

DIAGNOSING DISABILITY THROUGH RESPONSE-TO-INTERVENTION:
AN ANALYSIS OF READING RECOVERY AS A VALID
PREDICTOR OF READING DISABILITIES

Michael W. Dunn

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Genevieve Williamson, Ph.D., Chairperson

Doctoral Committee

Gretchen Butera, Ph.D.

Jerome C. Harste, Ph.D.

Ginette Delandshere, Ph.D.

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Abstract

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DIAGNOSING DISABILITY THROUGH RESPONSE-TO-INTERVENTION: AN ANALYSIS OF READING RECOVERY AS A VALID PREDICTOR OF READING DISABILITIES

There is growing evidence that the current method of identifying students with a reading disability is ineffective. The wait-to-fail model of assessing students after second/third grade and conceptual problems using intelligence tests for identification result in students not being provided the assistance they need during the early-elementary school years (Lyon, Fletcher, Shaywitz, Shaywitz, Torgensen, Wood, Schulte, & Olson, 2001). The educational community is pursuing this discussion in terms of response-to-intervention (RTI) methods of assessment. A student can be considered for identification by an assessment of: the amount of progress demonstrated over time during a remedial intervention program, and by attaining an established cut-off score of success.

Reading Recovery, a one-on-one intervention program, is a widely implemented remedial literacy program to assist struggling readers in first-grade classrooms. This program meets the criteria of response-to-intervention because of its daily assessments, which track students' progress and cut-off score of reaching book 15 by the end of the 20-week intervention. The program uses a series of story books (numbered 0–25) that increase in difficulty. By means of a discriminant function analysis, a retrospective study of second- through fifth-grade students who participated in Reading Recovery during first grade investigated assessment elements of the Reading Recovery Program (beginning text level, ending text level, and number of weeks in the Reading Recovery Program).

Results indicated that Reading Recovery assessment elements are significant predictors of first-grade students who later are identified as reading disabled. Using the school districts' current reading disability definition as an 18-point difference between intelligence and reading achievement test scores rendered significant results. Significant results were also found with refined reading disability definitions based solely on students' low reading achievement scores—emphasizing the students who struggle most with reading. In all the analyses, ending text level was the largest Reading Recovery assessment predictor of students later being identified as reading disabled or not.

_____ Genevieve Williamson, Ph.D., Chairperson

_____ Gretchen Butera, Ph.D.

_____ Jerome C. Harste, Ph.D.

_____ Ginette Delandshere, Ph.D.

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Chapter 1

Introduction

A fundamental debate currently exists about the method of diagnosis for learning disabilities (LD). The focus of the discussion has centered on two issues. First, there are conceptual problems with the use of intelligence tests in the assessment process (discrepancy between IQ and academic achievement) for special education services eligibility. Second, the practice of waiting until fourth grade to assess whether a student has not succeeded in grasping the academic skills taught (the “wait-to-fail model”) is considered to be contributing to the increased severity of academic difficulties for students in older grades.

The alternative being proposed is response-to-intervention (RTI). This is a method in which a child’s identification as having a LD is based on his or her nonresponsiveness within a defined period of time to a skills-based intervention addressing the area of academic difficulty. This study investigates an established first-grade remedial reading program, Reading Recovery (RR), for its predictability concerning students who would be later identified as having an LD. In other words, RR serves as the “intervention” in RTI, and therefore failure to succeed in this remedial program may suggest that students have an LD. RR meets the criteria of RTI with its pass/fail component of a student’s progressing to book 15 during 20 weeks of 30-minute, daily reading strategy intervention sessions. Owing to conceptual problems with the current method of diagnosis for LD used in the wait-to-fail model, assessment elements of the RR Program could serve to better predict students who need special education services and to provide them as soon as first grade.

Conceptual Evolution of a Learning Disability

Learning disability as a concept is conceptually defined as unexpected underachievement; that is, students do not perform academically commensurate with their potential even though they have had adequate opportunity to learn (Lyon, Fletcher, S. Shaywitz, B. Shaywitz, Torgesen, Wood, Schulte, Olson, 2001). Investigating this phenomenon began in the early nineteenth century. Dyslexia, word blindness, and dysgraphia have been terms coined by researchers (i.e., Berlin, Kussmaul). However, only since 1962 has the concept of LD, unexpected underachievement, been formally recognized by the educational community. Samuel Kirk's LD definition as unexpected underachievement addressed a critical need to identify children who failed to learn (Raymond, 2004). Because their lack of academic performance could not be attributed to mental retardation, visual impairments, emotional disturbance, or hearing impairments, they were disenfranchised from receiving special education services. Thanks to later efforts of parental and professional advocacy groups, special education services were formally offered to students with LD through the Learning Disabilities Act of 1969. Legislation reaffirmed these provisions in the Education for All Handicapped Children Act of 1975 and currently with the Individuals with Disabilities Education Act of 2004 (Hallahan & Mock, 2003).

Definition of a Learning Disability

The current federal definition of learning disabilities contains five conceptual

components. First, the student with a learning disability is considered to have a “disorder in psychological processes” (Raymond, 2004, p. 159). The student does not process information as efficiently or effectively as others do. Past researchers in learning disabilities have related this to perceptual or perceptual-motor processing, psycholinguistic processing, or cognitive functioning. However, “disorder in psychological processes” has yet to be defined in a way that renders valid, reliable, and practical assessment devices. Second, the language component refers to disorders that could be manifested by deficits in receptive language (listening and reading) as well as expressive language (speaking and writing). Language processing (i.e., inner language) is also a part of this component. Third, the inclusion clause bridges the gap of time between this era and previous eras. For example, a student diagnosed in the past with dyslexia would now be considered as learning disabled. Fourth, the exclusion clause (that a student is labeled as LD because the student’s difficulties cannot be attributed to something else) conceptually originates from the original definitions of learning disabilities in the 1960s. Students cannot read although they can see, cannot speak well although they can hear, do not learn well yet do not have mental retardation or emotional disabilities, and do not do well academically although they have ample educational experiences at home and in the community. Fifth, the ability/achievement discrepancy clause refers to students who have indications of being able to perform at a particular skill level but fail to achieve at this level.

Furthermore, the federal definition of learning disabilities is composed of any one or a combination of seven skill domains: (1) listening; (2) speaking; (3) basic reading (decoding and word recognition); (4) reading comprehension; (5) arithmetic

calculation; (6) mathematics reasoning; and (7) written expression (Fletcher, 2003; Lyon, 2001). With these criteria, so many students could fit this category that it could be considered as a public health problem for children in the United States (Blair & Scott, 2002). In 1996, more than half the students receiving special education services were labeled with a learning disability. Because the costs of special education are 2.3 times the costs of general education services, the strain on the public education system is significant (Lewit & Baker, 1996). Research (Roush, 1995) indicates that 80% of students with learning disabilities have them within the area of reading. This study focuses on investigating RR assessment elements and their level of predictability for students later identified as having an LD. For the purposes of this study, the federal definition of learning disability (LD) will now be referred to as reading disability (RD).

Characteristics of a Reading Disability

Within the seven LD skill domains, students who exhibit indicators of having difficulty with reading may be considered as possibly having a RD (Mann, Shankweiler, & Smith, 2003). About 4 to 10% of children encounter noticeable difficulty with learning to read. In the elementary grades, this reading difficulty includes but is not limited to developmental dyslexia. Developmental dyslexia is defined as a discrepancy between a child's intelligence level and his or her level of reading ability. Students with dyslexia read significantly below the level that would be expected based on IQ alone (Mann et al., 2003). Although the complex learning process of reading correlates about 0.6 with intelligence, there are still children who

possess a seemingly adequate level of intelligence (about 90 or higher) but nonetheless still encounter reading problems (Rutter, 1978).

Although reading is often considered a visual skill, visual perception is only part of the reading process. To successfully decode words, sentences, and paragraphs on a page, seeing them is not enough. Students must map written language units with their spoken language. This spoken language develops for students from their individual history and from the development of our human species. Therefore, the function of writing and reading use the same processes as speaking and listening (Mann et al., 2003).

A writing system “writes” language by representing units of spoken language. In English, these are called phonemes. The most important demand that a writing system places on a reader is language awareness. A reader needs to be aware of the unit the writing system represents. If a student has difficulty with this, it will be difficult to understand how written words relate to the spoken language. Because alphabets represent phonemes, a student learning to read needs to understand that spoken language can be broken down into phonemes—phonemic awareness (Mann et al., 2003). Being a speaker and hearer of one’s language is, therefore, not enough; one has to be able to consciously analyze and manipulate the units that his or her writing system represents (Lieberman, 1999).

