

The Evaluation of a First Grade Mathematics Tutoring Program Suitable for Response to Intervention Models



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**A National Conference on Using Research to Strengthen Response to
Intervention (RtI) Decision Making and Implementation**

Research Context

- **Efficacy** versus **Effectiveness**
- Think scale-up - what would be a typical district implementation
- Evidence based on random assignment to support causal statements –
Randomized Controlled Trials
- Dearth of research in early math RTI employing rigorous designs - 4 RCT studies

Efficacy Study

(Fuchs, Compton, Fuchs, Paulsen, Bryant & Hamlett (2005))

- Student random assignment – blocked within classroom
- Several schools in a “southeastern metropolitan school district”
- **At-risk** students – lowest 21% through screening
N=139
- Weekly meetings with tutors
- Large effects: $d' \approx .50+$ on three outcomes

Percentile Rank Change

(10th -> 23rd)

(25th -> 45th)

(32nd -> 50th)

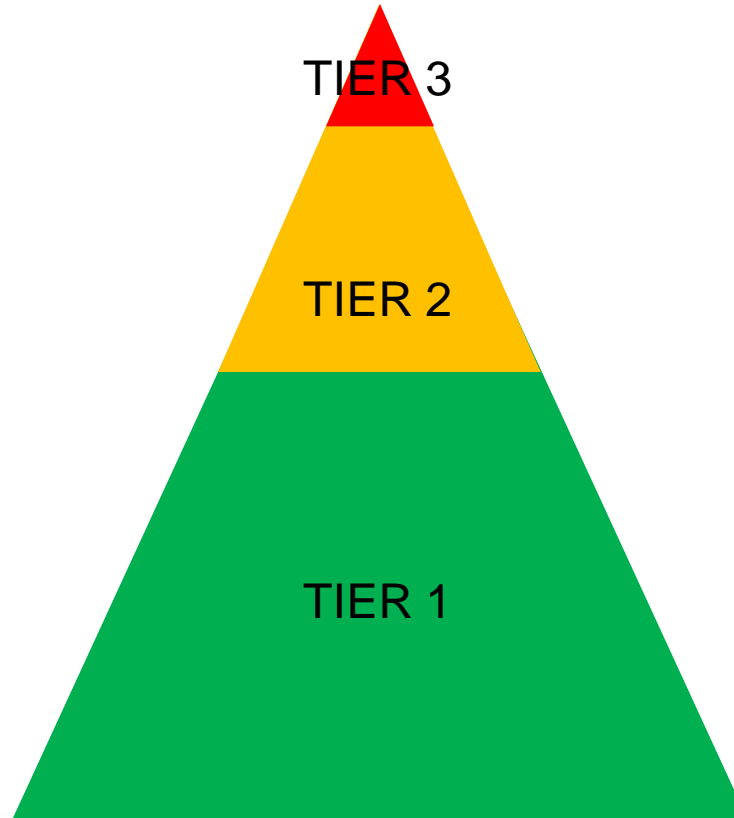
The Intervention

- In English-only
- Pull-out sessions – in addition to core math instruction
- Small groups of 2 to 3 students
- Scripted – Delivered by a tutor

- Tutoring Schedule:
 - 16 weeks
 - 3 times per week
 - 40 minutes each session

 - **≈30 hours of Small-Group Tutoring**

A Typical Pyramid



What happens in the group?

- Scripted – direct/explicit instruction
- **Concrete-Representational-Abstract**
(lots of worksheets/activities) - 30 minutes
- Fact fluency flash cards – 10 minutes
- Behavior Management

Student earn points for mastery and for group behavior

(On Task...Work Hard...Follow Directions)

Scope & Sequence - I

Topic

1. Identifying and writing numbers to 99
2. Identifying more or less with objects
3. Sequencing Numbers
4. Using $<$, $>$ and $=$ signs
5. Skip counting by 10s, 5s, 2s
6. Introduction to Place Value
7. Place Value
8. Identifying Operations (+/-)
9. Writing number sentences

