Proximal Effects of Robust Vocabulary

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Introductions

- Developers of Intervention
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- McREL Efficacy Trial Research Team
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- Funding
  - 3-year grant U.S. DOE Institute of Education Sciences (#R305A080627-09D)
Presentation Overview

- Intervention
- Research Design and Method
- Year 1 Results
  - Proximal effects on vocabulary
  - Proximal effects on comprehension
  - Fidelity of implementation
- Implications and Discussion
Intervention

- **Elements of Reading: Vocabulary (EOR-V)**
  - An instantiation of robust vocabulary
  - Widely-used supplemental reading program

- **Unique components**
  - Tier 2 Words
  - Research-based Lessons
    - Both definitions and context
    - Multiple exposures and use
    - Systematic, structured instruction
  - Deep processing
Tier 2 Words

versatile  audacious  giddy  perseverance
Research-based Lessons

- Both definitions and context
  - “If someone is *versatile*, he or she can do many different things.”

- Multiple exposures and use
  - After a read-aloud poem about words being *versatile*, the class reads a story about a boy who can do anything and everything and completes a fill-in-the-blank title for the story (A ____________ Boy)

- Systematic, structured instruction
  - Five-day lesson plan
    - Introduction of words, guided and independent practice, followed by assessment
Active Deep Processing

- Word chats, graphic organizers, and writing prompts
  - “Would you describe yourself as a versatile person? Why or why not? What other things would you like to learn how to do to make yourself even more versatile?”

- Others
  - Would you want a docile guard dog? Why?
  - Would you like to own some diligent termites? Why?
  - Would you help a distressed rattlesnake? Why?
Theory of Change

**Intervention**

- Tier 2 Words
- Research-based Lessons
- Deep Processing

**Proximal Effects**
- Learn Target Words
- Comprehend Passages with Target Words
- Word Consciousness

**Distal Effects**
- General Vocabulary
- Verbal Reasoning
- Passage Comprehension
Research Questions

- What is the Year 1 (2008-2009) impact of *Elements of Reading: Vocabulary* on student
  - vocabulary in kindergarten, first, third and fourth grades?
  - listening/reading comprehension in kindergarten, first, third and fourth grades?
## Research Design

<table>
<thead>
<tr>
<th>Grade</th>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N schools = 22</td>
<td>N schools = 24</td>
</tr>
<tr>
<td></td>
<td>Year1 (08-09)</td>
<td>Year2 (09-10)</td>
</tr>
<tr>
<td>K</td>
<td>TK</td>
<td>Non-part</td>
</tr>
<tr>
<td>1</td>
<td>T1</td>
<td>TK</td>
</tr>
<tr>
<td>2</td>
<td>Non-part a</td>
<td>T1</td>
</tr>
<tr>
<td>3</td>
<td>C3</td>
<td>Non-part</td>
</tr>
<tr>
<td>4</td>
<td>C4</td>
<td>C3</td>
</tr>
<tr>
<td>5</td>
<td>Non-part</td>
<td>C4</td>
</tr>
</tbody>
</table>

*a* Non-part = non-participating students. T = treatment C = control
### Sample Counts by Grade and Experimental Group

<table>
<thead>
<tr>
<th></th>
<th>Kindergarten and First</th>
<th>Third and Fourth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Treatment</td>
<td>Control</td>
</tr>
<tr>
<td>Schools</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>Teachers</td>
<td>208</td>
<td>211</td>
</tr>
<tr>
<td>Students</td>
<td>3,141</td>
<td>3,565</td>
</tr>
</tbody>
</table>
Measures

- **Implementation Fidelity**
  - Teacher logs, survey and classroom observations
  - Audio-recording of a sample vocabulary lesson

- **Student Measures**
  - Baseline: SAT-10
  - Year 1: Test of Instructed Words (TOIW)
    - TOIW -Vocabulary (TOIW-V)
    - TOIW - Comprehension (TOIW-C)
Sample of 20 *EOR-V* words (24 at fourth grade)
- Four items per word; 80 total (96 at fourth grade)
  - If you fell and got hurt would you be giddy?
  - Does giddy mean to freeze something?
  - Does giddy mean to be so happy that you start to act silly?
  - If you and your friend were having a good time and laughing all day, would you be giddy?