In addition to phonemic awareness, other types of language skills have been linked to reading disability. De Weirdt (1988) concluded that children who are poor readers may have problems perceiving speech in terms of “hearing” spoken words—speech perception. Reading ability can be measured in terms of the ability to read

individual words (decoding) or understanding the meaning of sentences and paragraphs (vocabulary skills) (Mann, 2003). Students with reading disabilities perform poorly on working memory or “short-term” memory tasks such as digit span, recall of strings of letters, nonsense syllables, or words in order, whether presented by ear or by eye (phonetic working memory) (Brady & Shankweiler, 1991). Finally, there is growing evidence that reading ability can be measured in terms of comprehending sentences (syntax and semantics) (Mann, Shankweiler, & Smith, 1985). Students with RD have difficulty with repeating and comprehending spoken sentences such as “The dog jumped over the cat and chased the monkey,” instructions such as, “Touch the small red square and the large blue triangle” (Smith, Mann, & Shankweiler, 1986), and the concept of parody (“he showed *her* the bird seed” as opposed to “he showed her the bird seed”). These five characteristics of language-based learning disabilities define the subgroup referred to as reading disabilities (Mann, 2003).

A core issue for reading disabilities is to what extent underachieving students with and without reading disabilities are distinct from low-achieving students (Algozzine, Ysseldyke, & McGue, 1995; Fletcher, Shaywitz, Shankweiler, Katz, Liberman, Stuebing, Francis, Fowler, & Shaywitz, 1994; Kavale, 1995; Kavale, Fuchs, & Scruggs, 1994; Pennington, Gilger, Olson, & DeFries, 1992). For a student exhibiting low achievement, achievement is considered as discrepant with age but not intelligence since both achievement and intelligence are below that expected for age. Furthermore, a reading disability is often considered to be distinct from low achievement because low achievement is related to low cognition and academic levels

of functioning or may be attributed to factors associated with poverty—not a specific cognitive impairment (Blair & Scott, 2002).

The employment of these RD definitional criteria has facilitated some dramatic increases in the number of students identified with RD receiving special education services. There were 1.2 million students identified as LD in 1979-1980. By 1998-99, the number had increased to 2.8 million (U.S. Department of Education, 2000). From 1981 to 1991, students aged 6 to 21 as identified under IDEA (2004) increased by 38%. The largest increase (44%) occurred among students between the ages of 12 and 17. These increases have occurred at not only public schools but also post-secondary and private schools (Lyon et al., 2001).

The Use of IQ in RD Identification

The use of IQ in the identification of RD stems from the research of Marion Monroe, an associate of Samuel Orton, who is considered to be the father of the International Dyslexia Society (Hallhan & Mock, 2003). In the 1930s and 1940s, Monroe pioneered the practice of calculating a reading index—the discrepancy between actual and expected levels of reading achievement for a student. By using this index, she could identify students who needed special assistance. Later, in 1963, Barbara Bateman created a definition for RD that reintroduced Monroe’s concept of a reading index; the IQ/achievement discrepancy method has been inextricably tied to RD ever since (Bateman, 1965). Current practice is based on the “wait-to-fail” model, which gives students the chance to learn literacy skills in early elementary grades; students are then typically referred for RD assessment in third or fourth grade. In

practice, identification is defined as a discrepancy between IQ as defined by an intelligence test such as the WISC-R (Weschler, 1983) and academic achievement such as the Woodcock-Johnson Tests of Achievement-Revised (Woodcock & Johnson, 2001).

Shortly after the passage of P.L. 94-142 in the mid-1970s, the federal government published regulations about how states could operationalize the definition of the RD construct. Other than the IQ/achievement discrepancy method just described, three other methods have been employed. Grade-level deviations are calculated based on an expected grade-level score's being compared to an actual grade-level score; a discrepancy is calculated from the difference. Because grade equivalents may vary markedly from test to test and from subtest to subtest within the same battery, the grade deviation method is not recommended (McLoughlin & Lewis, 1994). Expectancy formulas include some combination of student responses to instruction on relevant curriculum of variables such as IQ, chronological age, mental age, years in school, and grade age (e.g., Negin, 1987). Regression methods address measurement errors associated with IQ and achievement measures (e.g., Reynolds, 1990; Warner, Dede, Garvin, & Conway, 2002). Each state was left to develop its own criteria for diagnosis; hence, a student could be eligible for special education services in one state but not another state if the student were to move. Hamill (1990) found that most states use the discrepancy component as part of their criteria for identifying students with RD. Mercer, Jordan, Allsopp, and Mercer (1996) found that a majority of states are using standardized measures to define discrepancy.

In the 1930s Orton had theorized that IQ was not consistently reflective of a student's actual intellectual capacity. He felt that this was especially true of students with reading deficits (Siegel, 1998). This view is shared by many present-day reading researchers (Fletcher, Francis, Rourke, Shaywitz, & Shaywitz, 1992; Jiménez-Glez & Rodrigo-Lopez, 1994; Stanovich & Siegel, 1994; Tal & Siegel, 1996; Toth & Siegel, 1994). Although intelligence is considered to be a measure of a person's potential by asking questions relating to logical reasoning, problem solving, critical thinking, and adaptation, IQ tests actually measure factual knowledge, definitions, fine-motor coordination, and so on (Siegel, 1999). IQ tests do not measure reasoning or problem-solving skills. Typical questions on an IQ test include: questions about word definitions, geography, and history; doing puzzles to assess fine-motor coordination; memory tasks where a student is to memorize a series of numbers for later recall; and doing math calculations mentally (without the use of paper). Problem solving tasks such as strategizing through a math word problem or demonstrating an ability to complete a multi-step task are not included. In some subtests, extra points are awarded for speed. A student with a slow, thorough style would not achieve as high a score as someone who is more expeditious (Siegel, 1999).

Therefore, intelligence tests are more a measure of what a student has already learned than they are predictive of what the student can learn in the future. It is a paradox that a student with characteristics of an RD who has struggled with reading and literacy skills would be administered an intelligence test, given that the test's questions include tasks directly related to learning to read such as memory and definitions of words (Siegel, 1999). Furthermore, IQ tests can be poor predictors of

those students who would benefit from remediation (Kershner, 1990; Van der Wissel & Zegers, 1985).

Use of IQ tests provokes issues of systemic overrepresentation of students of a low socioeconomic status (SES) (Blair & Scott, 2002; Bradley, 1993; Bradley, Caldwell, Rock, Barnard, Gray, Hammond, Mitchell, Gottfried, Siegel, & Johnson, 1989; Molfese, DiLalla, & Lovelace, 1995; Schaimberg & Lee, 1991), Native Americans (Reschly, 2002), and Blacks (Lawson, Humphrey, Wood-Garnett, Fearn, Welch, Greene-Bryant, & Avoké, 2002). School classroom practices and IQ tests are premised on students having foundational language skills as demonstrated by the middle-class, White majority. Some parents or guardians may not have the money to offer their children the opportunity to experience visits to the local museum, family vacations, community sports and clubs, or may not even be able to read and model literate practices to their children at home. Medical related issues can also provoke learning problems for children. Ingestion of certain chemicals through playing on a carpet contain lead or consumption of artificial food coloring and flavoring can impair IQ (Burlton-Bennett & Robinson, 1987; Soong, Chao, Jang and Wang, 1999). These children become viewed as not being in sync with the expectations of school classroom practices. The students are later referred for special education services for which assessments (i.e., IQ tests) are administered. These tests, similar to grade-level academic standards and classroom practices, are also based on the student's having learned certain background knowledge deemed as "required" for an ability to learn to exist. By not having the "acceptable" language skills, these students become viewed as being at risk.

Research (Peterson & Shinn, 2002; Warner, Garvan, & Conway, 2002; Watkins, Kush, & Schaefer, 2002) has found that there are weaknesses in terms of accuracy contained in the current IQ-achievement model. One study (Proctor & Prevatt, 2003) compared four identification models that used the WISC-R (Weschler, 1983) and concluded that all four were suspect. Although the different models identified similar numbers of students, each model identified different students.

Other research (Coutinho, Oswald, & Best, 2002; Warner et al., 2002) has discussed the aspect of bias in intelligence testing for reading disabilities. For example, because the normative sample for IQ scores is based primarily on (middle-class) European Americans, the regression line used to predict achievement from IQ data would not be applicable to students of different socioeconomic, racial, or ethnic groups. Individual student characteristics such as gender and ethnicity as well as socioeconomic characteristics can also influence the likelihood of a student's being identified as reading disabled.

Even with predetermined methods of standardized assessment, procedures are sometimes not even followed. Research (MacMillan & Siperstein, 2001) has investigated the issue of California school districts that have failed to follow the criteria for identifying a student as reading disabled. Based on feedback from school personnel and the findings of these researchers, the concept of reading disabilities used in schools were ones that were not stated in legislation nor used by researchers. School teams viewed assessments as merely a means to get students the services they need. In essence, the current assessment methods for reading disabilities are being questioned and even ignored.

Students from Minority Groups and RD

Research has shown that certain minority groups are either overidentified (i.e., African Americans) or underidentified (i.e., Asian/Pacific Islander) as having a RD. For example, African Americans accounted for 14.8 percent of the school age population during the 1998-1999 school year, yet 18.3 percent of the African American population was labeled as RD—rendering African Americans 1.3 times as likely to be identified. Conversely, Asian/Pacific Islanders accounted for 3.8 percent of the school age population. However, only 1.4 percent Asian/Pacific Islanders was classified as RD (Donovan & Cross, 2002). The consequences of over- and underrepresentation can be inappropriate labeling of students as well as denied access to educational programming that is appropriate for them. The ramifications of such misclassification can also include low expectations for achievement, increased likelihood of social-emotional problems, along with postschool outcomes (differential graduation rates, differential enrollment in postsecondary institutions, and differential earning power upon graduation) (Lawson et al., 2002).

