## SOUTHEAST COMPREHENSIVE CENTER

Advancing Research, Improving Education





## Rapid Response—Response to Intervention Practices

Date	July 14, 2008
Number	00076
Request	A state department of education (SDE) served by the Southeast Comprehensive Center has requested the following information about Response to Intervention (RtI) practices:  1) For Tiers II and III respectively, what does scientifically based research indicate about pupil/teacher ratios for optimal or maximum small group instruction? Do small group size numbers change with grade levels (e.g., 4th grade, middle school, high school)?  2) What does the research indicate about intervention effectiveness beyond implementation fidelity—group size, minutes per day, and days per week?
Summary	In response to this request, the Southeast Comprehensive Center (SECC) used various Web search engines to locate information on these topics. Due to time constraints for this request, SECC has provided a brief summary of research findings as well as resources for each topic below. Upon request, SECC will provide detailed information concerning the research-based data on these topics.

# PUPIL TO TEACHER RATIOS FOR OPTIMAL TIER II AND TIER III INSTRUCTION

Based on a review of the resources obtained by SECC, researchers differ on the number of students that should compose of a group for Tier II intervention. Research indicates that Tier II small group instruction ranges from a single student per group to five students per group (Haager, Klingner, & Vaughn, 2007). Juxtaposed, there seems to be a consensus among researchers and Rtl experts that Tier III intervention constitutes individualized, one-to-one intervention.

1) Journal of Educational Psychology: How effective are one-to-one tutoring programs in reading for elementary students at risk for reading failure? A meta-analysis of the intervention research by Elbaum, B., Vaughn, S., Hughes, M. T. & Moody, S. W., 2000.

The researchers conducted a meta-analysis of supplemental, adult-instructed one-to-one reading interventions for elementary students at risk for reading failure. One of the study findings suggests that when comparing one-to-one with small-group supplemental instruction, results indicate both groupings are highly effective, and the one-to-one programs are not more effective than small groups.





## 2) National Comprehensive Center for Teacher Quality (NCCTQ)—TQ Connections

Link to resource: http://www.tgsource.org/forum/index.php/topic,38.0.html

"Several studies have compared the effects of remedial instruction delivered individually and in groups of 2-6. The general finding is that the results in groups of 3 to 6 children are comparable to results in individual, one to one, instruction. In reporting this finding it should be emphasized that the children in these studies were at approximately the same skill levels and had similar needs . . ."

"Student to teacher ratios in Tier II academic interventions may therefore be in the range of 2-5 or even 2-6 and produce significant gains in specific areas such as reading. There are obvious advantages to the larger group sizes in terms of cost benefits and numbers of children serves."

"I believe these results on teacher to student ratios just cited apply to students across grade levels, including K-6, middle, and high school."

Personal communication–Dr. Dan Reschly, July 3, 2008, in response to SECC's query on pupil to teacher ratios for optimal Tier II and Tier III instruction.

## 3) National Research Center on Learning Disabilities (NRCLD)

NRCLD Rtl Template: Reading and Mathematics

Link to resource: http://www.nrcld.org/topics/rti.html

Click on http://www.nrcid.org/topics/rti/html to view a table listing core reading and mathematics programs implementation by group size, minutes per day, and number of weeks for Tier I, Tier II, and Tier III.

## 4) National Research Center on Learning Disabilities (NRCLD)

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

Link to resource: http://www.nrcld.org/topics/rti.html

Tier II intervention should consist of instruction in the general education classroom and small-group interventions. Small group interventions should a) include 2 to 4 students per group; b) have 3 to 4 interventions; c) last 30–60 minutes per week; c) for a duration of 9–12 weeks.

