

# ScaleUp

## SCALING-UP TIER 2 INTERVENTION: LESSONS LEARNED

PCRC 2009



SMU

THE INSTITUTE FOR  
READING RESEARCH



# The Research Team

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# Overarching Questions

1. Do results of previously validated Tier 2 reading interventions generalize in real world contexts?
2. What are barriers and facilitators to research-supported educational practices being implemented wide-scale in schools?




# Overview of the Research

- Study 1: Generalization of *Responsive Reading Intervention* in Suburban, Rural, and Urban context.
- Study 2: Generalization of *Early Interventions in Reading* in Urban & Rural Low SES contexts
- Study 3: Measuring the Impact of Implementation Fidelity on student outcomes
- Study 4: Contextual factors impacting student outcomes
- Study 5: The Impact of Virtual and On-Site Coaching (analyses in progress)

# What is Being Scaled-Up

**If progress is inadequate, move to next level.**



## **Tier 1: Quality Core**

Enhanced general education classroom instruction.

## **Tier 2: Secondary Intervention**

Child receives more intense intervention in general education, presumably in small groups.

## **Tier 3: Tertiary**

Intervention increases in intensity and duration. Support typically needed across years.

# Scaling Two Interventions

## Responsive Intervention

(Denton & Hocker, 2005)

- Systematic, explicit instruction in synthetic phonics & analogy phonics
- Students apply decoding, fluency, & comprehension skills while reading/writing
- Teachers respond to student needs documented through assessment
- Leveled text (decodable can be integrated)

## Early Interventions in Reading

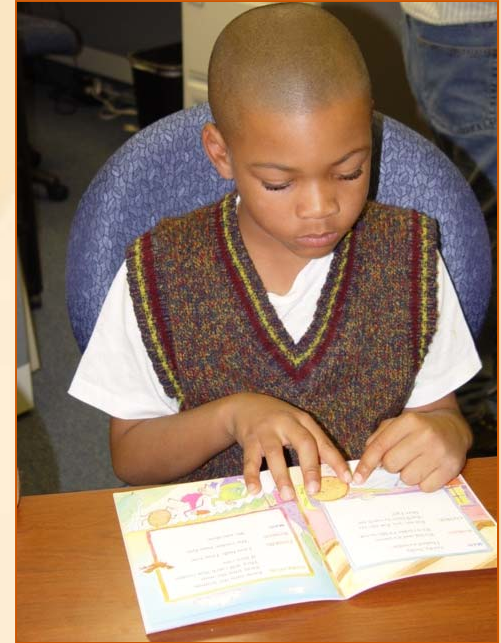
(Mathes & Torgesen, 2005)

- Explicit instruction in synthetic phonics, with emphasis on fluency and comprehension strategies.
- Decodable text
- Carefully constructed scope and sequence designed to prevent possible confusions
- Daily Lessons are prescriptive
- Lessons are fully specified

\*\*Prepublication title = Proactive Reading.

# Previous Research Results

- Students in both interventions performed significantly better than at-risk students in the same school who did not receive the interventions in *phonological awareness, word reading, and oral reading fluency*.
- *Both interventions were equally effective*



Mathes, P. G., Denton, C. A., Fletcher, J. M., Anthony, J. L., Francis, D. J., & Schatschneider, C. (2005). The effects of theoretically different instruction and student characteristics on the skills of struggling readers. *Reading Research Quarterly*, 40, 148-182.