The reality of the educational context of minorities in schools relates to an academic environment that is White, middle-class based. Statistics indicate that during the 1998-1999 school year, Whites represented 66.2 percent of the school age population, and 63.0 percent of students labeled as LD were White (Lawson et al., 2002). The system of assessment for identification is working as it should for this dominant group for whom the school system is designed. However, students who do not have the presumed culture, language, and social skills are put at a disadvantage in

receiving appropriate academic programming to meet their needs. RTI, the proposed alternative discussed previously, would focus RD classification on the individual skills of the students and their documented progress in intervention activities. The current method of using an intelligence test with predetermined questions based on cultural experiences and social skills in tune with White, middle-class culture puts students in minority groups at a disadvantage in the identification process. This results in overidentification because of low intelligence as defined by IQ tests.

RD and Socioeconomic Status

Social class has been identified as a determinant of a student's behavior and performance in school (Grundmann, 1997). O'Connor and Spreen (1988) compared the relation between parents' socioeconomic status and educational level and the educational and occupational achievement of adults who were identified as learning disabled as a child. The hypothesis that these were positively correlated was confirmed in the data analysis. There was a distinct positive correlation between the parents' socioeconomic status and level of education versus the educational and occupational achievement of the children with a learning disability. This trend was also reflected in the students' salary and employment as adults in their twenties. The socioeconomic status and educational level of the father in particular played an important role in the outcome for children with a learning disability.

Given that typical practice for RD identification is determined by a difference in intelligence and expected reading ability, the relationship between intelligence levels and socioeconomic status relates to this study. Students from lower-income

backgrounds tend not to have the same nutritional practices, opportunities to have educational experiences outside of school (e.g., going to the museum), or literate practices modeled for them at home, for example. Molfese, DiLilla, and Bunce (1997) found that although home environment measures were the single most important predictor of group differences in children's intelligence at ages 3 through 8 years, socioeconomic status showed a smaller but still significant effect beginning at age 5 over and above the effects due to home environment. A later study based on the same longitudinal data indicated that socioeconomic status influenced the rate of intellectual growth—for nonverbal skills, specifically (Espy, Molfese, & DiLilla, 2001).

Molfese, Modglin, and Molfese (2003) found that the home environment during early childhood is an important element in the development of reading abilities. There were significant correlations between socioeconomic status (measured with a questionnaire about the home environment) and reading scores. If a student's home environment is not providing an adequate foundation for the skills taught at school to be learned, these students will be viewed as needing remediation at school. Through participation in a remedial intervention program such as RR, students who do not respond to the intervention could be nominated for continued assistance with special education services. This would allow them to have their low reading skills continue to be addressed over the long term.

RTI: An Alternative Method for Identification

Even though there are problems with the current methods of assessment for

RD, it is generally accepted that the practice of addressing the needs of students with RD (about 4% of the school-age population [Vital Health Statistics, 2002]) needs to continue. Identifying students earlier while receiving the benefit of intervention could help alleviate the severity of RD deficits and therefore lower the disproportionate number of older students who are represented in special education. Given that the concept of RD is valid, issues about identification methods need to be investigated.

The concept of RTI stems from a National Research Council (1982) study. Because the IQ/achievement discrepancy method is fraught with measurement and conceptual problems, this report (Fuchs, Mock, & Young, 2003; Heller, Holtzman, & Messick, 1982) suggested that the validity of special education classification be based on three criteria: (a) the general education programming will be adequate for learning to occur; (b) the special education program will improve student outcomes to warrant classification; and (c) the assessment process will be accurate and meaningful. As the number of students and costs in special education also remarkably increased (Lyon et al., 2001), alternative means for identification of RD became more desired. The President's Commission on Excellence in Special Education (2002) made a formal recommendation that RTI be put into practice so that students could be identified based on progress in interventions that they need instead of waiting to be assessed for services eligibility—the “wait-to-fail” IQ/discrepancy model. In the reauthorization of the Individuals with Disabilities Education Act (2004), states were formally offered the option of using the RTI method for RD identification.

A series of researchers (Limbos & Geva, 2001; Pereira-Laird, Deane, & Bunnell 1999; Sofie & Riccio, 2002; Taylor, Anselmo, Foreman, Schatschneider, &

Angelopoulos, 2000; Vaughn & Fuchs, 2003) have discussed RTI methods for reading disabilities and found that they can be effective and should be considered. An RTI model researched by Vaughn & Fuchs (2003) consisted of daily supplemental reading instruction focusing on phoneme segmentation, fluency, and comprehension for students who were at risk (comprising both monolingual English speakers and English language learners). With teacher/student ratio groupings of 1:1, 1:3, and 1:10, the results indicated that setting prior criteria for exit (40 to 50 letters per minute for Letter Naming, 40 phonemes per minute for Phoneme Segmentation, 35 to 40 words per minute for Nonsense Words, and 55 to 65 words per minute on Connected Text) resulted in very large effect sizes; different sizes amongst the groups in this study indicates the power of these results. Certainly rapid naming and phonemic awareness have been concluded to be good predictors of students having difficulty with reading skills (Lovett, Steinbach, & Fritjers, 2000; McGuiness, McGuiness, & McGuiness, 1996; Stanovich, 1988a; Torgensen & Wagner, 1998; Torgensen, Wagner, & Rashotte 1997). Tiu, Thompson, & Lewis (2003) concluded that processing speed should be added to the simple view of reading and that decoding ability was the best single predictor of reading comprehension—the ultimate goal of reading. Reading Recovery (RR), a remedial first-grade literacy program, could also be a practical example of an RTI assessment process. Daily programming includes students reading text which involves the use of phoneme segmentation, oral fluency (not reading rate specifically), and comprehension. If students do not make progress through the daily literacy lessons designed for each student individually and running record assessments using books leveled with increasing difficulty in the 30 minutes per day,

20-week RR Program, this would demonstrate their impaired reading skills and need for further special education services.

Reading Recovery Description

Given the continuous nature over time of classrooms having students who are not successful with learning to read, a researcher (Clay, 1985) in New Zealand has created a remedial reading program, RR, that responds to this issue. This one-student-to-one-teacher program (Clay, 2002) contains a series of lessons and strategies for a student to complete with a trained teacher in a 20-week period. After some initial observations of the student's reading strategies, the student is given a series of reading tasks in which strategies are used and developed with the aim of improving the student's reading skills. If the student still is not reading at a level relative to the average reading ability of his or her class after the initial 20 weeks, the student may continue with the program to attain improvement or may leave the program because of a nonresponse to the remediation methods. This student's status would be referred to as "continued" because of the need to continue beyond the initial 20 weeks (Clay, 2002). "Discontinued" status would refer to a student who succeeded with the RR intervention at week 20—that the student had attained book level 15, representative of the end of first grade reading ability.

This program that originated in New Zealand is a multidimensional approach to reading instruction that attempts to meet the needs of a school district, its teachers, and the students who struggle with reading. Lyons, Pinnell, and Deford (1993) provide a concise definition of the program as a "system-wide intervention that

involves a network of education, communication, and collegiality to create a culture of learning that promotes literacy for high-risk children” (p. 2).

Reading Recovery contains three levels in its aim to assist students with low reading skills. At the first level, Reading Recovery helps districts improve the delivery of reading instruction to its lowest-achieving readers. Second, through staff development, Reading Recovery requires dedication, training, continual in-service, and data collection of the trained and highly capable teaching staff who carry out the program (Pinnell, McCarrier, & Button, 1990). The third and most prominent characteristic of the program is student intervention, which yields academic dividends for students (Rumbaugh & Brown, 2000).

The process of the intervention involves a referral, assessment, intervention, and decision of the student’s being “discontinued” or “continued” in the program because of nonresponse to the intervention’s strategies. Before the school year actually begins, the trained Reading Recovery teacher seeks the advice of kindergarten teachers who taught the students about to enter first grade. Students identified with an exceptionality are not permitted for acceptance into the program because the program is not intended for a student with predetermined academic difficulties.

First-grade students who are in the lowest 20% of their class for reading ability are nominated for the program, which results in a number of students being selected for parental permission to receive intensive daily support and practice with reading strategies (Moriarty, 1996; American Federation of Teachers, 2000). Initial sessions are referred to as “roaming around the known,” with the purpose of

screening and making diagnostic assessments of the student. The intention is for the Reading Recovery teacher to facilitate the student in demonstrating what the student can do in terms of literacy. As the teacher observes the child and works with reading and writing texts, the student may discover responses in literacy tasks that were unknown to the student before. These foundation skills and knowledge can serve as a springboard, giving the student confidence enough to move to new levels when the program starts (Clay, 1993).

The format of a typical daily lesson is as follows: rereading two or more familiar books; rereading yesterday's new book and taking a running record; identifying letters (plastic letters on a magnet board) and possibly word-making and breaking; writing a story (including hearing and recording sounds in words); rearranging a cut-up story; introducing a new book; and attempting a new book. Variations of this lesson may be made as long as a sound rationale exists for doing so (Clay, 1993).