#### 5) Remedial and Special Education

Reading instruction grouping for students with reading difficulties by Vaughn, S., Linan-Thompson, S., Kouzekanani, K., Bryant, D. P., Dickson, S., & Blozis, S. (2003)

The researchers studied the effects of three grouping formats (1:1, 1:3, 1:10) on the reading outcomes of second grade struggling readers who received supplemental reading intervention. Based on study findings, both 1:1 and 1:3 teacher-student ratios were highly effective intervention group sizes for supplemental reading instruction. Students in the 1:10 group failed to make minimal gains.

**6) University of Kansas, Center for Early Intervention in Reading and Behavior** Formulating secondary-level reading interventions by Kamps, D. M, & Greenwood, C. R. (2005)

Link to resource: http://www.jgcp.ku.edu/

This paper describes first-year, first-grade findings for students participating in secondary-level interventions (i.e., small-group reading instruction) in a randomized trial of the efficacy of secondary (Tier II) and tertiary (Tier III) reading and behavior interventions under way at the Center for Early Intervention in Reading and Behavior,





University of Kansas. The formulation of the experimental secondary-level intervention was guided by evidence supporting the efficacy of (a) small groups of 3 to 6 participating students and low student–teacher ratio combined with (b) explicit, phonics-based instruction.

## 7) University of Oregon, IDEA Beginning Reading

Models of Reading Program Implementation

Link to resource: http://reading.uoregon.edu/curricula/models.php

Click on http://reading.uoregon.edu/curricula/models.php to view a table that lists core reading programs, specialized programs, and time/grouping conditions for Kindergarten to third grade.

## 8) Implementing Response to Intervention in Elementary and Secondary Schools: Procedures to Assure Scientific-Based Practices

Mathew K. Burns and Kimberly Gibbons, 2008.

Links to resource: http://www.taylorandfrancis.com or http://www.routledge.com

Chapters 6 and 7 of this book discuss intervention strategies for Tier II group instruction and Tier III intensive interventions for individual students. These experts suggest that the ideal group size for Tier II intervention appears to be 4 to 6 students. Suggested grouping models for secondary schools with six to eight periods per day or 90-minute block schedules were also discussed.

Note: The information provided above is for reference purposes only and is not an endorsement of any programs or strategies detailed in the resources.





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TQ Connections. Washington, DC: National Comprehensive Center for Teacher Quality (NCCTQ). Retrieved on July 8, 2008, from http://www.tqsource.org/forum/index.php

Vaughn, S., Linan-Thompson, S., Kouzekanani, K., Bryant, D. P., Dickson, S., & Blozis, S. (2003). Reading instruction grouping for students with reading difficulties. *Remedial and Special Education*, *24*(5), 301–315.

## INTERVENTION EFFECTIVENESS BEYOND IMPLEMENTATION FIDELITY AS IT RELATES TO GROUP SIZE, LENGTH OF SESSION, AND DAYS OF WEEK

Pierangelo & Giuliani (2008) describe intervention as a means of providing extra help or extra instruction to specifically target skills that a student has not acquired. Recently, greater attention has been drawn to the effectiveness of all educational interventions and programs, partly due to an innovation, Response to Intervention (Rtl). As education evolves around an outcome-oriented enterprise, the usefulness of intervention or instruction is determined by its very effect on student learning outcomes (Burns, Griffiths, Parson, Tilly, & VanderHayden, 2007).

To "ensure high-quality instruction, choosing a program that has strong evidence of effectiveness is important" (Burns, Griffiths, Parson, Tilly, & VanderHayden, 2007, p. 84). Many studies and reviews have addressed intervention effectiveness. Pierangelo & Giuliani (2008) identified some of the variables that were found to have the strongest evidence of positive effect on student academic achievement in various content areas:

- 1) Interventions provided in direct and explicit instruction. The components of direct instruction outlined by Silver, Strong, & Perini (2007) involve modeling, directed practice, guided practice, and independent practice.
- 2) Increasing the amount of time allowed for intervention.
- 3) Decreasing group size.
- 4) Providing numerous opportunities for practice, feedback, and error correction.

