  \( p = .06 \) | ES = .00  
  \( p = .99 \) |
Plan B

- Explore whether student subgroups benefitted from 2 years of treatment using
  - Multi-year data from RCT, except
    - data from one school with low FOI
    - Y1 data (due to low FOI across schools)
  - Propensity Score Matching (PSM)
  - Multiple regression on unmatched & matched samples
    - disaggregated into quintiles based on baseline ITBS scores
Method

• PSM optimal matching used to
  – create a control group that more closely matches the treatment group on baseline covariates
  – reduce the effect of selection bias on estimates of program effects

• Multiple regression used to
  – estimate effects of READ 180 on student subgroups’ performance on ITBS Total Reading, Comprehension and Vocabulary
Covariates

- **Demographics**
  - Gender
  - FRL
  - ELL
  - African American
  - Grade 8
  - Age (in months)
  - ELA (days)

- **Baseline scores**
  - ITBS Total Reading
  - ITBS Comprehension
  - ITBS Vocabulary
  - State Test:
    - Math
    - Reading
    - Science
    - Social Studies
## Covariate Balance Before and After Matching

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
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</thead>
<tbody>
<tr>
<td><strong>Sample Sizes</strong></td>
<td>$N_T = 653$</td>
<td>$N_T = 651$</td>
</tr>
<tr>
<td></td>
<td>$N_C = 944$</td>
<td>$N_C = 651$</td>
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<tr>
<td><strong>Absolute Standardized Bias (SB)</strong></td>
<td>2.02</td>
<td>0.60</td>
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<tr>
<td><strong>ELL SB</strong></td>
<td>8.15</td>
<td>0.00</td>
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<tr>
<td><strong>Age SB</strong></td>
<td>8.28</td>
<td>2.25</td>
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<tr>
<td><strong>TCAP Read SB</strong></td>
<td>8.46</td>
<td>2.79</td>
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</table>
Parameter Estimates, by Quintile

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<tr>
<th></th>
<th>Quintile</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tbody>
<tr>
<td><strong>ITBS Total Reading</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Matched</td>
<td>2.89</td>
<td>-0.06</td>
<td>-0.73</td>
<td>-1.56</td>
<td>-0.37</td>
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<tr>
<td></td>
<td>p = 0.10</td>
<td>p = 0.93</td>
<td>p = 0.67</td>
<td>p = 0.37</td>
<td>p = 0.85</td>
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<tr>
<td>Unmatched</td>
<td>2.21</td>
<td>-0.61</td>
<td>-1.24</td>
<td>-1.48</td>
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<tr>
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<td>p = 0.15</td>
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<td><strong>ITBS Comp</strong></td>
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<tr>
<td>Matched</td>
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<td>-1.08</td>
<td>-2.11</td>
<td>3.25</td>
<td>-1.68</td>
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<tr>
<td></td>
<td>p = 0.33</td>
<td>p = 0.62</td>
<td>p = 0.33</td>
<td>p = 0.13</td>
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<tr>
<td>Unmatched</td>
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<td>-1.81</td>
<td>-0.84</td>
<td>2.12</td>
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<tr>
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<td>p = 0.90</td>
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<td><strong>ITBS Vocab</strong></td>
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<tr>
<td>Matched</td>
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<td>-2.40</td>
<td>2.96</td>
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<tr>
<td>Unmatched</td>
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<td>-3.27</td>
<td>0.38</td>
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<tr>
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<td>p = 0.63</td>
<td>p = 0.61</td>
<td>p = 0.11</td>
<td>p = 0.86</td>
<td>p = 0.88</td>
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</table>
Conclusions

• In this study, no subgroup of students benefitted more from READ 180 than regular reading and ELA offerings

• Since we know that published research favors studies showing positive findings
  – Research consumers lack access to the full range of findings about an intervention
  – Literature will skew decisions towards use of interventions for which there is compelling (unpublished) evidence suggesting no significant improvement in outcomes compared to current practice
References


Questions?
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Thank you