RR emphasizes the use of context clues, rather than decoding, and tends to give students the keys to sound-symbol relationships only after they have encountered problems with the text (American Federation of Teachers, 2000). The standard protocol approach of RTI as demonstrated by Vellutino, Scanlon, Sipay, Small, Pratt, Chen, & Denckla (1996) would have a more scripted approach to teaching these skills through drill and skill practice. In RR, students who seem likely to fail or are not making desired progress after the first 20 weeks in the daily 30-minute Reading Recovery sessions may be "continued" with the hope of improvement in reading

skills, or be “discontinued” from the program and possibly be recommended for special education services.

The RR Program fits the model of intensive, sound reading intervention that is used in RTI research (Fuchs & Fuchs, 1998; Fuchs, Fuchs, & Speece, 2002) given the program’s pass/fail component . A student is considered “discontinued” (successful) and able to return to the regular classroom when the student has reached an average ability with the class (book level 15). A student can also be discontinued after 20 weeks or longer because of an apparent lack of ability to successfully use the strategies as presented. During the initial days of participation in the program, assessments are completed to define the student’s level of reading ability (referred to as beginning text level). By the end of the program, the student’s ending text level is determined (ending text level). These book levels are assessed with running record assessments. They consist of a series of nations that RR teachers make as a student orally reads 100 words of text. Success with a given book level is based on the student’s oral reading accuracy rate. Ninety percent accuracy is the cut-off score needed to progress to a higher book level. Other indicators provide insight into reading skills: self-correction rate (number of self corrections per the number of oral reading errors); notations about visual, syntactic, and meaning cues. Running records provide reading process indicators of students’ literacy skills (Clay, 2002). The use of these types of indicators (level of ability [book levels/running record scores], amount of progress over time [number of weeks]) is represented in the RTI method of RD diagnosis. If a student does not make progress through the book levels to book 15 or

participates more than the 20 weeks, this student would be indicating characteristics of having a RD due to small and slow growth in literacy skills.

Running Record description. For the running record, the teacher requires the student to read a 100-word portion of yesterday's new book aloud during the RR lesson. While the student reads, the RR teacher looks at a photocopy of the text and makes notes on the students' substitutions, omissions, and self-corrections of words and phrases.

When the reading is completed, the teacher tallies the number of mistakes the student made and subtracts this number from 100 so as to arrive at a fraction representing the number of words that were read correctly out of the 100-word portion of text. An error-rate percentage is then calculated from this fraction. Self-correction rate is calculated by adding the errors and self-corrections; the sum is divided by the number of self-corrections (Instructional Support System of Pennsylvania, 1994).

The premise of the running record is that the text's level of difficulty should be just above the student's level of mastery, with the aim of giving the student the element of challenge that prompts the student to strategize through the reading decoding activity, thereby improving performance. Hence, as competency increases, grade level text does as well. A student will not progress to a second-grade level of reading decoding by perpetually reading a first-grade-level text.

Research (Clay, 1969; Ross, 2004; Stafford, 2000) demonstrates that the running record is an effective tool in planning instruction to facilitate improved reading achievement. As noted previously, as the student reads a text, notations are

made about words inserted, substituted, or omitted. In one example, when the text stated, “See you in the morning” but the student read, “She you in the morning,” this error would represent meaning (message), structure (syntax), and visual (letter, cluster, or word) types of errors. “You” was referring to the boy’s sister in this story. So, when the student saw the word “see,” the student conceivably could have thought that “she” referred to the girl in the story. “She” could also be the first word in a sentence; hence, the structure of the sentence could have influenced the response. The fact of both “see” and “she” beginning with an “s,” ending in an “e,” and being three letters long renders the visual information of both words to be similar. Therefore, visual information could have influenced the error. The student reading this passage immediately self-corrected the mistake. Meaning (message), structure (syntax), and visual information are also categorized for self-corrections. In this case, the self-correction was attributed to the visual cues noted previously; that is, of both “see” and “she” beginning with an “s,” having three letters, and ending in an “e”. Errors related to meaning refer to cases where students substitute a word in the text with a different word representing the same thing/idea. One example would be saying “car” instead of “automobile”, which was the word written in the text. Structural errors involve errors made due to not following the syntax of the text. A student could read two sentences by omitting the period that separates them, for example (Clay, 1993).

By doing one running record a day with a student, a RR teacher can discover much about a student’s use of an array of internal processing strategies within the brain’s cueing systems (Hebert, 2004). An RR teacher summarized a student’s reading of a passage by commenting that she may repeat phrases or whole sentences

occasionally, self-correct most of her errors, pick up more visual information, and attempt all words. However, the student needs to take more responsibility for making the information match—to recognize when meaning is lost, to search further, and to self-correct. (Clay, 1993)

The running record element of the RR Program provides an analysis score for the number of errors (error rate) a student makes in reading a text slightly above his or her current level of ability. For students exhibiting signs of having difficulty with reading skills, running records can be used to assess students' competency in terms of reading decoding (error rate) and self-correction rate (comprehension). Teachers can, therefore, deduct where students' elements of weakness exist. Is the student reading by means of graphophonic or phonemic cues? How does a student appear to strategize decoding a word that he or she does not know? Does the student comprehend the meaning of the text by self-correcting errors? If the student cannot read the text with 90% accuracy, then the student has not succeeded at this reading-ability level (Clay, 2002). Assessing the number of times the student self-corrects mistakes provides insight into the student's concept of meaning (semantics), structure (syntax), or visual information (graphophonics). These elements can all be used in identifying students who are not responding to the instruction of reading skills (Clay, 2002).

Running Record measures can also be used over a period of time to determine how much progress a student is making with reading activities and how quickly (Fuchs, Fuchs, McMaster, & Otaiba, 2003)—thereby exemplifying RTI in practice. If a student attains a 90% or more accuracy of words read correctly on a running

record, the student moves up to the next book level. When these results indicate a student who is having difficulty (<90% accuracy on the running record), consultation, problem-solving approaches, and adaptations can be implemented to attempt to address the student's needs. If conclusions from this intervention resulted in grade-level performance, then the student would not be considered as RD. Conversely, a student's failure to improve his or her reading skills after a series of weeks of participating in an intervention such as RR would be indicative of having a RD (Clay, 1985).

RR's effectiveness research. RR has come to be used in 49 states, the District of Columbia, Department of Defense Dependents Schools (domestic and foreign), Bureau of Indian Affairs Schools, plus Canada, the United Kingdom, and Australia ("Reading recovery: Basic facts," 2004). For example, the State of Indiana has made RR part of state policy by funding it through its Early Literacy Intervention Grant Program (Reed, 2001) with the goal of reducing the number of children who remain unable to read by third grade.

Some research ("Reading recovery: Basic facts," 2004; Grossen, Coulter, & Ruggles, 2004; Hiebert, 1994; Nicholson, 1989; Robinson, 1989) disputes Reading Recovery's effectiveness, given: (a) its cost (one teacher per student for 30 minutes per day over 20 weeks (or more); (b) the fact that learning levels achieved through the program are not sustained in subsequent grades; and (c) that 10 to 30% of children receiving the program in first grade (ages six to seven) do not successfully complete it.

Conversely, the prevalence of the program's use and cases of success has provoked research attesting to its effectiveness ("Reading recovery: Basic facts," 2004; Brown, Denton, Kelly, Outhred, & McNaught, 1999; Lyons, 1998; Pinnell, 1989). The Texas follow-up study (Askew, Kaye, Frasier, Anderson, & Rodriguez, 1999) stated that discontinued RR students (those who attained book level 15 by the end of the program) attained average-level scores for their grade based on standardized assessment scores, text reading and retelling, and classroom teachers' observations of classroom-based skills. In an Ohio study, a sample of fourth-grade students including RR students who were continued (successfully achieved book 15 by week 20) and discontinued (students who required additional time in RR beyond week 20 in the goal of reaching book 15) indicated results of at least 67% above proficiency (Hovest & Allington, 1997). A Kansas longitudinal study (Briggs, 2003) concluded that when students who were most at risk in first grade completed the RR Program were compared to scores of a randomly selected comparison group spanning all ability levels, the RR students attained scores near the mean of their peer group. A 1999 study completed by the Government of New Zealand study found that fewer than 1% of the participants needed further referral (Pinnell, McCarrier, & Button, 1990).

Sylva and Evans (1999) completed a comparison study of RR participants to a phonological intervention program. Over the course of this longitudinal study, 180 students were offered one or the other intervention while being compared to a control group of approximately 200 children. The results indicated that RR proved to be the most effective in the short and medium term, and these results were attributed to the

RR Program's being aimed at a broader range of skills than phonological intervention was. The long-term significant impact of the program came to benefit those who started as nonreaders when they began the program.

Summary

The systemic biases of intelligence tests in the identification of students with RD along with the lack of early intensive help for students in a wait-to-fail model have provoked a need for alternative methods of identification. RTI offers students the opportunity to receive assistance for their difficulties with reading at an early point in elementary school. When the intervention methods are a means to identify students as RD, students can continue to receive special education services following the intervention. With RR, RTI as well as special education services could begin in first grade.