In addition to these variables, meta-analyses of studies targeting students in secondary schools, suggest that the effects of strategy instruction are large, especially on reading comprehension (Apthorp & Clark, 2007). The authors described strategy instruction as specific learned procedures that foster active, self-regulated learning. Additionally,





recommendations for literacy instructional practices that have been found to be very effective for improving the academic achievement of secondary students are detailed below (Torgesen, J. K., Houston, D. D., Rissman, L. M., et al., 2007):

- 1) Providing explicit instruction and supportive practices in the use of effective comprehension strategies throughout the school day.
- 2) Increasing the amount and quality of open, sustained discussion of reading content.
- 3) Setting and maintaining high standards for text, conversation, questions, and vocabulary.
- 4) Increasing students' motivation and engagement with reading.
- 5) Teaching essential content knowledge so that all students master critical concepts.

Also, research indicates that interventions that conduct formative and behavioral assessment are highly effective in enhancing the academic skills of all students at all grade levels.

## 1) National Comprehensive Center for Teacher Quality (NCCTQ)-TQ Connections

On the effectiveness of interventions, "clearly, one important additional factor is the quality or strength of the intervention. Instructional and behavioral interventions vary significantly in quality and strength, ranging from some popular interventions that have little or no effects to interventions that produce large effect sizes."

Click on http://www.tqsource.org/forum/documents/TQ\_Meta\_analysis\_table.doc to view a table on intervention effect sizes from a chapter in Reschly, D. J., & Bergstrom, M. K. (in press). Response to Intervention. In T. B. Gutkin, C. R. Reynolds, & (Eds.) The handbook of school psychology (4th Ed.). New York: Wiley.

"A second very important influence in intervention effects is behavioral assessment and formative evaluation. There now are a variety of behavior assessment tools including curriculum-based measures in reading, math, and written language that are useful to determining progress. Coupled with formative evaluation methods, the behavior assessment measures assist teachers and others in determining when instruction is working as intended and when instruction needs to be modified in order to achieve better results."

Personal communication—Dr. Dan Reschly, July 3, 2008, in response to SECC's query on intervention effectiveness beyond implementation. Dr. Reschly's comments are posted on the NCCTQ Web site at the following link: http://www.tqsource.org/forum/index.php/topic,38.0.html

#### 2) Response to Intervention: Research for Practice

Burns, Griffiths, Parson, Tilly, & VanderHayden (2007)

This book examines the research specific to Rtl and summarizes study findings to assist educators in making decisions that will improve learning outcomes for students. Also, there are various studies and reviews that address intervention effectiveness, a few of which are detailed below. A review of these materials indicates that the following variables were found to have the strongest evidence of positive effect on student achievement:

- Explicit and direct instruction/intervention
- Intensive instruction
- · Small group, supplemental instruction
- · Increase in amount of instructional time
- · Formative evaluations
- Behavioral assessment

## **Explicit and direct instruction/intervention**

Providing explicit instruction is an intervention approach that is very effective in improving student outcome for students in K–12. Some of the studies supporting explicit instructional strategy are described below:

American Institutes for Research. (1999). An educator's guide to school-wide reform.

Arlington, VA: Educational Research Service. The American Association of School Administrators, American Federal of





Teachers, National Association of Elementary School Principals, National Association of Secondary School Principals, and National Education Association contracted with the American Institute for Research to review 24 comprehensive curricula and school-wide reform programs.

Crawford, D., & Snider, V. E. (2000). Effective mathematics instruction: The importance of curriculum. *Education and Treatment of Children, 23,* 122–142. This article compared the effectiveness of three different mathematics curricula for fourth-grade students. In year 1, students receiving the explicit curriculum scored higher on: the computation subtest of the National Achievement Test, curriculum-based tests and a multiplication fact test compared to students receiving the implicit curriculum.