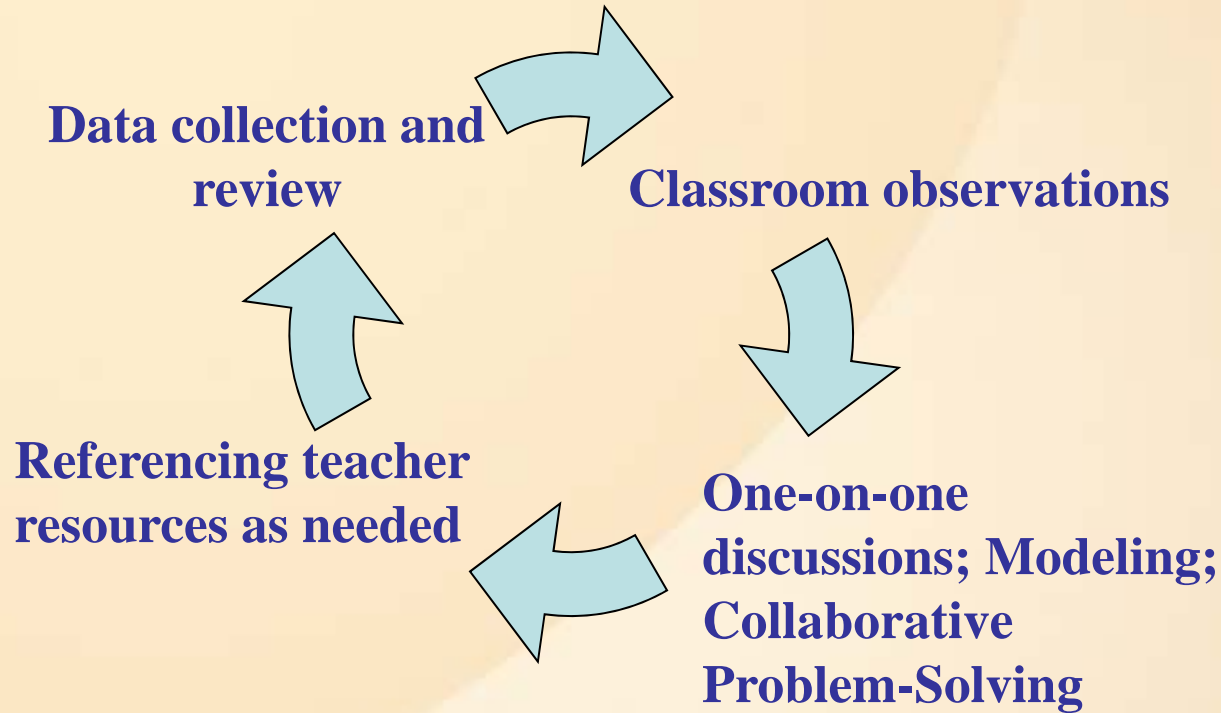
# Four Year Project (2004-08)

- Following schools and teachers.
- New cohort of 1<sup>st</sup>-grade students each year.
- Total of 86 Schools in the Dallas/Fort Worth and Austin areas.
- Farthest North-Farthest South: 255 Miles
- Farthest East-Farthest West: 105 Miles
- Schools had a choice of intervention
- Large urban, suburban, small town, and very small rural districts

# Research Design

- Students within building assigned randomly to EIR/RRI or typical practice.
- Teachers in each intervention assigned randomly to 1 of 3 coaching conditions.
  - **On-Site:** Monthly coaching sessions
  - **Virtual Coaching:** Sessions via the computer – text based.
  - **On-Demand:** Teacher requested support (the contrast condition)

# The Coaching Process



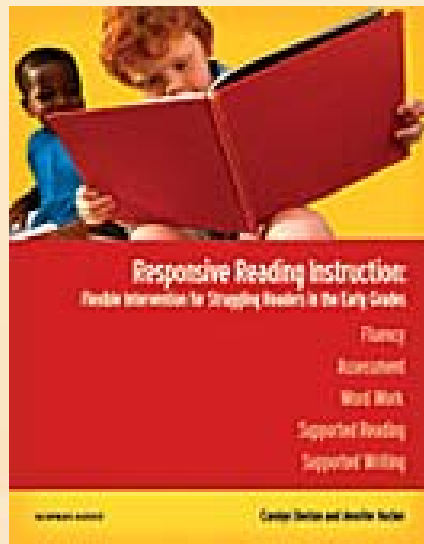
Based on the Student-Focused-Coaching model -- Hasbrouck, J. E., & Denton, C. (2005). *The reading coach: A how-to manual for success*. Boston: Sopris West.

# Results

# Clear Selection Bias Resulting in Very Different Samples

## Suburban Districts

- Nearly all chose to implement *Responsive Reading Intervention* (Denton & Hocker, 2005)



## Urban Districts

- Nearly all chose to implement *Early Interventions in Reading* (Mathes & Torgesen, 2005)



# Study 1: Generalization of Responsive Reading Instruction (RRI)

- RRI implemented in 31 schools across 2 years.
- Students at-risk for reading difficulties at each school were randomly assigned to receive the research intervention (RRI;  $n = 182$ ) or typical practice (TP;  $n = 240$ ).
- 43% of the TP students received an alternate school-provided intervention.
- Students in the RRI group had significantly higher outcomes than those in the TP group on multiple measures.
- Over 90% of RRI students met word reading criteria for adequate intervention response, but fewer met a fluency benchmark.