RR assessment variables could offer educators a means to determine which students would be later identified as RD. The longer a student "continues" in the program (especially after 20 weeks), the higher the likelihood of an underlying language processing problem for the student (Rhodes-Kline, 1996). Therefore, the length of time a student participates in the program could be an indicator of a reading disability.

Book levels used in the RR Program define the reading level a student has attained. Book level 15 is the desired goal of RR because it represents end of first grade reading ability. A student's book level is assessed using running records. These are another possible tool in an RTI approach for the identification of reading

disabilities. Considering the characteristics of a reading disability (phonemic awareness, speech perception, vocabulary skills, phonetic working memory, and syntax and semantics), all are implied in the process of interpreting students' miscues in oral reading. An RR student would need to demonstrate a certain level of phonemic awareness in reading a story (Mann, 2003). The student's ability to "hear" spoken words would be assessed in the process because the student should be monitoring the meaning of the story as he or she reads to confirm that the words that are read make sense and, when they do not, to self-correct (Forbes, Poparad, & McBride, 2004). Vocabulary skills (Mann, 2003), phonetic working memory (Brady & Shankweiler, 1991), and syntax and semantics (Mann, Shankweiler, & Smith, 1985) are also involved in this decoding and comprehension process. All five of these criteria represent the skills that good readers have and the difficulties students with reading disability characteristics face. Therefore, with RR elements, one could predict that students exhibiting such characteristics have a RD.

Research Question

This study is designed to address the following questions: Is failure to respond to the RR intervention a good predictor of RD? More specifically, which, if any, of the elements (beginning text level, ending text level, number of weeks of participation in the RR Program) are good predictors of students who are later identified as having a RD by third through fifth grade?

Chapter 2

Literature Review

Definitions of Literacy

Recent criticisms on school children's ability to read and write has resulted in widespread educational reform ("No Child Left Behind Act," 2002), standardized testing (Kohn, 2000), and a renewed emphasis on phonics ("Reading First," 2002). The argument that the current literacy skills of students are somehow in a newly developed crisis does not reflect the actual facts of the past (Willis, 1997). Literacy has been the subject of heated debate for decades.

Addressing the needs of students with deficient literacy skills is the aim of the RR Program. This study seeks to determine the utility of RR as a method to define who the students with characteristics of having a reading disability are and therefore address their needs in early elementary grades. Defining the context in which the RR Program operates helps to contextualize its methods and possibilities for success in remediation and identification.

Historical definitions. When the United States Government formulated the Department of Education in 1867, about 1% of White Americans and eighty percent of African Americans were illiterate—based on the decennial census 1870–1930. This large difference is, of course, attributable to the societal role of both races during that period. By 1979, only about 0.4 percent of White Americans and 1.6 percent of the African American population were considered illiterate (National Center for Education Statistics, 1992).

During the 1870–1992 period, however, the definition (or components) of literacy changed. Literacy was no longer simply a concept of reading and writing but

now incorporated functional literacy (whether a person's educational level is sufficient to function in a modern society) (National Center for Education Statistics, 1992). Willis (1997) contends that the definitions of literacy during this period were part of three general considerations: literacy as a skill, literacy as school knowledge, and literacy as a social and cultural construct.

Literacy as a skill (the ability to read and write) is probably the most common definition of literacy (Willis, 1997). The American Heritage Dictionary (2000) defines literacy in contrast to illiteracy: Literacy is “the condition or quality of being literate, especially the ability to read and write” (*The American Heritage Dictionary: Dictionary of the English Language*, 2000). Goody and Watt (1972) offer a variation of the skills approach by placing literacy skills on a continuum with oral forms as primitive and written forms as advanced. A study (Lockridge, 1974) of literacy in seventeenth-century New England is an example of the literacy as a skill definition in historical research. He argues that the ability to write one’s signature on a will, for example, demonstrated literate skills. Other factors that helped influence literacy during this time were class, population density, geographical location, and occupation.

These historical definitions tell us that the definitions and purposes of literacy are closely related to the ideological, political, social, economic, and racial goals of the nation. Historically, means of literacy acquisition has been disproportionately distributed across gender, racial, economic, geographic, linguistic, and religious lines. In early American history, people of color were denied access to public schooling and

literacy skills. Similar practices were directed toward the lower socioeconomic classes, women, and ethnic and racial minorities.

Venezky's (1995) proposed modern-day definition contends that literacy is a minimal ability to read and write in a language as well as an ability to strategize in the use of reading and writing in everyday life—an interaction between social demands and everyday life. Gee (1990) characterizes this definition as being too simplistic. It does not acknowledge that literacy is situated in the society of which the individual person is a member. When literacy is situated in the individual person (as it is in Reading Recovery), the multiple ways in which reading, writing, and language interrelate within the context of social life are obscured.

Numerous conceptual definitions of literacy exist. Governments, educators, linguists, academics, employers, to name a few viewpoints, may all hold varying perspectives of literacy. A group of prominent literacy researchers known as the New London Group (Street, 1996) have conceptualized literacy as “multiliteracies” (visual literacy, graphic literacy, computer literacy, and so on) into three main models: autonomous, critical literacy, and “New Literacy Studies.”

Theoretical Literacy Models

Autonomous model. Until recently, the autonomous model was the widely accepted definition of literacy among researchers, practitioners, and policy makers. This model views literacy as one reading process for all people. The assumption is that if you know how to read, then you *are* literate—as though there is a universal set of skills in becoming literate. Literacy is a neutral technique that can be applied

across all social and cultural contexts with generally uniform effects (Street, 1996). A tangible example of this model would be that a literate person could both read and write a short, simple phrase about everyday life.

The major tenet of this literacy model is the idea of a “great divide” between oral and written forms of communication (Finnegan, 1988). In a community in which the major form of interaction is through oral communication, a certain degree of “modern” society is lacking—specifically, the ability to distance oneself from immediate contexts, formal contexts, and a modernizing life perspective.

The acquisition of literacy has profound implications for people and societies. As people acquire literacy, their worldviews expand; they become critical, scientific, and logical thinkers. Political and economic institutions are expected to change with the expansion of literate skills. Rational economic planning and capitalist entrepreneurship replace barter and exchange. Hence, a new world order is created where western “developed” societies are imitated by “underdeveloped” societies. According to Murray (2005), education’s promotion and spread of literacy facilitates the skill levels of workers—especially for women.

A similar evolution of literacy development transpires in a religious society. According to the autonomous model, literate members of the community are able to develop religion by the “book.” Instead of an oral-religious societal tradition, in which customs or beliefs change as priests and elders change, a religion by the book, such as Christianity or Islam, maintains fundamental aspects of the faith over time (Goody, 1987). In all cases for the autonomous model, communication becomes less rooted in the immediate and personal. Ideas and beliefs become detached from local

pressures and are placed, rather, in a broader perspective. RR would compare to the autonomous model in that it aims to help students improve their literacy skills so that they can become less dependent on others for information. These students are offered the opportunity to become more autonomous in their literacy skills. With the RTI model, RR would help identify those students in need of further assistance to achieve autonomy. Other RTI standard protocol approaches (e.g. Vellutino et al., 1996) use a scripted approach to teaching literacy skills in that skills are taught in a systematic fashion. RR uses a non-scripted method where errors are analyzed by the RR teacher and addressed through mini-lessons at the following session (Clay, 2002). Whereas Vellutino et al. (1996) would devote a block of time to phonemic awareness for example, RR would embed these skills and lessons based on the students' reading of leveled texts.

At the individual level, the autonomous model is considered to a similar format in the acquisition of literacy. As with the social level, the main aspect of literacy is seen as the ability to compare and contrast ideas so as to evaluate them critically (Street, 1996). This model focuses on individual and technical skills involved in the reading process and one's ability to achieve literacy skills by separating out the social and cultural interference of traditional perspectives; it is insensitive to cultural variation and is narrowly economic. It also focuses on western forms of literacy at the expense of other local traditions. Because of the concentration on a universal set of skills, the autonomous model evades the issue of people having their own voice, perspective, and discourse (Street, 1996). The underlying assumptions of the model imply that there is only one kind of literacy—

you either have it or you do not—; that a person who can read will automatically be better off; and that equality of opportunity is assumed because there is no provision for those who do not have access. The model's vagueness renders a common decision about its meaning to arise. It also supposes that equal access renders equal results. Modern society is more complex than this binary perspective. Some (Dudley-Marling, 1997) view the RR Program (Clay, 2002) from this perspective given the objective of student participants attaining reading skills viewed to be acceptable by an education system based on middle-class standards and values.

Policy based on this definition would conceivably be based on the public education system model, have narrow objectives (simply to read and write), and be based on a minimal literacy standard applicable to all regardless of difference in work or location. A heavy reliance on existing methods and materials would make it relatively inexpensive to fund. Because the autonomous definition blends well with common practices for the teaching of reading and writing, accountability is at a low level because success is the responsibility of the individual. On the other hand, the vagueness of the model would render a common standard difficult to determine (Street, 1996).

