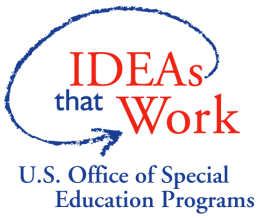

Responsiveness-to-Intervention Symposium

December 4-5, 2003 • Kansas City, Missouri

The National Research Center on Learning Disabilities, a collaborative project of staff at Vanderbilt University and the University of Kansas, sponsored this two-day symposium focusing on responsiveness-to-intervention (RTI) issues.

The symposium was made possible by the support of the U.S. Department of Education Office of Special Education Programs. Renee Bradley, Project Officer. Opinions expressed herein are those of the authors and do not necessarily represent the position of the U.S. Department of Education.

Operationalizing the Response to Intervention Model to Identify Children with Learning Disabilities: Specific Issues with Older Children

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When citing materials presented during the symposium, please use the following: "Torgesen, J. K. (2003, December). *Operatinalizing the Response to Intervention Model to Identify Children with Learning Disabilities: Specific Issues with Older Children.* Paper presented at the National Research Center on Learning Disabilities Responsiveness-to-Intervention Symposium, Kansas City, MO."

Operationalizing the response to intervention model to identify children with learning disabilities: specific issues with older children

In thinking about how the response to intervention (RTI) model might be applied to the identification of children with learning disabilities, I will concentrate on how the model might work in the case of children whose primary area of learning difficulty is in reading. I will do this for three reasons. First, this is the area of academic growth that I know the most about, second, reading is the most important academic tool skill that children develop while in school, and third, the highest proportion of children identified as learning disabled have reading difficulties. I will further concentrate on the use of the RTI model with older children, as this is an area less frequently addressed in existing commentary.

As background for my specific remarks about use of the RTI model to identify older children with reading disabilities, it seems important first to discuss a few facts and ideas about reading itself. The first idea is that the most important overall indicator of reading growth is a child's ability to construct meaning from text. In other words, the goal of literacy instruction is to help children acquire the skills that enable learning from, understanding, and enjoyment of written language. Ultimately, it is a child's ability to efficiently interpret the meaning of text that is the surest indicator of proficiency in reading.

The second idea, or rather fact, is that to construct meaning from text, a child must have adequate skills in two broad areas: 1) general language comprehension; and, 2) ability to accurately and fluently identify the individual words in print. Knowledge and active application of specific reading strategies is also helpful to maximize reading comprehension (Snow, Burns, & Griffen, 1998), but most of the variability among children and adults in comprehension of written material can be accounted for by measuring the two broad families of skills identified in Gough's simple view of reading (Gough, 1996; Hoover & Gough, 1990). That is, good general language comprehension and good word reading skills are the most critical skills required for effective comprehension of written material.

The most important challenge that children face when they enter school and begin learning to read is to understand how the oral language they have already learned is represented in print (Beck & Juel, 1995). In other words, the first challenge children face in learning to read is learning how to identify printed words accurately and fluently. The phase of reading development in which the primary emphasis is on acquiring the skills required to read words in print is sometimes referred to as the "learning to read" phase (Chall, 1983), and for most children this extends roughly through the end of second grade.

The next phase of reading growth has been referred to as the "reading to learn" phase (Chall, 1983), and here the challenge of continued reading growth changes somewhat from the earlier period. Children are still faced with challenges in the word-reading domain, but these challenges are primarily in the area of adding to the range of words they can recognize at a single

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glance. It is important for children to continue adding to the vocabulary of words they can recognize by sight, as this enables them to maintain fluent reading on passages that incorporate an ever-expanding corpus of words (Torgesen, Rashotte, & Alexander, 2001). Another, and equally significant challenge to reading growth beyond third grade is presented by the increasing conceptual complexity of texts children are asked to read, as well as the broader range of words that are used to convey those concepts. For example, individual differences in vocabulary knowledge (knowledge of word meanings) explain an increasingly larger proportion of the variance in reading comprehension as the texts children read employ an ever expanding range of words to convey meaning (Hiebert, in press, 2003; Snow, 2002).