# RRI End of Year Observed Score Means and Standard Deviations, Estimated Means, and Effect Sizes

Measure	RRI ( <i>n</i> =182)			Typical Practice ( <i>n</i> =240)			Effect <i>s</i>
	<i>M</i>	<i>SD</i>	<i>EM</i>	<i>M</i>	<i>SD</i>	<i>EM</i>	
CTOPP Blending Words	14.21**	3.04	14.27	13.43	3.27	13.43	.27
CTOPP Segmenting Words	9.69	2.83	9.70	9.33	3.61	9.31	.12
TOWRE Sight Word Eff.	27.92***	10.67	27.86	23.28	10.34	23.21	.47
TOWRE Nonwords	10.63***	6.21	10.59	8.14	5.64	8.09	.44
WJ III Letter Word Id	438.08***	18.04	438.00	424.58	20.72	424.40	.72
WJ III Word Attack	473.33***	17.54	473.32	465.38	18.96	465.15	.46
WJ III Passage Comp.	455.78***	14.06	455.61	447.34	17.23	447.40	.53
WJ III Spelling	457.96***	12.43	457.80	449.72	14.63	449.90	.63
Oral Reading Fluency	31.35***	18.68	32.01	25.03	17.12	24.71	.45

\* \*\*p < .001; \*\*p < .01

## Study 2: Generalization of *Early Interventions in Reading* (EIR) in Urban & Rural, Low SES contexts

- ERI implemented in 1<sup>st</sup>-Grade in 20 schools across 2 years.
- Students at-risk for reading difficulties at each school were randomly assigned to receive the research intervention (ERI;  $n = 148$ ) or typical school practice (TP;  $n = 159$ ).
- 76% of the TP students received an alternate school-provided intervention.
- Students in the ERI group had significantly higher outcomes than those in the TP group on multiple measures of reading.
- Over 90% of ERI students met word reading criteria for adequate intervention response, but fewer met a fluency benchmark.

# EIR End of Year Observed Score Means and Standard deviations, and Effect Sizes

Measure	<i>EIR</i>		<i>Typical</i>		<i>Effect</i>
	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>	
<b>CTOPP Blending Words</b>	<b>14.20</b>	<b>.47</b>	<b>12.53</b>	<b>.46</b>	<b>.49</b>
<b>CTOPP Blending Non-words</b>	<b>9.47</b>	<b>.36</b>	<b>8.48</b>	<b>.35</b>	<b>.30</b>
<b>CTOPP Segmenting Words</b>	<b>10.41</b>	<b>.38</b>	<b>8.89</b>	<b>.38</b>	<b>.44</b>
<b>IRT Word List</b>	<b>22.48</b>	<b>1.03</b>	<b>19.83</b>	<b>1.01</b>	<b>.25</b>
<b>TOWRE Sight Word Efficiency</b>	<b>24.66</b>	<b>1.28</b>	<b>22.84</b>	<b>1.26</b>	<b>.17</b>
<b>TOWRE Phonemic Decoding</b>	<b>11.25</b>	<b>.78</b>	<b>9.67</b>	<b>.75</b>	<b>.24</b>
<b>WJ-III Letter Word ID (w)</b>	<b>429.93</b>	<b>2.83</b>	<b>423.44</b>	<b>2.79</b>	<b>.28</b>
<b>WJ-III Word Attack (w)</b>	<b>473.53</b>	<b>2.51</b>	<b>468.44</b>	<b>2.47</b>	<b>.26</b>
<b>WJ-III Passage Comprehension (w)</b>	<b>447.12</b>	<b>2.05</b>	<b>443.03</b>	<b>2.02</b>	<b>.24</b>
<b>WJ-III Spelling (w)</b>	<b>451.71</b>	<b>1.79</b>	<b>449.41</b>	<b>1.76</b>	<b>.15</b>
<b>Oral Reading Fluency</b>	<b>29.63</b>	<b>2.00</b>	<b>27.59</b>	<b>1.98</b>	<b>.11</b>
<b>Nonsense Reading Fluency</b>	<b>55.38</b>	<b>2.78</b>	<b>52.04</b>	<b>2.74</b>	<b>.26</b>
<b>Phonemic Segmenting Fluency</b>	<b>51.83</b>	<b>1.45</b>	<b>48.28</b>	<b>1.42</b>	<b>.38</b>

## *EIR Differences in End of Year Achievement*

	Blending Words		Blending Nonwords		Segmenting Words		IRT Word List		TOWRE Sight Word Eff.	
	Est.	SE	Est.	SE	Est.	SE	Est.	SE	Est.	SE
<b>Fixed effects:</b>										
<b>Intercept</b>	<b>12.53***</b>	<b>.46</b>	<b>8.47***</b>	<b>.36</b>	<b>8.90***</b>	<b>.37</b>	<b>19.62***</b>	<b>2.39</b>	<b>22.83***</b>	<b>1.37</b>
<b>Group</b>	<b>1.67***</b>	<b>.39</b>	<b>.97**</b>	<b>.37</b>	<b>1.51***</b>	<b>.39</b>	<b>2.64*</b>	<b>1.20</b>	<b>1.84</b>	<b>1.25</b>
<b>School Pretest</b>							<b>1.99**</b>	<b>.62</b>		
<b>Random effects:</b>										
<b>Residual</b>	<b>11.74</b>		<b>10.42</b>		<b>11.76</b>		<b>109.93</b>		<b>119.29</b>	
<b>Intercept <sup>a</sup></b>	<b>2.64</b>		<b>1.13</b>		<b>1.26</b>		<b>5.85</b>		<b>21.12</b>	