Scope & Sequence – II

Topic

- I 0. Place Value (counting/writing to 99)
- I 1. Addition facts to sums of 18
- I 2. Subtraction facts to 18
- I 3. Review of Addition and Subtraction Facts
- I 4. Missing Addends
- I 5. Place Value – Review
- I 6. Two-digit addition with no regrouping
- I 7. Two-digit subtraction with no regrouping

Efficacy Study

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Scale-Up Study Scope

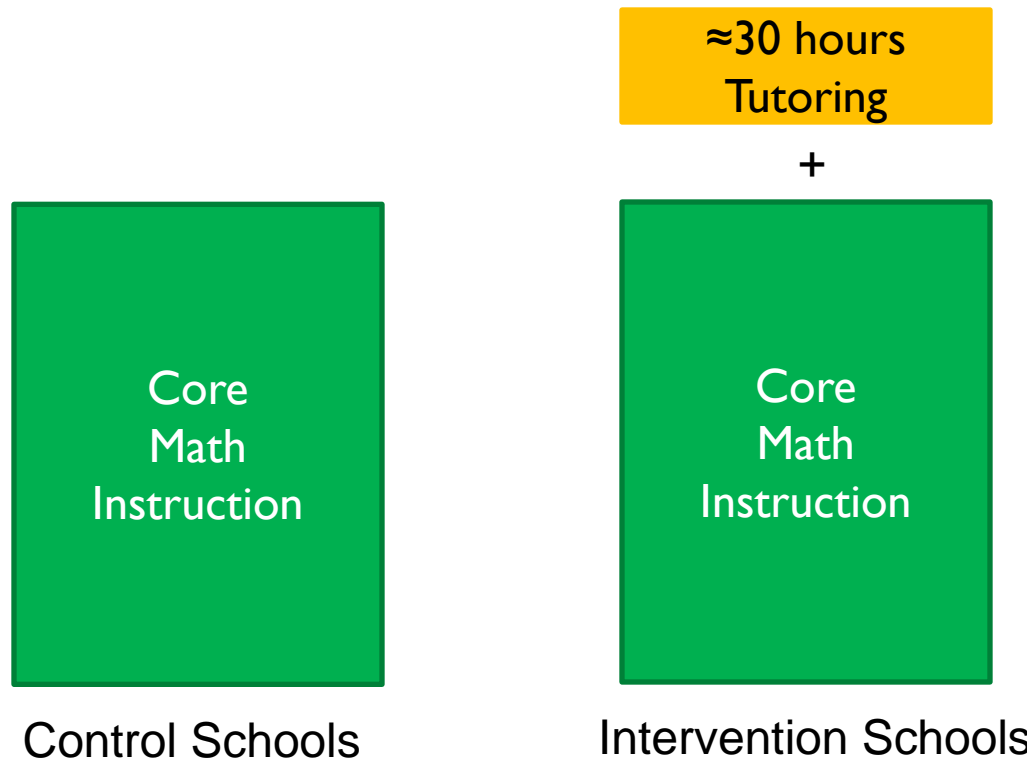
- 82 schools in four districts
- School-level random assignment
- Students whose parents consented
 - ≈ 3000 screened
 - ≈ 1000 At-Risk
 - ≈ 500 Tutored
 - ≈ 75 **LOCAL** Tutors
- Powered to detect about half of Fuchs (2005) effect



Research Question

Of those students for whom parental consent was received,
and who performed in the lowest $\approx 35\%$ on the screener,

Does participation in the tutoring program improve performance
on a math achievement measure administered in May.



Screenener

25 Minutes –

individually administered to all students with consent.

- Concepts/Applications
- Computational Fluency

- Quantity Discrimination
- Math Knowledge Test

- Story Problems
- Digits Backward

What May We Learn

Test difference in post-test scores
between **At-Risk control** and
At-Risk tutored.

- If statistically significant finding...
- If no significant finding...

Why RCTs ?