This brief and oversimplified discussion of the growth of reading skills has implications for the measures that should be used within RTI models to identify children with reading disabilities. In kindergarten through second grade, measures most sensitive to individual growth in reading will likely focus on word level skills, such as phonemic decoding and oral reading accuracy and fluency. It makes sense to focus on word level skills through second grade because it is in these areas that skills are growing most rapidly, and individual differences in word reading ability are probably the most important factor in determining performance on reading comprehension measures at this age level (Foorman, Francis, Shaywitz, Shaywitz, & Fletcher, 1997). In kindergarten, before most children can read connected text, measures of pre-reading skills that have a *causal* relationship with later word reading growth, such as measures of phonemic awareness, and letter-sound knowledge, are the best candidates to use within RTI models (Torgesen & Wagner, 1998). In order to identify children who will later struggle with reading comprehension because of limited oral language ability, it also seems important to monitor the development of vocabulary in young children (Beck, McKeown, & Kucan, 2002).

If RTI models use growth in word level reading skills as the primary means of identifying children with reading disabilities in the early elementary grades, they are likely to identify a high proportion of the children who have traditionally been labeled learning disabled because of reading difficulties. Current definitions of dyslexia, for example, suggest that it is a ". . . specific language-based disorder of constitutional origin characterized by difficulties in single word decoding…" (Lyon, 1995). The immediate cause of these difficulties in single word decoding among children with dyslexia is weakness "…in the phonological component of their natural capacity for language"(Liberman, Shankweiler, and Liberman, 1989, p.1). Children can manifest varying degrees of weakness in phonological processing while performing at average, or above average levels on many other language and cognitive tasks (Share & Stanovich, 1995). Thus, reading difficulties that are characterized primarily by difficulties in the development of accurate and fluent word reading skills fit well within the traditional view of learning disabilities, which has required that children exhibit some cognitive/linguistic strengths in addition to weaknesses in their area of disability.

Application of the RTI model to the identification of learning disabilities in early elementary school will identify other children who also have phonological weaknesses, and thus experience difficulty in the "learning to read" phase, but who also have weaknesses in broader cognitive and lan-

guage domains. These children may also perform poorly on measures of phonological skill, not because of "constitutional weaknesses", but rather because their pre-school language environment did not support the growth of phonological sensitivity (Lonigan, 2003). Many of these children would not have been identified using previous approaches to the identification of learning disabilities because they do not show a significant discrepancy between their word reading skills and other language/cognitive skills. However, they have the same phonologically based problems in learning to read words, and they need the same kind of instructional interventions, as children whose phonological disability is significantly lower than their other language/cognitive skills.

In an ideal world, if the RTI model were applied consistently and was followed up with sufficiently powerful interventions, the vast majority of children should arrive at the end of second grade with adequate word level reading skills. This is, in fact, the finding from numerous prevention studies that show all but a small proportion of children can be taught to read words accurately and fluently if given timely and appropriate interventions (Denton & Mathes, 2003; Torgesen, 2000).

To introduce an important issue associated with use of the RTI model at third grade and later, I will first present some data from Florida's Comprehensive Assessment Test (FCAT) that is given to all children in Florida from third to tenth grade. The FCAT is an excellent test of reading comprehension that places increasingly heavy demands on word knowledge, conceptual understanding, and inference making skills at each successive grade level from three through ten. It is also the primary test used to assess the reading growth of Florida's school children. The test is criterion referenced against an established standard of performance at each grade level, and scores are reported in five achievement levels. Level 3 indicates grade level performance, and level 1 is considered to be seriously below grade level. Third grade students who achieve at level 1 cannot be promoted to fourth grade until their performance improves. Figure 1 shows the percentage of children who scored at level 1 and level 2 in the reading portion of the FCAT in 2003.

The most important point from Figure 1 is that the percentage of students achieving level 1 performance on the FCAT rises from 23% in grade 3 to 43% in grade 9. The percentage of students at level 1 drops in grade ten, but a significant number of children who took the test in grade 9 are no longer in school in grade 10 (the number of students taking the test dropped from 206,000 at grade 9 to 167,000 in grade 10). If we assume that the test increases appropriately in difficulty from grades 3 through 10, we are left with the conclusion that approximately 43% of students in Florida are making seriously inadequate progress in learning to read by grade 9. These students are not making adequate progress through the "reading to learn" phase toward adult levels of reading proficiency. Given the current state of reading instruction and early identification of reading failure in Florida (as in most states), it is likely that many in the group of 9th grades students who scored at level 1 on the FCAT continue to struggle with basic issues of word reading accuracy and fluency. However, many others may fail to achieve adequate levels of literacy on a test like the FCAT because of inadequate knowledge of word meanings, poorly developed conceptual knowledge, or difficulties with reasoning and inference making.