## *EIR Differences in End of Year Achievement -- Continued*

	TOWRE Phonemic Decoding Efficiency		WJ III Letter Word Identification		WJ III Word Attack		WJ III Passage Comprehension		WJ III Spelling	
	Est.	SE	Est.	SE	Est.	SE	Est.	SE	Est.	SE
<b>Fixed effects:</b>										
<b>Intercept</b>	<b>10.66***</b>	<b>.74</b>	<b>423.39***</b>	<b>2.82</b>	<b>467.92***</b>	<b>2.15</b>	<b>443.00***</b>	<b>2.04</b>	<b>449.43***</b>	<b>1.76</b>
<b>Group</b>	<b>1.58*</b>	<b>.76</b>	<b>6.45*</b>	<b>2.68</b>	<b>4.81*</b>	<b>2.28</b>	<b>4.07***</b>	<b>1.96</b>	<b>2.30</b>	<b>2.30</b>
<b>Cohort</b>									<b>4.61*</b>	<b>2.20</b>
<b>Student Pretest</b>	<b>1.12***</b>	<b>.18</b>								
<b>School Pretest</b>					<b>.62**</b>	<b>.20</b>				
<b>Random effects:</b>										
<b>Residual</b>	<b>44.01</b>		<b>549.41</b>		<b>394.59</b>		<b>293.67</b>		<b>221.46</b>	
<b>Intercept<sup>a</sup></b>	<b>4.87</b>		<b>83.72</b>		<b>37.80</b>		<b>42.87</b>		<b>31.26</b>	

Note: Between-school variance. School Pretest was only included as a covariate if it improved model fit. \*\*\* $p < .001$  \*\* $p < .01$  \* $p < .05$

# Study 3: Measuring the Impact of Implementation Fidelity on Student Outcomes

## Question:

How do quality of implementation of the intervention and quantity of the intervention delivered impact student outcomes?

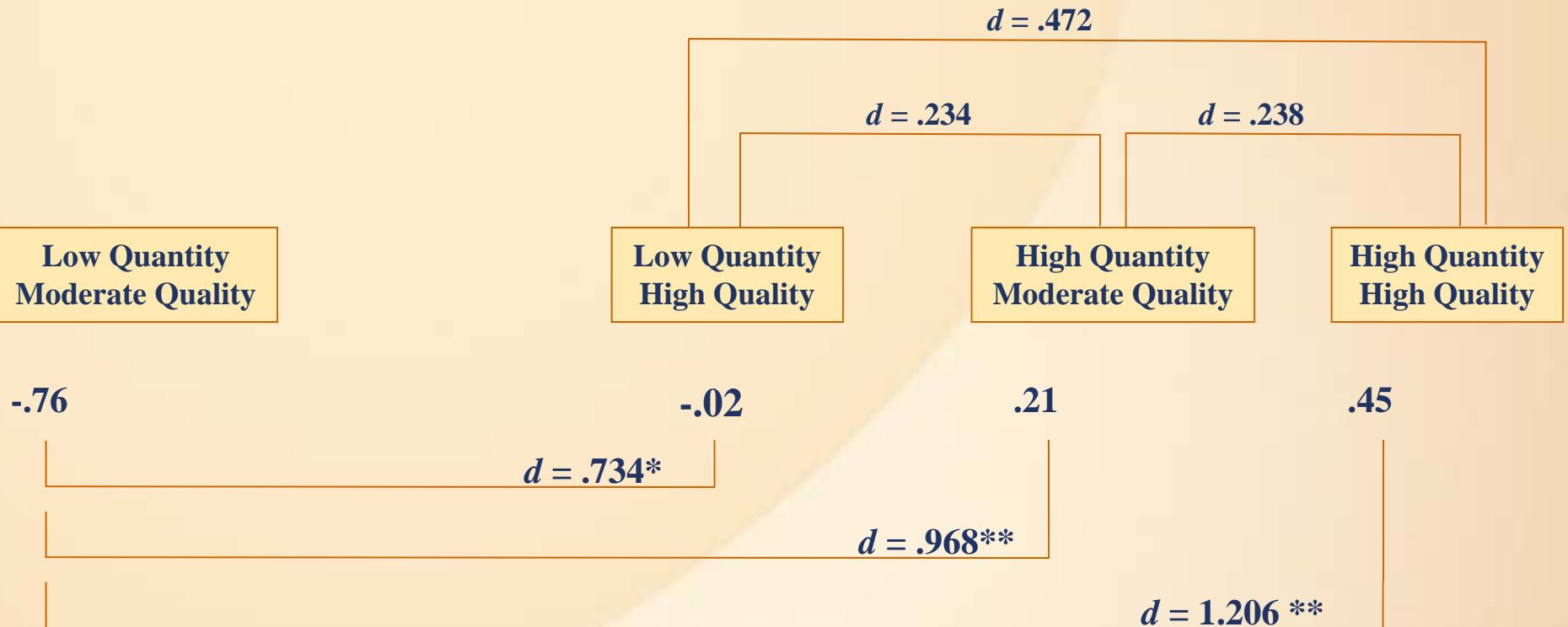
- quality = both the number of components delivered and how well each component was delivered during an instructional session (i.e., the snapshot)
- quantity = the amount of the intervention delivered across the time period in which the intervention was supposed be implemented (i.e., dosage).

