



Responsiveness to Intervention (RTI): Reading and Math Standardized Tier 2 Research-Based Intervention

*National Research Center on
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Overview

Presentation topics

- Multi-Tier RTI Model
- Tier 1 Level
- Tier 2 and Beyond Level
- Reading Intervention
- Math Intervention
- NRCLD



Multi-Tiered RTI Model Overview

- Tier 1: General education instruction
- Tier 2 and Beyond: Small-group intervention
- Tier 3 (or final): Individual intervention (special education)

A Multi-Tiered RTI Model: Tier 1

- Tier 1 consists of general education instruction with the following features:
 - Scientific, research-based curriculum
 - Consistent implementation
 - Proven successful for vast majority of students
 - Screen all students, with weekly monitoring of at-risk students who do not respond to general education instruction



A Multi-Tiered RTI Model: Tier 2 and Beyond

- Tier 2 and Beyond consists of general education instruction plus the following intervention:
 - Small-group instruction (2-4 students)
 - 3-4 intervention sessions per week (30-60 minutes per session)
 - Conducted by trained and supervised personnel (not the classroom teacher)
 - Conducted in and out of the general education classroom
 - 9-12 weeks in duration (repeated, as needed)

A Multi-Tiered RTI Model: Special Education

- The final tier consists of general education instruction plus an individualized intervention (special education instruction):
 - Individualized instruction (1-3 students)
 - 4-5 intervention sessions per week (60-90 minutes per session)
 - Conducted by trained special education personnel (not the classroom teacher)
 - Conducted in and out of the general education classroom
 - One school-year in duration

Tier 2 and Beyond Intervention Overview

Small Groups (1:3, 1:5, 1:10)

- 9-12 weeks, 3-4 times per week, 30-60 minutes per session
- Point system for motivation
- Immediate corrective feedback
- Mastery of content before moving on
- More time on difficult activities
- More opportunities to respond
- Fewer transitions
- Setting goals and self-monitoring
- Special relationship with instructor

Tier 2 and Beyond Intervention Training

- Demonstration of each activity
 - Practice with each other
- Demonstration of entire intervention session
 - Practice with each other
- Scheduled practice with other instructors, supervised by trainer
- Practice with 'real' students
- Practice with trainers (as students)
- Detailed feedback to instructor at each step to assure fidelity of implementation
- Weekly intervention meetings to update on next series of lessons and to problem solve



An Example:
First-Grade Tier 2 and Beyond
Intervention for *Reading*

*Validated Intervention Protocol Using
Randomized Controlled Field Study*

*~ Conducted in 42 First-Grade
Classrooms in 10 Metro Schools
in Tennessee ~*

NRCLD Vanderbilt *Reading* Study Overview

- Identified at-risk children
- Assessed at-risk students on cognitive and academic measures and collected teacher ratings of attention/distractibility
- Randomly assigned at-risk students to intervention and control conditions; tutored/instructed children in small groups 4 times per week for 9 weeks
- Post-tested students (followed children from beginning of grade 2 to end of grade 4)

Tier 2 and Beyond Intervention for *Reading*

- Small groups (groups of 3-4 students)
- 4 times per week outside classrooms
- Each session:
 - 45 minutes of instructor-led intervention
 - 10 minutes of sight words practice
 - 5 minutes of letter sounds practice
 - 15 minutes of decoding practice
 - 15 minutes of reading fluency practice
- Lessons are scripted for instructor
 - Detailed wording of steps and prompts involved in each activity



Tier 2 and Beyond Intervention *Reading*

Lesson

- Steps included in the sounds, sight words, and decodable words activities:
 1. Introducing new sound or word
 2. Choral practice
 3. Individual practice
 - 2 opportunities to produce correct sounds or words



Tier 2 and Beyond Intervention *Reading*

Lesson (continued)

Reading activities:

4. Choral reading of previous story
 - Echoing the instructor, one line at a time
 - Choral reading of story

5. Choral reading of new story
 - Echoing the instructor, one line at a time
 - Choral reading of story

6. Individual speed reading
 - Each student reads new story 3 times, for 30 seconds
 - Opportunity to earn incentives for increasing reading fluency



Number of Tier 2 and Beyond Intervention for *Reading Sessions*

- Research intervention groups completed 36 sessions
- 64 lessons created within lesson sequence
 - 16 weeks worth of lessons (4 times per week)

Topic Mastery and Review for Tier 2 and Beyond Intervention for *Reading*

- Mastery of the topic assessed each day
- If every student in group achieved mastery of sight words on the first day of that set, group moved to the next set on the following day
- Each student had two trials to master sight words during the session.
- Group progressed to next set regardless of mastery status after two sessions on same set
 - To ensure that group would be able to cover more words and sounds