Foorman, B. R., Francis, D. J., & Fletcher, J. M. (1998). The role of instruction in learning to read: Preventing reading failure in at-risk children. *Journal of Educational Psychology, 90, 37–55*. The researchers investigated which of three instructional strategies (i.e., direct, embedded or implicit) results in the greatest and most rapid student gains in reading). Study findings showed that when providing reading instruction to students at risk for reading failure, it is extremely important that the instruction be delivered in a thoughtful and explicit manner.

National Institute of Child Health and Human Development. (2000). Report to the National reading panel, teaching children to read: An evidence-based assessment of the scientific research and its implications for reading instruction. Washington, DC: author. In summarizing the existing research on vocabulary, explicit vocabulary instruction that has high rates of repetition was reported to be effective in improving student skills.

Torgesen, J. K. (2002). The prevention of reading difficulties. *Journal of School Psychology, 40, 7–26.* This article reviews the research findings about what is required to read well, describes common reading difficulties, and provides an overview of effective prevention of reading problems. A number of effective instructional practices were identified. Effective instruction that focuses on preventing reading difficulties focuses on explicit teaching, phonemic awareness, phonemic decoding, fluency in reading and comprehension, oral vocabulary, spelling and writing was identified as having strong effects on student outcomes.

#### Intensive instruction

Intensive instruction provides more daily academic engaged time focused on reading instruction and practice for students who are at-risk (Burns, Griffiths, Parson, Tilly, & VanderHayden, 2007).

Torgesen, J. K. (2002). The prevention of reading difficulties. *Journal of School Psychology, 40, 7–26.* This article reviews the research findings about what is required to read well, describes common reading difficulties, and provides an overview of effective prevention of reading problems. Providing additional intensive instruction, in addition to core reading instruction, to at-risk students results in significant growth in student achievement.

## Small group, supplemental instruction

"Tier II interventions are the most researched aspect of the Response to Intervention (RtI) model. For example, several studies have shown that participating in small group remedial instruction lead to increased student learning and prevent[s] further reading difficulties from developing." (Burns, Griffiths, Parson, Tilly, & VanderHayden, 2007, p. 95)

Fuchs, L. S., Fuchs, D., Hamlett, C. L., Hope, S. K., Hollenbeck, K. N., Capizzi, A. M., Craddock, C. F., & Brothers, R. L. (2006). Extending responsiveness-to-intervention to math problem-solving at third grade. *Teaching Exceptional Children, 38,* 59–63. This study examined the results of applying Rtl to third-grade math instruction for students at-risk and not at-risk for math difficulties. The study concluded that using effective curricula in whole group or in supplemental interventions only will not result in as much growth for students receiving Tier II instruction.

## Increase in amount of instructional time

Fuchs, L. S., Fuchs, D., Hamlett, C. L., Hope, S. K., Hollenbeck, K. N., Capizzi, A. M., Craddock, C. F., & Brothers, R. L. (2006). Extending responsiveness-to-intervention to math problem-solving at third grade. *Teaching Exceptional Children*,





38, 59–63. This study examined the results of applying Rtl to third-grade math instruction for students at-risk and not at-risk for math difficulties. The study found that increasing the amount of instructional time with an effective curriculum (i.e., core instructional time plus tutoring time) can significantly improve the skills of students receiving Tier II instruction.

## Formative evaluations

"Intervention effect must be monitored and kept or modified based on student performance improvement over time. Formative assessment refers to the collection of student performance data across time to inform teaching and to allow teachers to alter instruction to improve learning." (Burns, Griffiths, Parson, Tilly, & VanderHayden, 2007, p. 71)

Burns, M. K. (in press). Reading at the instructional level with children identified as learning disabled: Potential implications for response-to-intervention. *School Psychology Quarterly*. This study examined the effect of preteaching words to third graders identified as learning disabled (LD) within the context of an Rtl model and details how data collected through curriculum based assessment (CBA) can be used when developing interventions. For all participants in the study, reading was assessed using weekly curriculum-based measurement (CBM) probes from the general education third-grade reading basal. The results of the study revealed that the growth rate for reading fluency for those students in the intervention group was four times greater than the rate of those within the control group. As hypothesized, preteaching unknown words resulted in the students exhibiting growth rates that exceeded the control group.