# Canonical Solution for Teacher Fidelity Predicting Student Outcomes in EIR

Variable	Function 1			Function 2			$h^2$ (%)
	Coef	$r_s$	$r^2$ (%)	Coef	$r_s$	$r^2$ (%)	
Quality	0.00	.29	8.12	-1.04	<u>-.96</u>	91.78	99.90
Quantity	1.00	<u>1.00</u>	100.00	.30	.00	0.00	100.00
$R^2$			11.90			9.80	
Blending Words	.53	<u>.69</u>	47.06	-.06	-.37	13.62	<u>60.68</u>
Blending Nonwords	.22	<u>.52</u>	26.83	.00	-.30	9.24	36.07
Segmenting Words	-.09	.26	6.60	-.49	<u>-.64</u>	40.70	<u>47.31</u>
Word List	-.10	.30	8.88	-.11	-.36	12.96	21.84
Sight Word Efficiency	.71	<u>.46</u>	21.07	.74	-.17	2.82	23.89
Phonemic Decoding	-.76	.02	.04	-.15	-.34	11.22	11.26
Letter Word ID	.53	<u>.57</u>	31.92	.38	-.36	13.10	<u>45.03</u>
Word Attack	-.38	.09	.83	-.38	<u>-.60</u>	35.88	36.71
Passage Comprehension	-.16	.27	7.40	-.25	<u>-.51</u>	25.91	33.31

Note. Structure coefficients ( $r_s$ ) greater than  $|\cdot45|$  are underlined. Communality coefficients ( $h^2$ ) greater than 45% are underlined. Coef = standardized canonical function coefficient.  $r_s$  = structure coefficient.  $h^2$  = commonality coefficient. Posttest score adjusted by pretest score. EIR data only.

# Pairwise Comparisons Between Group Centroids



$d$  = Standardized mean differences were calculated by dividing the difference between group centroids by the square root of the residual (Maxwell & Delaney, 2004). Outcomes based on EIR data only.