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Thus, as we think about the application of a response to intervention model with older children, we face an issue that has important implications for the kinds of students that will be most likely to be identified as learning disabled. That is, if this model is effectively applied in the early grades, it will already have identified all the students who have the most common kind of reading disability that directly affects the ability to acquire accurate and fluent word reading skills (Torgesen, 1999). The kinds of children most likely to be identified as candidates for special education in the upper grades will be children who do not make adequate progress in the reading comprehension area.

The most important challenges to continued growth of reading ability after about third grade involve continued growth in reading fluency, growth in knowledge about word meanings (vocabulary), growth of inference and reasoning skills, and development of a range of reading strategies that can be employed to improve comprehension or repair it when it breaks down (National Reading Panel, 2000). If an RTI model were applied to growth in reading comprehension, or to growth in each of these four areas of component skills, a large number of children will be identified who have difficulties in areas that have traditionally been been assessed by measures of verbal intelligence.

As mentioned earlier, appropriate preventive interventions during the early stages of learning to read can prevent word level reading difficulties in a very high proportion of children. However, when these interventions have been applied to children, such as those from low SES or minority backgrounds, who enter school with large deficits in vocabulary development, their progress in reading declines sharply as their lower levels of vocabulary knowledge begin to affect reading comprehension after about third grade (Foorman, Seals, Anthony, Pollard-Duradola, 2003). This problem is illustrated in a recent study in which performance on a measure of oral reading fluency was used to predict FCAT reading comprehension performance in third grade (Buck & Torgesen, 2003). Among Caucasian children who achieved an adequate score on the fluency measure (110 WPM), only 9% achieved below grade level on the FCAT. The corresponding figure for African American students was 17%, and for Hispanic students, it was 13%. Although simple measures of oral reading fluency are a good overall measure of reading progress even beyond the early stages of reading growth, variables such as vocabulary knowledge and verbal reasoning skills play an increasingly important role in explaining individual differences in reading comprehension tests at each successive grade level. If measures of reading comprehension are used as part of the RTI model with older children, increasing numbers of students with problems in the verbal knowledge and reasoning domain will be identified as learning disabled. Of course, if measures of vocabulary knowledge were used as part of an RTI model with children in early elementary school to identify students at risk for reading comprehension difficulties in third grade and later, the same effect would occur.

To summarize the discussion thus far, the application of an RTI model for the identification of reading disabilities in children after early elementary school will identify large numbers of children failing to make adequate progress in reading comprehension. Since a large part of the variance on reading comprehension tests after third grade is explained by individual differences in the kind of verbal knowledge and skill that has traditionally been measured by ver-

bal intelligence tests, the RTI model will identify many children whose reading difficulties are caused primarily by what is usually referred to as verbal intelligence. This would necessarily involve an expansion of the concept of learning disabilities to include any child with insufficient ability or knowledge to achieve a specified level of performance on measures of reading comprehension, even if that lack of ability falls in areas most directly assessed by measures of broad knowledge and ability such as IQ tests.