The autonomous model's characteristics relate to the context in which literacy is viewed by today's school. Academic standards as recently implemented by states as well as standardized assessment benchmarks comment on the tasks and skills that students are to demonstrate; yet, maintaining a common standard between school districts and states as well as issues of fairness and equity in testing have resulted in a

call for alternative methods to identify students who are in need of assistance at an early point in elementary school.

This study on RR as a predictor of reading disabilities addresses the issues of standardized testing in the identification of students with RD. When the IQ/achievement discrepancy method of assessing RD's relationship to a student's success is replaced with an early reading skills intervention such as RR, racial and socioeconomic biases in standardized testing are no longer issues in the process.

In response to the weaknesses of the autonomous model, new literacy concepts have been developed to comment in a more critical and culturally relative manner about issues of how literacy can be acquired and developed. "Critical" literacy and "new literacy studies" place more emphasis on the "social" aspect of literacy as opposed to the cognitive skills of individual learners. Both agree in rejecting the autonomous model of literacy; they conceptualize reading and writing as social practices—hence the overall label: "social" literacies (Street, 1996).

Critical literacy model. Critical literacy is a literate practice that recognizes that the world is changing rapidly. To continue with the autonomous model would mean a perpetuation of those who are disadvantaged from the genres of power (Lankshear & McLaren, 1994). Postmodernists argue that the nature of our modern world has changed remarkably (traditional to modern; preliterate to literate). Examples can be found in the workplace, nature of job tasks, management-employer relationships, and productions of goods and their distribution amongst countries. In a global context, the context of workers and the economy have changed: Economic processes have become more interconnected, the democratization of workplaces has

evolved into more uniform than hierarchical structures, and the marketing of production is targeted to consumer choices. Whereas the modern world was based on the rational, linear thinking of science and objective truth, the new world order is more diverse, disordered, and less predictable and logical (Street, 1996).

The concept of literacy has shifted radically in this postmodern world order. The types of “reading” and “writing” that workers are expected to use are different from those of the modern era (O'Connor, 1994). Employees are now required to work in a more flexible fashion. Instead of performing a repetitious action on an assembly line, people need to be able to change in the use of different forms of communication (spoken, written, visual, computer-based). Hodge and Kress (1991) comment that the shift from modern to postmodern literacies has evoked the “end of language”; instead of words and text, workers focus on semiotic systems of language: icons, visual representations, and visual display.

Hirsch (1987) contends that these changes have resulted in literacy’s taking on a much broader definition—computer literacy, visual literacy, technological literacy, as well as the extended metaphors of political and cultural literacy. Current educational trends do not complement these new conceptual definitions because of the “back to basics,” much-discussed fear of rising “illiteracy,” and “falling” academic standards. Instead, they reflect an earlier period when the world order was considered safer, stabler, more persistent, and more definitive. Within this critical perspective, literacy continues as a means by which we know the world we live in; it refers not only to reading and writing but also to the way we think about ourselves as

working and thinking beings. This literacy of the modern era is therefore distinct from that of the postmodern era (Street, 1996).

Critical literacy's strengths are that it defines literacy in a larger world context and addresses the workplace needs of the contemporary world. One ideal or practical literate discourse or practice is replaced with multiple perspectives reflecting the experiences, viewpoints, and aspirations of each person in the community—from local to global. Employees can better articulate their needs and concerns based on their vantage point as opposed to the autonomous model's way of seeing groups of working people "advancing" in economic growth in tandem (Street, 1996).

Critiques argue that critical literacy as a model is too theoretical and is ungrounded in descriptions of social/individual practice. Beneath its exterior, it actually remains rooted in an "autonomous" model—that literacy acquisition can provide access to forms of power. McCabe (1993) argues that the question of how new technologies have changed the literate practices of the Third World remains unanswered; the new world "media" order has transformed the way we live as the printing press did in the past. Because this new technological era is not ubiquitous, there is a distinct disconnect with the modern world and the literacy practices of remote rural areas such as squatter settlements in the Cape Peninsula or Namaqualand in South Africa (McCabe, 1993).

The possible predictiveness of the RR Program and socioeconomic status (defined by free/reduced lunch) of students in this study for reading disabilities exemplifies factors that contribute to a student's ability to participate in critical literate practices. If students can develop literacy skills to the average level of their

classroom, then they have been remediated to the point of being considered equal with their peers for continued academic, social, and career success in our technological world. The element of socioeconomic status as a predictor will define the relationship of economic advantage to academic disadvantage, illustrating the degree of relationship between the concept of classroom practices promoting those with desired skills from home to those with deficient skills formed and practiced at home (Raymond, 2004). However, in some cases the desired school practices are modeled at home yet a child has difficulty with developing these desired literacy skills; these concepts of cause and effect do not always remain consistent. A more intensive investigation of a student's reading skills through an intervention could not only help address a student's difficulties but also render clarification on what long-term special education assistance should be provided—hence the benefit of considering student performance in the RR intervention program as a predictor.

New literacy studies. Another alternative to the autonomous model apart from critical literacy has developed in recent years amongst researchers (Barton, 1994; Street, 1994) and practitioners. “New literacy studies” incorporates a more social perspective on reading. With experience of working in the literacy field, there has been a realization that literacy as a practice varies from one context to another. Readers and writers have different conceptions of what they may be doing as readers and writers; these meanings are not just reflective of an individual or cognitive perspective but also are derived from cultural processes. Hence, the academic and schooled literacy of western cultures represents only one form of literacy among many (Barton & Ivanic, 1991).

This new literacy model has led to the creation of such concepts as “literacy events” and “literacy practices.” Literacy events stem from the work of Shirley Brice Heath (1996), who wrote one of the first ethnographies of literacy as social practice. She advocated that any situation or event in which reading or writing was salient received the term “literacy event.” This provoked a new manner in which to conduct research given that reading and writing could be analyzed in context as opposed to speculative accounts of either the autonomous or critical literacy models.

The new literacy studies model, with its conceptual basis of literacy as a social practice, calls upon researchers to suspend personal conceptions of what literacy means and therefore be open to variation. Whereas the autonomous model attains its evidence from experiments with an individual’s skills or from inferential speculation about social change (a charge also used against critical literacy), the new literacy studies model is grounded in accounts of social practice. Pedagogues will benefit from the use of “real” materials for teaching and for the emphasis on meanings in new literacy studies.

New literacy studies weaknesses are that it can complicate programs and curricula to the point of nothing actually being done. The process of new literacy studies is so demanding on designers and organizers that they actually could almost be considered ethnographers themselves, sensitive to the cultural nuances of their subjects and having to address both the literacy needs of the immediate environment and those that their subjects are likely to enter (Heath, 1996). McCabe (1993) has commented that this anthropological perspective has been critiqued for being relativistic, romantic, and irrelevant to the needs of the modern world. This attention

to local practices and context-specific literacy can lead to empiricism—the simple accumulation of detailed accounts with no general theory (Miyoshi, 1988).

New literacy studies has implications for the “multiliteracies” position. The key distinction is between “multiliteracies” and “multiple literacies”—in terms of not only semantics but also significant theoretical and methodological issues.

Multiliteracies is metaphorical in nature. It extends the idea of reading and writing to other practices such as reading and writing, visual literacy, computer literacy, and so on. Multiple literacies considers the multiple social and cultural constructions of literacy in practice—not necessarily including computer/information technologies such as televisions, graphics, and laptops (Street, 1996).

Within specific literacy contexts, multiple literacies considers the various technologies that may be implicated in any set of practices from a holistic perspective. From this point of view, multiliteracies would appear to privilege the technical nature of the medium above its social use. If the focus is on this technical aspect of the medium, this would refer back to the autonomous model. Examples of this are the technological changes in communication such as alphabetic literacy and the printing press. The multiliteracies position takes the same perspective by asking what the effects of such technological changes are. New literacy studies would argue that such changes are best viewed as social processes. Different technologies’ uses vary with context and take their meaning from context. It is not so much the effects or impact of the new technologies but rather how people grasp them, what changes occur as the communicative act changes, and how people themselves might respond as opposed to simply letting themselves be affected (Stephens, 2000).

The multiple literacies' view is holistic in nature whereas the multiliteracies perspective can be considered as more atomistic. Although the concepts of literacy practices and literacy events provide for holistic mixes with such contexts, multiliteracies appear to favor the form above the context and content (Street, 1996).

The implications of these literacy models render pedagogical choices for literacy programs, teaching, and learning concepts. With the autonomous model, literacy skills are taught with an emphasis on individual skills and cognition, resulting in a technical pedagogy centered on rote learning, skills building, and little critical inquiry. The argument is that the skills are to be learned, and then the newly literate decide what to do with them.