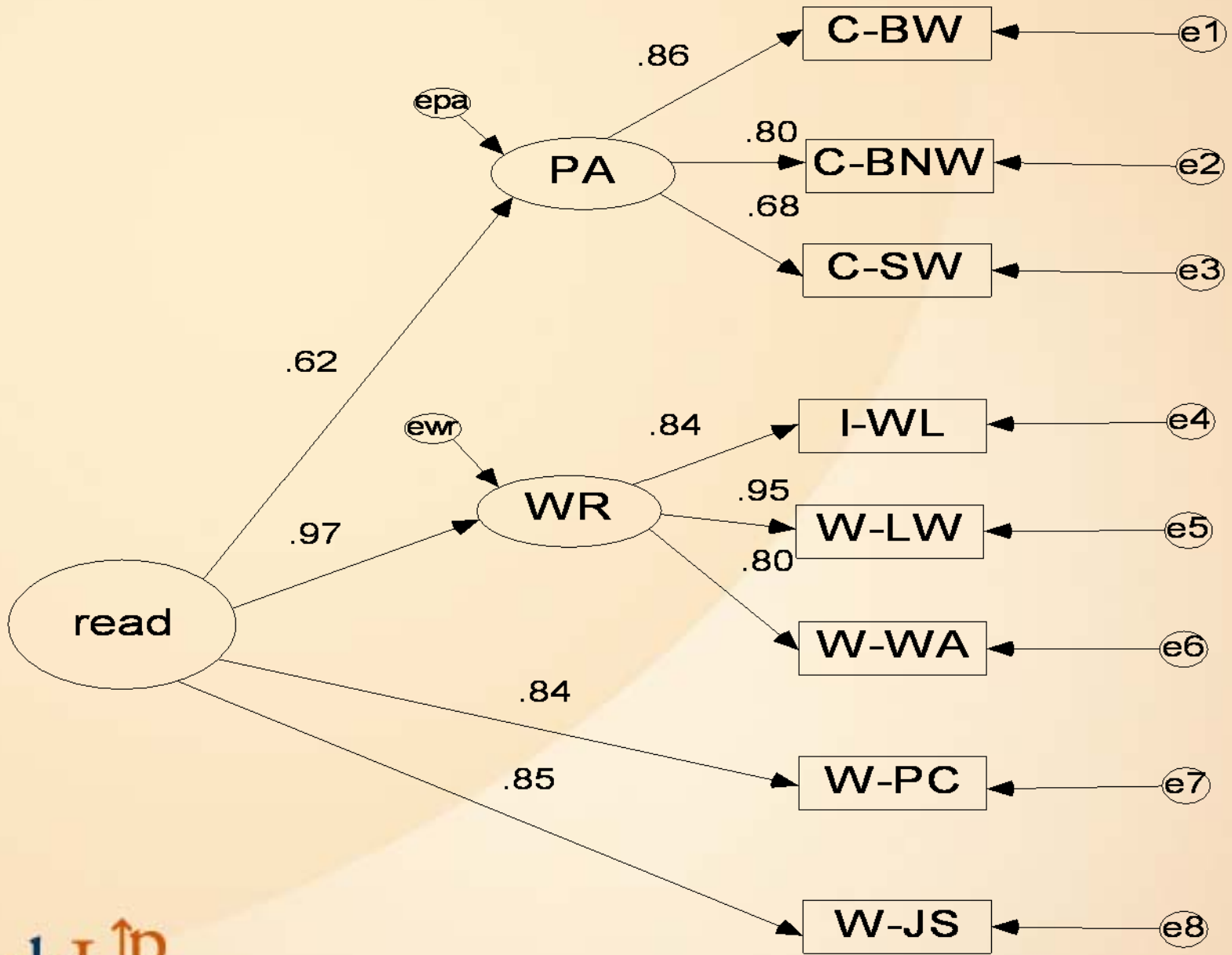
# Study 4: Contextual Factors Impacting Student Outcomes

## Research Questions:

- Were the two intervention types (RRI or EIR) a factor in student outcomes?
- What student factors accounted for differences in intervention students' reading outcomes?
- What teacher factors accounted for differences in intervention students' reading outcomes?
- What school factors accounted for differences in intervention students' reading outcomes?
- When combined, what student, teacher, and school factors accounted for differences in treatment students' reading outcomes?

# Confirmatory factor analysis for reading.

- Through structural equation modeling, we found that the pretest-posttest measures factored into a higher-order factor we called reading.
- The reading factor comprised two variables (i.e., spelling and passage comprehension) and two lower order factors (i.e., phonological awareness and word reading)



## Phonological Awareness Posttest Factor Score Analyses

	M0: Null		M1: Student		M2: Student+Teacher		M3: Student+Teacher+School	
	Est.	SE	Est.	SE	Est.	SE	Est.	SE
<b>Fixed effects:</b>								
<b>Intercept</b>	-.012	.062	-.018	.056	-.148	.093	-.359	.115
<b>Student Pre</b>			.561***	.045	.553***	.046	.561***	.046
<b>ADHDIn</b>			.081*	.038	.085*	.038	.086*	.038
<b>Int. Teacher (Title 1)</b>					.187	.107	.176	.102
<b>Coaching (Virtual)</b>							.301*	.128
<b>Coaching (On Site)</b>							.335*	.127
<b>Random effects:</b>								
<b>Residual (<math>\sigma^2_e</math>)</b>	.606	.049	.389	.033	.387	.033	.394	.034
<b>Intercept (<math>\sigma^2_{\mu 0}</math>)</b>	.105	.039	.096	.033	.093	.032	.067	.028
<b>Fit:</b>								
$\chi^2$	861.691		675.434		671.235		655.525	
<b>AIC</b>	867.691		685.434		683.235		671.525	
<b>BIC</b>	879.282		704.460		706.048		701.796	