Scoring
- Total items correct
TOIW-Comprehension

- Same sample of 20 EOR-V words (24 at fourth grade)
- 6 - 8 EOR-V words per story; multiple choice, inferential questions asked about important details in story
  - Why did Mrs. Vanderbot want the cakes?
    A) She was having a party.
    B) She really felt like eating cake.
    C) She liked to spend money on pastries.
    D) She was no longer on a diet.
    (B) is correct based on story’s use of craving in first sentence, “One morning Mrs. Vanderbot woke up with a craving for some fancy cakes.”

- Scoring was total items correct
Impact Analysis

- 2-level model
  - Student at Level 1 and school at Level 2
  - Baseline achievement as covariate

- Benjamini-Hochberg correction for multiple comparisons
## Results: Vocabulary

<table>
<thead>
<tr>
<th>Grade</th>
<th>Treatment Mean¹</th>
<th>Control Mean</th>
<th>Estimated Difference</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kindergarten</td>
<td>48.60 (.59)</td>
<td>41.72 (.57)</td>
<td>6.89* (.82)</td>
<td>0.86</td>
</tr>
<tr>
<td>First Grade</td>
<td>55.53 (.80)</td>
<td>48.30 (.77)</td>
<td>7.23* (1.16)</td>
<td>0.81</td>
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<tr>
<td>Third Grade</td>
<td>60.80 (.76)</td>
<td>52.28 (.77)</td>
<td>8.52* (1.09)</td>
<td>0.87</td>
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<tr>
<td>Fourth Grade</td>
<td>71.67 (.85)</td>
<td>61.32 (.92)</td>
<td>10.34* (1.06)</td>
<td>0.98</td>
</tr>
</tbody>
</table>

¹ Total items = K - 80, First - 75, Third - 78, Fourth - 93

*p < .001 (uncorrected)
# Results: Comprehension

<table>
<thead>
<tr>
<th>Kindergarten</th>
<th>Treatment Mean(^1)</th>
<th>Control Mean</th>
<th>Estimated Difference</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10.26 (.16)</td>
<td>9.29 (.16)</td>
<td>0.95* (.22)</td>
<td>0.35</td>
</tr>
<tr>
<td>First Grade</td>
<td>9.62 (.13)</td>
<td>8.94 (.13)</td>
<td>0.68* (.19)</td>
<td>0.28</td>
</tr>
<tr>
<td>Third Grade</td>
<td>10.38 (.11)</td>
<td>9.80 (.11)</td>
<td>0.58* (.16)</td>
<td>0.16</td>
</tr>
<tr>
<td>Fourth Grade</td>
<td>13.71 (.29)</td>
<td>11.72 (.29)</td>
<td>1.98* (.41)</td>
<td>0.52</td>
</tr>
</tbody>
</table>

\(^1\) Total items correct = K - 20, First - 15, Third - 19, Fourth - 24

\(* p < .001 \) (uncorrected)
Fidelity of Implementation

- Treatment versus control teachers
  - K and First
    - *EOR-V* teachers more frequently taught definitions
    - Control teachers more frequently provided contexts
  - Third
    - *EOR-V* teachers more frequently used pictures and fill-in-the-blank exercises
  - Fourth
    - No significant differences
Fidelity of EOR: Vocabulary

- 12 EOR-V lessons completed on average
- Majority of elements implemented with adequate fidelity
  - Adequate:
    - Read-aloud, photo cards, student book, graphic organizers, and assessments (and writing in fourth grade only)
  - Inadequate:
    - Definitions and writing
Depth of Processing

- Analysis of instructional conversations
  - Sample vocabulary lesson transcripts
  - Taxonomy of question types (McKeown & Beck)

- Results
  - Control classroom questions:
    - Required recall of instructed words
  - Treatment classroom questions:
    - Required explanations of examples of word use or reasons for choosing contexts as appropriate for new words
Teachers often report feeling inadequately prepared to teach comprehension and vocabulary (U.S. Department of Education, 2008).

A partially scripted program such as EOR-Vocabulary offers guidance that addresses these gaps and can result in significant and positive impacts on student achievement.
Next Steps

- For the publisher
  - Provide teachers clearer directions about how to use friendly explanations

- For educators
  - Identify ways to implement *EOR-Vocabulary* lessons at a faster pace (all student response, e.g., thumbs-up/thumbs-down)

- For researchers
  - Examine distal effects of *EOR-Vocabulary*
Q&A

- Is learning the words taught enough to reduce achievement gaps?
- Should we expect impact on words not taught?
- What about transfer effects?
References