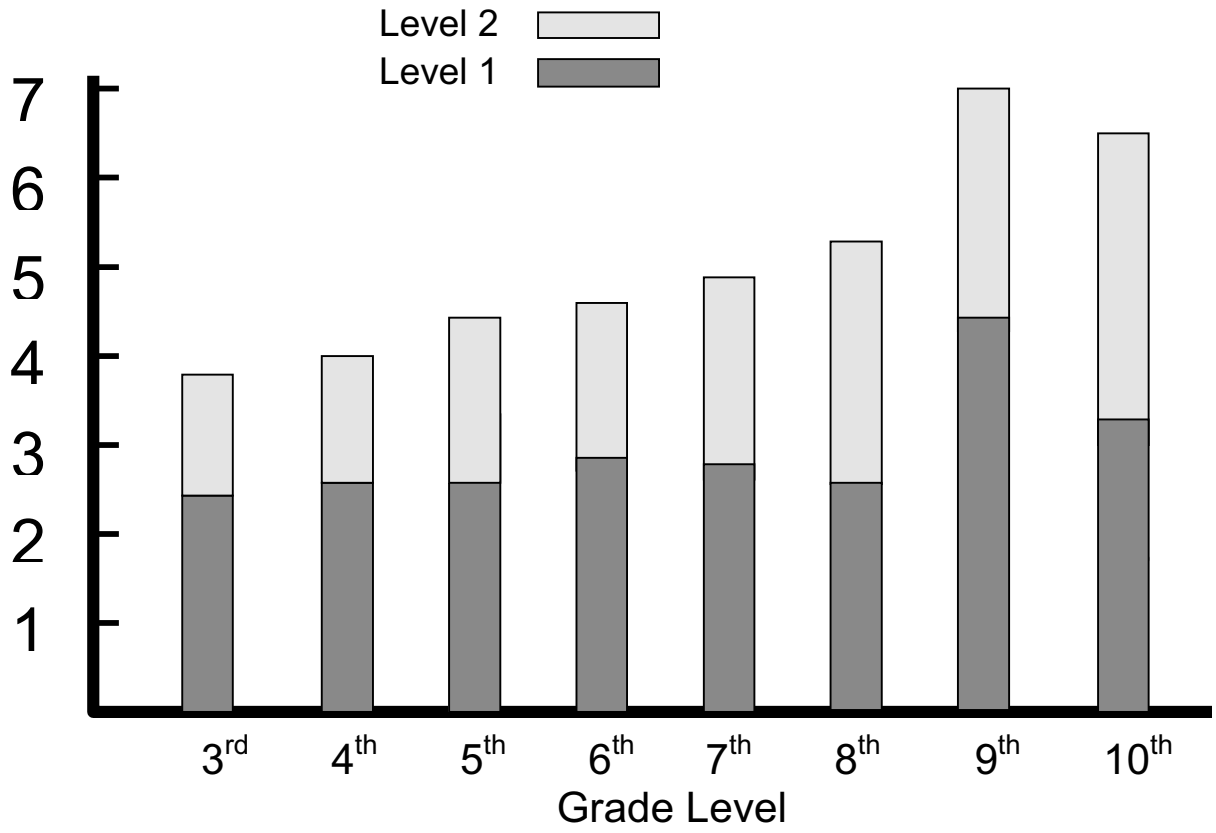
In thinking about the application of RTI models to the identification of reading disabilities in older children, it may also be of help to identify what is known about rates of growth in reading skills that are typically achieved by current interventions. The interventions we have most direct knowledge of are not what is typically referred to as "secondary interventions" but rather are interventions that have been applied to children with serious to moderate reading difficulties at any point from 3rd grade and higher.

Table1: Gains in standard score points per hour of instruction for three measures of reading skill

Authors of Study	Name of Intervention	Ave. Age of Subjects	Group Size	Hours of Intervention	Pre-test SS		Post-test SS		SS Gains per Hour of Instruct.		
					Ph. Dec.	Acc.	Ph. Dec.	Acc.	Ph. Dec.	Acc.	Comp.
Torgesen, et al., (2001)	LIPS	9yr,10mo.	1:1	67.5	68.5	68.9	96.4	82.4	.41	.20	.12
Torgesen, et al., (2001)	EP	9yr, 10mo.	1:1	67.5	70.1	66.4	90.3	80.5	.30	.21	.15
Wise, et al., (1999)		8yr, 9mo.	1:4,1:1	40	81.8	73.6	93.7	83.4	.30	.24	.14
Lovett, et al., (1994	PHAB/DI	9yr, 7mo	1:2	35	--	64.0	--	69.5	--	.16	.14
Alexander, et al., (1991)	ADD	10yr, 8mo	1:1	65	77.7	75.1	98.4	87.6	.32	.19	--
Truch (1994)	ADD	12yr, 10mo	1:1	80	--	76.0	--	93.0	--	.21	--
Rashotte, et al., (2001)	Spell Read	9yr, 8mo	1:4	35	82.6	87.4	98.9	98.1	.47	.31	.32
Torgesen, et al., (2003)	Spell Read	12 yr.	1:4	100	88	77	111.0	96.0	.23	.19	.19
Torgesen, et al., (2003)	Spell Read	12 yr.	1:4	51	87	82	102.0	90.0	.29	.16	.24
Lovett, et al., (2000)	PHAB/WIST	9yr, 8mo	1:3	70	67.0	62	84.0	75.0	.24	.18	.16
Lovett, et al., (2000)	WIST/PHAB	9yr, 8mo	1:3	70	59.0	56.0	80.0	70.0	.30	.20	.18
Truch (2003)	Phono-Graphix	12yr, 10 mo	1:1	80	--	83.5	--	98.8	--	.19	--
Torgesen, et al., (2003)	LIPS+Fluency + Vis/Verb	9yr,10mo	1:1,1:2	133	72.0	76.0	96.0	85.0	.18	.07	.07

Table 1 reports outcomes from a number of recent studies using a common growth metric. This metric is calculated by dividing the amount of gain in standard

score units by the number of hours of instruction that are provided, so rate of growth is expressed as the number of standard score points gained per hour of instruction. Of course, this metric depends on the common use across studies of standardized measures that have the same standard deviation, but there are a number of studies that have used measures similar enough to allow rough comparisons. Table 2 reports these growth rates for phonemic decoding (Ph. Dec.), word reading accuracy (Acc.), and passage comprehension (Comp.), along with other characteristics of the samples and the interventions they received. Not all scores are represented for each study, because standardized measures were not provided in all three areas of reading skill for all samples.