## Word Reading Posttest Factor Score Analyses

	M0: Null		M1: Student		M2: Student+Teacher		M3: Student+Teacher+School	
	Est.	SE	Est.	SE	Est.	SE	Est.	SE
<b>Fixed effects:</b>								
Intercept	.002	.066	-.007	.048	-.149	.083	-.104	.108
Student Pre			.526***	.046	.519***	.046	.518***	.049
ADHDIn			.280***	.039	.282**	.040	.286***	.040
Int. Teacher (Title 1)					.204*	.098	.211*	.098
Coaching (Virtual)							-.122	.120
Coaching (On Site)							-.023	.118
<b>Random effects:</b>								
Residual ( $\sigma^2_e$ )	.716	.059	.434	.036	.431	.036		
Intercept ( $\sigma^2_{\mu_0}$ )	.110	.046	.047	.024	.044	.022		
<b>Fit:</b>								
$\chi^2$	917.297		691.752		686.321		677.771	
AIC	923.297		701.752		698.321		693.771	
BIC	934.888		720.777		721.133		724.042	

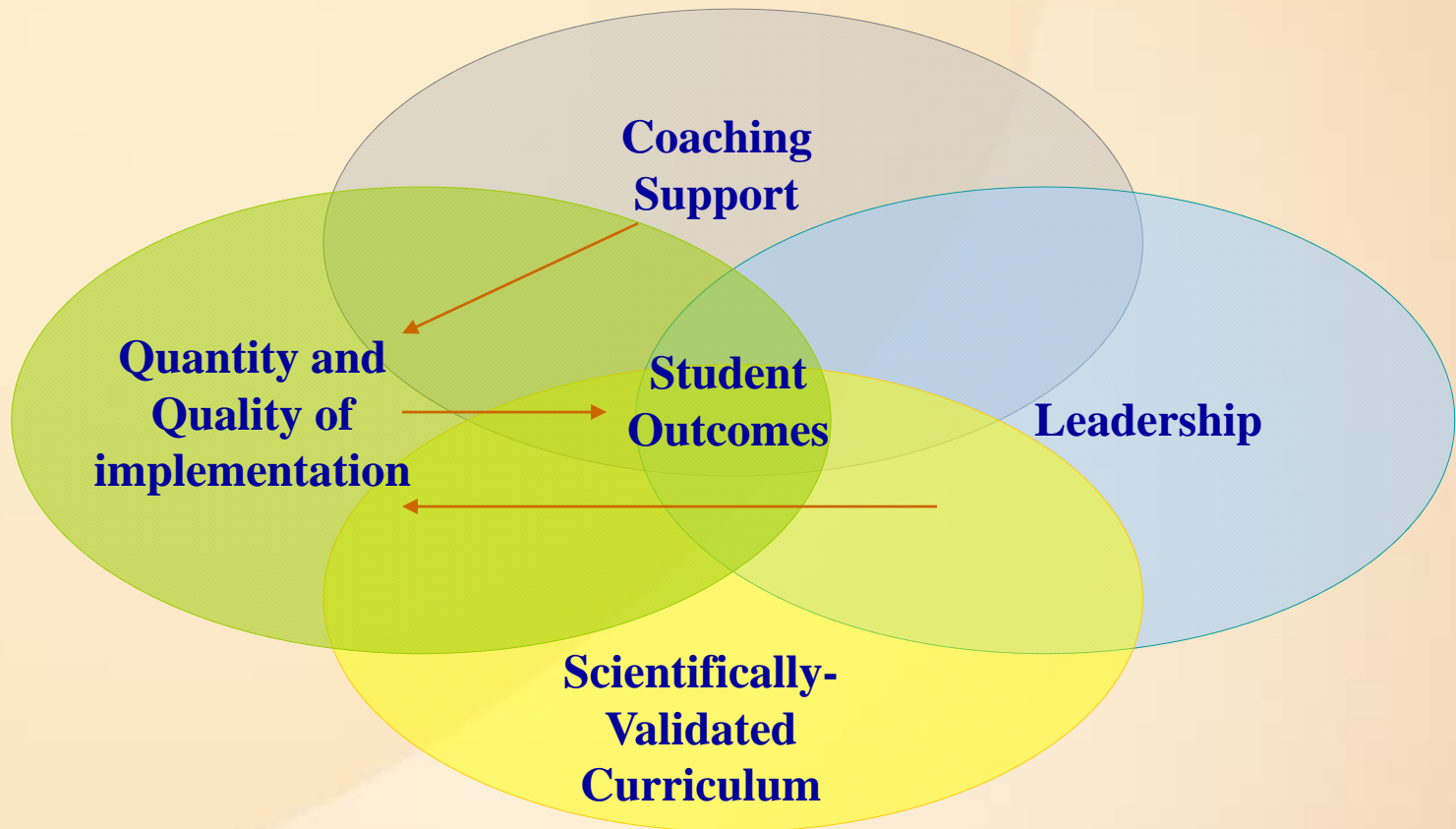
## Passage Comprehension Posttest Score Analyses