The new literacy studies model has been associated with a liberal, whole-language perspective on learning although it is not directly related (Willinsky, 1990). New literacy studies do, however, incorporate a social view of learning and sensitivity to context. Development programs using the new literacy studies model aim to expose learners to "real" materials as opposed to artificial textbooks (Archer, 1996; Rogers, 1994). Recognizing that literacy is not neutral but rather associated with power relations reflects the critical learning style espoused by Freire and his followers (Freire, 1985; Freire, 1987). There appears to be a convergence of capitalist, commercial imperatives and those of the critical approach; in both instances, workers are emancipated from previous unnecessary constraints, and literacy is seen as a key to progress and freedom (Gee, 1999). "In this way, perhaps the new "social" literacies are being reincorporated into the traditional autonomous

model. Therefore, the need for critique and differentiation remains relevant” (Street, 1996).

The current educational climate exemplifies one of the three models just described. Systemic aspects of the binary nature of the autonomous model are illustrated by students who do not meet the standard of literate practices that the educational system demands. The National Assessment of Educational Progress (NAEP) reported that there has been no overall change in reading ability from 1992 to 2000—almost 40% of grade four students still cannot read at a “basic” level; the percentage rises even higher among low-income and minority children (Sallinger, 2003).

Current official definitions of literacy. Our current belief in universal literacy is relatively new and represents a recent change in the definition and purpose of literacy. The Report of the National Reading Panel (2000) defined reading as purposeful and active. A reader reads to understand the text, construct memory representations of what he/she understands, and then put this understanding to use. These concepts form the basis for literacy standards in terms of the nation’s report card: the National Assessment of Educational Progress. With students reading various texts in the assessment and responding to multiple-choice and constructed-response formats, the resulting information about student achievement helps the public, policy makers, and education professionals understand the strengths and weaknesses in student performance and make informed decisions about education (National Assessment Governing Board, 2004). The resulting broad literacy goals from this process for third-grade students include: read with enough fluency to focus on the

meaning of what they read; form an understanding of what they read and extend, elaborate and critically judge its meaning; use various strategies to aid their understanding and plan, manage, and check the meaning of what they read; apply what they already know to understand what they read; read various texts for different purposes; possess positive reading habits and attitudes.

The National Research Council's research-based report (Snow Burns, & Griffin, 1998) reported similar characteristics of third-grade readers: summarize major points from fiction and nonfiction texts; read longer fictional selections and chapter books independently; discuss underlying themes or messages when interpreting fiction; distinguish cause and effect, fact and opinion, main idea, and supporting details when interpreting nonfiction.

The relevance of definitions of literacy to this current study on RR as a predictor of reading disabilities is that it is a defined concept of what literate practices are considered as acceptable by schools which provokes the inevitable practice of students being categorized into those who are competent in reading from those who are not. Principles of literacy definitions implied through standardized assessments facilitate these categories to be created, with the result being a need to identify certain students in need of remediation. Determining who requires remediation following a period of intervention is the subject of this study.

The National Assessment Governing Board (2004) defines its definition of reading literacy as having the following characteristics: is the right of every person; offers people access to information and the ability to function in life; enriches through the power of language and the beauty of poetry; extends the human experience

through the exploration of events in literary works; and is the key to knowledge and information. In the twenty-first century, literacy is more than the concept of reading and writing. The reading process is multifaceted in that students must not only decode text and comprehend its meaning for reflection and purposeful understanding but also interact with even more diverse texts such as CD-ROMs, Web pages, blackberries, and so on (Lyon, 1998).

Literacy skills in the twenty-first century are an integral aspect of the ability to function in western society. Computer-information technologies, school academic standards, and employment tasks require more and more defined skills reading and writing to complete employment and personal tasks (Street, 1996).

Education's systemic literacy practices. Our educational system is a socially constructed entity that has been refined over time into its present form. Educational policy makers and administrators, as people in authority and influence, decide on literacy criteria that students are expected to meet. Gee states that people, as well as their understanding of the world and each other, are simple outcomes of their sign systems and the minds that influence them (Gee, 1993). Although different people see the same object and its sign, such as literacy skills, the interpretation of the expectations will vary from one person to another. Gee comments that it is these sign systems that legitimize our ways of thinking and seeing. Over time, we habitualize and routinize our world and standards of practice. He further comments that a sign system exists neither because it is intrinsically normal or legitimate, nor because it is common. It is simply that some people have done it in a particular manner in the past and continue to do so in the present (Gee, 1993).

Although the conceptual reasons for existence of illiteracy are complex, a prime factor is the dominant middle-class culture, which assumes that its views are the norm and creates expectations that all students must meet. This stereotyping of children according to socioeconomic class, race, and language is reflected in the public education system. Students are streamed into different levels of ability either within their own classroom or into whole class groups. This early segmenting of children indicates a strong bias against children from poor or immigrant families ("Right to Learn Report," 1985).

Many countries have noticed that early streaming of children has significant impacts on the probability of being members of the equivalent social class in adulthood (Dempsey, 1987). The link between the lower socioeconomic groups and remedial classes is well documented (Espy et al., 2001; Grundmann, 1997; Molfese et al., 1997, 2003; O'Connor & Spreen, 1988). The long-term impact is profound. Choices made at an early age influence and even determine opportunities in education and in the working world. Students who are streamed into lower-level school programs are less likely to gain proficiency in reading and writing and more likely to be adults who are functionally illiterate (Dempsey, 1987).

This concept of streaming becomes cyclical in that these students grow up to be parents with little means to support themselves and their children's education. Having not succeeded "satisfactorily" through the education system themselves, they do not model and transmit "acceptable" literate practices to their children such as experiencing educational activities (visiting the museum, taking trips, and so on) that schools expect students to have done as a foundation for academic studies in the

classroom. The absence of background knowledge makes meeting classroom expectations very difficult. As this context evolves, the parents feel disempowered to advocate for their children's needs because the parents themselves do not have the literate skills and confidence to do so (Dempsey, 1987).

These systemic practices are in fact promoted simultaneously at a variety of levels through private and public sector initiatives. Recent changes in legislation at the state and federal level (e.g., "Dynamic Indicators of Basic early Literacy," 2000, "No Child Left Behind Act," 2002, "Reading First," 2002) have promoted assessment ("Dynamic Indicators of Basic Early Literacy," 2000, "Indiana Standards Tool for Alternative Reporting," 2005) and higher standards as an attempt to help "improve" education and force student improvement. Students will be tested in academic areas and, if they do not succeed, they will be sent for remediation until improvement is demonstrated (Indiana Standards Tool for Alternative Reporting, 2005).

Because the undercurrent of the educational system is White in perspective and nature, puts racial minorities at a disadvantage in attaining academic success. Minority students may have a different accent from the White majority, given that speaking English or even "standard" English is not necessarily practiced at home. By not having the "desirable" language modeled at home and not being taught in their mother tongue, these students are unable to perfect either to the desirable degree. Teachers can tend to view this characteristic as undesirable in terms of how academic success is rewarded in the classroom (Gayfer, 1987; Macedo, 2000; Paley, 2000).

The result of these systemic practices within the educational system is demonstrated by the practice of segmenting students into groups such as those who

are considered literate and those who are not. The students viewed as illiterate become candidates for remedial programs (such as Reading Recovery) that are aimed at bringing those students' skills up to the standard of middle-class Whites. These systemic practices of the educational system have provoked such students as being in need when they are the by-product of a system that does not value their skills, backgrounds, or life experiences because they are not the desired type implied in the system of the majority.

Methods of Teaching Literacy

Conceptual designs of teaching reading can be categorized into three main models: Subskills model, skills model, and the holistic model. The subskills model of reading instruction is based on behaviorist learning theory (Engelmann, 1983) in that reading must be taught in an explicit way from parts to whole through a carefully designed hierarchy of skills. "Each skill must be taught, positively reinforced, mastered, and tested before the next appropriate skill in the hierarchy is presented" (Goodman, Watson, & Burke 1987). Letters and sounds are assumed to be the simplest units of language. These are carefully introduced one at a time before word recognition skills are taught. Consonants are introduced first, followed by long vowels and short vowels. Usually, this method focuses on developing these subskills before an understanding of the meaning of what is said. When tests indicate that the beginning subskills have been mastered, larger units of language are introduced.

In this model, mastery of these hierarchically arranged skills is attained through practice. Because errors become learned responses, they are unacceptable. To

this end, the reading process is carefully designed and directed to ensure exact responses. In this test-teach-test curriculum model, the teacher monitors the reader's progress. The basis of this model is letter/sound relationships; this basis supports the next level of word recognition, which in turn supports the top tier: word meanings or vocabulary. These stages are separate and hierarchical (Howard, 2005).

The skills model represents the most common practice of reading instruction used in schools as reflected in most basal readers. Advocates of this model often view themselves as eclectic—using what they feel are the best insights of all views of reading. The first elements of instruction include the teaching of relationships between letters and sounds. Many programs teach irregular words as whole units through the use of flash cards or games focusing on words in isolation. In addition to phonics, word recognition and vocabulary instruction can include children's literature as well as the integration of other language arts (writing, speaking, and listening) with reading instruction. The three language cueing systems (graphophonics, syntax, and semantics) are taught usually in separate lessons using prescriptive language rules (Carnine, 2004).