Fuchs, L. S., & Fuchs, D. (1986). Effects of systematic formative evaluation: A meta- analysis. *Exceptional Children*, 53, 199–208. One of the research questions investigated is whether the use of formative evaluation is beneficial enough that it warrants the additional time and cost that it takes to implement such a procedure. A meta-analysis was conducted to review studies that analyzed the effects of formative evaluation on academic achievement. The study found that the use of systematic formative evaluation procedures used with the majority of students with mild disabilities was related to a significant increase in school achievement (weighted mean effect size of .70).

## Behavioral assessment

Academic programs that successfully manage behavior by integrating proactive behavioral strategies into Tier I (core) instruction enhance students' academic skills. Numerous studies have been conducted to evaluate the effect of school-wide behavior interventions on students' behavioral learning, and study findings have demonstrated promising results for the use of proactive behavioral strategies (Burns, Griffiths, Parson, Tilly, & VanderHayden, 2007).

## 3) Implementing Response to Intervention in Elementary and Secondary Schools: Procedures to Assure Scientific-Based Practices

Mathew K. Burns & Kimberly Gibbons (2008)

Chapter 6 of this book discusses the length of intervention for Tier II instruction. These experts maintain that in addition to the regularly scheduled 90-minute block of reading instruction, the length of additional Tier II interventions should be at least 30 minutes, except for Kindergartners, who may be successful with 15–20 minute interventions. The duration of intervention affects student academic achievement. For valid instructional decision-making in Tier II, a minimum of 16 data points at two assessments per week is needed. Also, Pierangelo & Giuliani (2008) explained that there is no clear consensus on duration of intervention in Tier II, but research supports 8 to 12 weeks for each round of intervention.

## 4) Interventions for Adolescent Struggling Readers

A Meta-Analysis with Implications for Practice [4–12]

Link to resource: http://www.centeroninstruction.org/files/COI%20Struggling%20Readers.pdf





The results of this meta-analysis provide guidance for intervening with adolescent struggling readers, outlining major implications for practice, interventions, special ed, adolescent, struggling, practice, comprehension, reading, strategies, vocabulary, decoding, fluency reading special education. The practice brief, Effective Instruction for Adolescent Struggling Readers: A Practice Brief [4–12] can be downloaded at the following link: http://www.centeroninstruction.org/files/Practice%20Brief-Struggling%20Readers.pdf

#### 5) Florida Center for Reading Research (FCRR)

Link to resource: http://www.fcrr.org/mission.htm

This FCRR was established by Governor Jeb Bush in January 2002. It is jointly administered at Florida State University by the Learning Systems Institute and the College of Arts and Sciences. The center conducts basic research on reading, reading growth, reading assessment, and reading instruction; disseminates information about research-based practices related to literacy instruction and assessment for children in pre–K through 12th grade; conducts applied research that will have an immediate impact on policy and practices related to literacy instruction; and provides technical assistance to Florida's schools and to the state's department of education for the improvement of literacy outcomes in students from pre–K through 12th grade.

The FCRR has reviewed programs for Tier III that were considered appropriate to be implemented with these students. Based on the reviewer's findings, the programs may produce reading growth in Tier III students if they are implemented with fidelity and enthusiasm. Please note that this is not an "approved" list of programs, nor does this list constitute an endorsement of these programs over others that might be considered. These programs were found to contain sufficiently explicit and systematic instruction in critical reading skills to be helpful to struggling readers in third grade. To download the document, Tier III Intervention Programs, access the Web site at the following link: http://www.fcrr.org/FCRRReports/tier3interventions.htm.

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