	M0: Null		M1: Student		M2: Student+Teacher		M3: Student+Teacher+School	
	Est.	SE	Est.	SE	Est.	SE	Est.	SE
<b>Fixed effects:</b>								
Intercept	.002	.079	-.005	.069	-.001	.061	-.447	.216
Student Pre			.229***	.047	.225***	.047	.224***	.047
ADHDIn			.360***	.047	.369***	.047	.376***	.047
Teacher Fidelity					.206***	.055	.154**	.055
Intervention(Responsive)							.319*	.119
Coaching (Virtual)							-.043	.139
Coaching (On Site)							-.118	.135
<b>Random effects:</b>								
Residual ( $\sigma^2_e$ )	.811	.066	.638	.054	.642	.055	.652	.056
Intercept ( $\sigma^2_{\mu_0}$ )	.191	.064	.139	.050	.080	.040	.045	.034
<b>Fit:</b>								
$\chi^2$	972.874		836.605		824.683		804.210	
AIC	978.874		846.605		836.683		822.210	

## Spelling Posttest Score Analyses

	M0: Null		M1: Student		M2: Student+Teacher		M3: Student+Teacher+School	
	Est.	SE	Est.	SE	Est.	SE	Est.	SE
<b>Fixed effects:</b>								
Intercept	.013	.079	.004	.061	.006	.056	.051	.100
Student Pre			.361***	.046	.353***	.046	.326***	.048
ADHDIn			.333***	.046	.339***	.046	.334***	.046
Teacher Fidelity					.164**	.052	.139**	.052
Coaching (Virtual)							-.041	.138
Coaching (On Site)							-.088	.136
School Pre							.279*	.134
<b>Random effects:</b>								
Residual ( $\sigma^2_e$ )	.814	.067	.567	.048	.564	.048	.550	.047
Intercept ( $\sigma^2_{\mu_0}$ )	.198	.068	.095	.041	.068	.034	.061	.031
<b>Fit:</b>								
$\chi^2$	975.294		789.993		780.467		756.822	
AIC	981.294		799.993		792.467		774.822	

# Conclusions: Critical Components for Positive Student Outcomes



# The Big Ideas

## Value of Coaching

- Coaching facilitated Quality of Implementation.

## Importance of Leadership

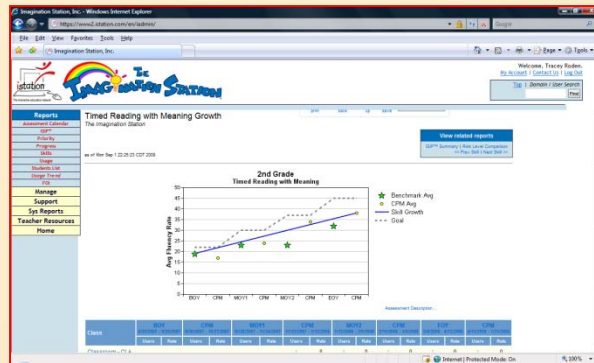
- School and district leaders facilitate or create barriers for Quantity of Implementation.
  - Support (or not) for role of intervention teacher
  - Ensuring time (or not) for Tier 2 intervention

# Current Research: Sustaining the Implementation When the Researchers Leave

- 23 teachers in 14 RRI schools in 7 school districts in the Austin area
- Schools take control of implementation with no restrictions
  - Selected intervention students, implementation model (pull-out; push-in; classroom teacher), and length of intervention (students entered and exited through the school year)
- Researchers served as (unpaid) consultants
  - Provided training on request when our schedules allowed
  - Offered “Train the Trainer” professional development so districts could take over completely
- Conducted fidelity observations 3x/year; tested all students in the lowest 25% of every first grade class in the schools at beginning, middle, and end of year
- A Campus Facilitator at each school collected student attendance (intervention dosage) data

# Current Research: Continued examination of technology-based coaching

Data-Based and Student focused using electronic data



Classroom Observations via webcams



Teacher Resources via the web

The screenshot shows a web page for 'ScaleUP' with a blue background. At the top, there are navigation buttons for 'Introduction', 'Teacher's Edition A', 'Teacher's Edition B', and 'Teacher's Edition C'. Below this, the page is divided into two columns: 'INTRODUCTION TO THE CURRICULUM' and 'INTERVENTION BASICS'. The 'INTRODUCTION TO THE CURRICULUM' section lists 'Integrated Curriculum', 'Critical Features: Pacing', 'Critical Features: Error Corrections', 'Critical Features: Mastery', and 'Time to Shine'. The 'INTERVENTION BASICS' section lists 'Small groups of three to five students', 'Forty-minute sessions', 'Five days per week', and 'In addition to core reading instruction'. A small photograph of a classroom is included in the 'INTERVENTION BASICS' section.

Communications via teleconferencing