Several aspects of the data reported in Table 1 are worthy of specific discussion. First, there is remarkable consistency in the rates of growth for phonemic decoding

skills, word reading accuracy, and passage comprehension skills reported across the studies. It should also be noted that these growth rates are far higher than is typically achieved in public school special education settings (Hanuschek, 1998). Second, growth rates for phonemic decoding skills are consistently higher than they are for word reading accuracy and passage comprehension. Even students who have failed to acquire functional word decoding skills by third grade can achieve rapid growth in these skills if taught with intensity and skill. Although not enough studies included standardized measures of reading fluency to include estimates of growth in this area, studies that do allow calculation of this metric for fluency indicate that it shows the slowest rate of growth (when compared against the fluency of non-disabled children of the same age) of any area of reading skill. For example, for samples 1,2,7,8,9,and 10 (numbered from top) in Table 1, the standard score gains in fluency per hour of instruction were .06, .01, .25, .14, .17, and .00.

Rate of growth in the fluency area (in standard score terms) was directly related to the level of development in word reading ability the children attained before intervention began . Moderately impaired children, as in samples 7,8, and 9 in Table 1 show the best growth, while students with very severe word level reading skills after third grade, although they do become more fluent readers in an absolute sense, do not typically "close the gap" in reading fluency to a significant degree (Torgesen, Alexander, & Rashotte, 2001).

The third thing to note from our experience in calculating growth rates across reading skills for older children with reading difficulties is that, apart from the level of impairment of the children, several factors influence estimates of growth rates and outcome levels. For example, in our studies, we find that estimates of word reading accuracy are consistently higher when a measure of text reading accuracy (such as the Gray Oral Reading Test) is used rather than a measure of single word reading accuracy (such as the Woodcock Reading Mastery Test). The particular test used to assess word reading accuracy affects the estimate of final status more than it does the estimate of growth rate. The higher scores for the Gray undoubtedly reflect the student's ability to use passage level context as an aid to more accurate identification of words (Share & Stanovich, 1995).

Another factor that is likely to influence the estimate of growth rate obtained within any single study is the number of hours of intervention that were provided. Truch (2003) has recently documented that rate of gain may decelerate quite rapidly for intensive interventions after the first 12 hours of the intervention. In his study, 80 hours of intensive instruction using the Phono-Graphix method (McGuinness, McGuinness, & McGuinness, 1999) were provided to 202 students ranging in age from 6 years old to over 17 years old. For students ranging in age from 10-16, the average gains per hour of instruction for single word reading accuracy was .74 standard score points per hour of instruction for the first 12 hours of instruction. For the next twelve hours, the rate was .11, and for the final 56 hours, it was .10 standard score points per hour. Although this study did not calculate standard scores for their phonemic decoding measure, the findings were similar, but expressed in terms of grade level units per hour of instruction. For phonemic decoding, the growth rate for the first 12 hours of instruction was .25 grade level units per hour of instruction, for the next 12 hours it was .07, and for the final 56 hours, it was

.04. This deceleration in growth rate across time within intensive interventions is probably part of the explanation for the particularly low growth rates observed in the 133 hour intervention study reported by Torgesen, et al., (2003).

In conclusion, this brief paper has presented data and analyses in support of two points concerning the use of the RTI model to identify children with reading disabilities in late elementary school, middle school, and high school. First, since growth in word knowledge, conceptual understanding, and reasoning/inference making skills play a significant role in explaining individual differences in the growth of reading comprehension in older children, a significant proportion of children who fail to make adequate progress in reading comprehension after grade three are likely to have cognitive/linguistic deficits in these areas. Thus, a large proportion of children identified by the RTI model as failing to make adequate progress in reading growth after third grade are likely to be students with generally low verbal intelligence, rather than specific disabilities of the type traditionally associated with the category of learning disabilities. Second, for older children who are still struggling with basic reading skills after third grade, gains from appropriately focused interventions should be most rapid for phonemic decoding accuracy, next for word reading accuracy, then reading comprehension, and slowest for reading fluency.

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