Results: Tier 2 and Beyond Intervention for Reading

- The first-grade reading intervention program resulted in improved performance on:
 - Word identification
 - Reading fluency
 - Comprehension
- Reading disability prevalence was lower among instructed students



An Example:
First-Grade Tier 2 and Beyond
Intervention for *Math*

*Validated Intervention Protocol Using
Randomized Controlled Field Study*

*~ Conducted in 41 First-Grade
Classrooms in 10 Metro Schools
in Tennessee ~*

NRCLD Vanderbilt *Math* Study Overview

- Identified at-risk children
- Assessed at-risk children and a sample of not at-risk peers on cognitive and academic measures and collected teacher ratings of attention/distractibility
- Randomly assigned at-risk students to intervention and control conditions; instructed children in small groups 3 times per week for 16 weeks
- Post-tested at-risk and not at-risk students on fact fluency, computation, concepts/applications, and arithmetic story problems (followed children from beginning of grade 2 to end of grade 3)

Tier 2 and Beyond Intervention for *Math*

- Small groups (11 groups of two students and 16 groups of three students)
- 3 times per week outside classrooms
- Each session:
 - 30 min of instructor-led intervention
 - 10 min of student use of software, MathFlash[©] (designed to improve automatic retrieval of math facts)



Tier 2 and Beyond Instructor-Led *Math* Intervention

- Concrete-representational-abstract model, which relies on concrete objects to promote conceptual understanding (e.g., base-10 blocks for place value instruction)
- 17 scripted topics addressing number concepts, numeration, computation, story problems (e.g., not geometry, measurement, charts/figures, money)

Tier 2 and Beyond Intervention for *Math: 17*

Scripted Topics

- Identifying and writing numbers to 99
- Identifying more, less, and equal with objects
- Sequencing numbers
- Using $<$, $>$, and $=$ symbols
- Skip counting by 10s, 5s, and 2s
- Understanding place value (introduction)
- Identifying operations
- Place value (0-50)
- Writing number sentences (story problems)
- Place value (0-99)
- Addition facts (sums to 18)
- Subtraction facts (minuends to 18)
- Review of addition and subtraction facts
- Place value review
- 2-digit addition (no regrouping)
- 2-digit subtraction (no regrouping)
- Missing addends

Tier 2 and Beyond Intervention for *Math*: 17

Scripted Topic Completion

- All groups completed topics through 2-digit subtraction (16 topics), but due to varying mastery rates, only 5 groups completed missing addends
- Each group completed 48 sessions
- Due to absences, the number of completed sessions for individual students ranged from 35 to 48 (mean = 43.8)



Tier 2 and Beyond Intervention for MathFlash[©]

- Math fact flashes on and disappears from computer screen
- Student types fact from short-term memory
- If correct, computer applauds, says the fact, and awards a point (5 points = a “trinket” for the toy box at the bottom of the screen)
- If incorrect, computer removes incorrect fact, replaces it with correct fact, and says the fact
- At end of each session, feedback is provided about number of correct and highest math fact mastered

Tier 2 and Beyond Intervention for *Math*

Topic Mastery and Review

- Mastery of the topic assessed each day
- If every student in group achieved mastery prior to the last day of the topic, group moved to the next topic (a few topics required completion of all 3 days)
- For mastery assessment, students completed worksheets independently, with percentage of correct answers determining mastery (for most topics, 90% accuracy)
- After the last day on a topic, group progressed to the next topic regardless of mastery status
- On the first day of each topic, students completed a cumulative review worksheet covering previous topics
- Review of topics 1-4 was conducted after winter break

Results: Tier 2 and Beyond Intervention for *Math*

- The first-grade math intervention program resulted in improved performance on
 - Math calculations
 - Math concepts/applications
 - Math word problems
 - Woodcock-Johnson III Calculation subtest
- Math disability prevalence was lower among instructed students at the end of 1st grade and at end of 2nd grade

NRCLD SLD and RTI Resource Products

- Executive Summary of the NRCLD Symposium on Responsiveness to Intervention
- Responsiveness to Intervention in the SLD Determination Process
- RTI Implementation Tool for Reading
- Screening Tool for Well-Described Responsiveness to Intervention Models and Comparison Models
- Responsiveness to Intervention: An SLD Determination Resource
- SLD Identification Overview: General Information and Tools to Get Started
- Specific Learning Disabilities and Responsiveness to Intervention Resource List
- A Research-Based View of Specific Learning Disabilities: Implementing Change
- Responsiveness to Intervention in Conjunction with Learning Disability Determination



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Thank you!

Check our website:
www.NRCLD.org