Basal readers are designed to practice control of letter-sound relations, word frequency, spelling patterns, and grammatical structures. Basals can include excerpts from professionally authored literature and genres other than narrative. Within the hierarchy of skills in this reading model, meaning is important but is often organized as a set of comprehension skills. Proponents of this view consider the need for language to be simplified for children to learn to read. Comprehension, letters/sounds (phonics), and vocabulary are the three components to this model (Cunningham,

2005).

The holistic model for reading instruction views the reading process from a transactional, psycholinguistic, and sociolinguistic perspective. At the heart of this model is the semantic system; surrounding and supporting it are syntactic systems of language, with the graphophonic system of language on the surface. These three systems are used simultaneously within a sociocultural context. For meaning to be constructed, the reader must use all the language systems within a sociocultural context (Goodman et al., 1987; Groff, 2005; Jones & Pasternack, 2002).

As demonstrated in the whole language model, it is important for teachers to come to know students as readers—their beliefs and level of proficiency as influenced by methods of instruction. This will inform the teachers' instruction during the reading process. This aspect of the model usually begins with a reading interview during which the student is asked about reading practices at school and at home, topics of interest, and the strategies the student uses. Classroom practices include the reading of literature (not only narrative stories but also newspaper stories, magazines, and nonfiction) so that students hear models of what their own writing might be like in the future. Students are encouraged to choose their own reading materials while at the same time the teacher is organizing the curriculum and environment for students to experience a variety of literary forms. Writing is a daily practice for students. When students make mistakes, they are not ignored in a whole language classroom; however, there is no preoccupation with the elimination of the mistakes, errors, and deficiencies. Instead, miscues are used to indicate the student's growth, logic, interpretations, and intellectual functioning. The strengths, as opposed to the

difficulties, of the student become the basis for lesson development. In this process, reading skills are practiced using a variety of materials with a multitude of messages in them. In reading and writing, students are to become involved in the creation of meaning (Goodman, 1987; Groff, 2005; Jones & Pasternack, 2002).

RR (Clay, 2002) was designed to complement general education classroom literacy instruction. In New Zealand, the birthplace of RR, literacy instruction is predominantly whole language in nature with theoretical concepts from Ken Goodman (1967, 1986) and Frank Smith (1978). The definition of RR as a whole language, balanced literacy, or direct instruction reading model is debatable by educators. Tunmer and Chapman (2003) critique RR for using strategies more closely aligned with whole language. Students are taught to read through a type of non-scripted approach that includes reading for meaning instead of emphasizing the development of essential word-level skills and strategies. While RR may be considered as a more direct instruction approach, Clay (1985) does not consider RR as such because there is no scripted curriculum delivered by the teacher. Some (Mucelli, 1997, Waiser, 2000) even view RR as a format for balanced literacy.

These different conceptual models of teaching literacy view the reading process and students' progress in it in different ways. Regardless, students can become nominated for remediation programs such as RR due to intrinsic factors or a possible mismatch of curriculum method and student's learning style(s). This provokes the existence of methods of identification such as RTI and RR success.

Analysis of the RR Program

Marie Clay created a remedial reading program, Reading Recovery, that responds to the issue of classrooms continually having students who are not successful with learning to read (Clay, 1985). With a certified teacher, preferably one with both classroom teaching experience and training in the Reading Recovery techniques, students viewed as being among the bottom 20% of their class in literate skills can receive assistance with reading and writing for 30 minutes a day over a 12- to 20-week period. Lyons, Pinnell, and Deford (1993) provide a concise definition of the program as a “system-wide intervention that involves a network of education, communication, and collegiality to create a culture of learning that promotes literacy for high-risk children” (p. 2)

During the 2000-2001 school year, Reading Recovery in the United States marked an important milestone: More than one million students had been served since its induction in 1984 (Cobb, Salesi, Moore, Cook, Ellsworth, Hawkins, Hurd, Jackman, Karam, Lowry, Gael, Todd, Brown, & Russell, 1994). RR was being used by over 11,000 schools in 3,450 districts (20% of public and 2% of private elementary schools [by the 1998—1999 school year] (Education Commission of the United States (2002, January 25). By 1997, this achievement included those served the Spanish version of the program, Descubriendo la Lectura. Evaluations of the success of the program have rendered results that both support and critique its effectiveness.

In 1994, Reading Recovery had reached the 10-year point of having been implemented in the United States. To assess its effectiveness overall, whether all

components were necessary, and how it compared to other programs aiming to improve literate skills of early elementary students, Pinnell, Lyons, DeFord, Bryk, and Seltzer (1994) conducted a study to inquire about the following issues: whether one-to-one teaching was an essential factor; whether training teachers in the program—which is a year-long endeavor—is necessary; and whether all the Reading Recovery strategies and tasks available to teachers are effective. Three treatments were implemented to use as contrast with Reading Recovery: Reading Success, Direct Instruction Skills Plan, and Reading/Writing Group. A comparison group was also created within each school that participated in the study. The results indicated that Reading Recovery was the only treatment group for which the mean treatment effect was significant on all measures. The Reading Success group's mean treatment effects were also significant at the end of the study but did not remain by the beginning of second grade. Reading Recovery was the most powerful program in the study when assessed from year one to year two. This finding complements Sylva and Evans' (1995) study that found Reading Recovery to be the effective in the short and medium term; students who started as non-readers benefited over the long term.

Other studies have concluded with results indicating the effectiveness of the Reading Recovery program. During the 1993-1994 school year, Maine (Cobb et al., 1994) conducted an evaluation of the program and found that 74% of students had been successfully discontinued. Other jurisdictions have experienced similar results: Texas (Askew, Kaye, Frasier, Anderson, & Rodriguez, 1999) and Halifax (Canada) (Talwar, 1993).

With Reading Recovery having been the subject of more than 100 journal articles and professional presentations, evaluations that empirically evaluate its effectiveness are largely limited to various unpublished technical reports. Shanahan & Barr (1995) analyzed existing studies and reports (Huck & Pinnell, 1986; Iversen & Tunmer, 1993; Lyons, Pinnell, Short, & Young, 1986; Pinnell, Huck, & Deford, 1986; Pinnell, Lyons, Huck, & Deford, 1987) to determine average gains of the various measures; this method limits bias of a small intervention program and increases reliability of the estimate. His findings show that an average student in Reading Recovery would appear to make dramatic progress as shown by the following results: learning 15.71 letter names; increasing pre-primer words by 13.24; increasing print awareness features by 8.73; writing 31.44 more words; accurately representing 24.86 more phonemes in dictations; and improving in-text level by nine books. However, the fact that Reading Recovery is a daily intervention of 30 minutes makes it difficult to absolutely ascertain the program's effectiveness; learning is also occurring in the regular classroom in addition to maturation and out-of-school educational experiences. When students with extremely low scores in literacy achievement are chosen for an intervention, test score improvements are likely to occur that are unrelated to learning—regression toward the mean. Also, students who do not succeed in the program and are withdrawn or often absent do not have their scores reflected in research results (Shanahan & Barr, 1995).

The Reading Recovery Program is controversial. First, it is expensive. Schools are experiencing an ever-increasing number of students demonstrating academic difficulty, and school districts can fund only a finite number of special

education teachers (Lewit & Baker, 1996; Lyon, Fletcher, Shaywitz, Shaywitz, Torgensen, Wood, Schulte, & Olson, 2001). This situation results in remedial groups often having two, 10, or more students receiving help together yet their individual needs are very distinct. For a program such as Reading Recovery to focus on the needs of one individual child at a time inevitably results in remediation that happens in groups having larger numbers of students (Mathieson, 2004). Second, although the aim of the program is to bring a student's literacy skills to a level representing the average ability of peers in a classroom, research (Lyons, 1998) shows that about 60% progress to this level without needing later remedial assistance. Although these students who did succeed obviously benefited, consideration must be given to how many others received less assistance because of the one-to-one student-teacher ratio of the Reading Recovery Program (Hiebert, 1994).

Even when students do make gains in the RR Program and are discontinued because they have reached the average level of ability in literacy skills relative to their classmates, they can still need continued support. McKenzie (2001), a trained RR teacher, implemented a Literacy Booster Program in her school for this purpose. Clay (1993) comments that this may be necessary.

The context in which students come to have difficulty with literacy involves more than just inadequate practice, instruction, or even ability. Literacy is taught and modeled in schools in a manner that reflects the systemic biases of skills of the middle and upper class. Marie Clay admits this aspect of the RR Program by commenting that it "adjusts to the characteristics of the system and its populations" (Clay, 1993). Because RR does not disturb the assumptions about learners and the

underlying existing school practices, it in fact participates in sustaining the assumptions of our contemporary school system—assumptions that justify the inequitable distribution of economic and social goods of our society (Dudley-Marling, 1997).

The reason for failure with literacy skills is located within the individual. It is the student who is removed from the classroom. It is the student who failed to learn to read as expected due to having a reading disability, requiring individual support, or lacking experiences with books. When students do not meet the defined criteria of literate skills of the school system, programs such as RR portray school failure as the student's fault, not as a public or social issue (Fulcher, 1989). Constructing failure of literate practices as the fault of the student gives no consideration to the effects of racism, sexism, or social class, as some examples, as opposed to the possibility that weak literate practices may be the result of an educational system that systematically alienates significant sectors of the student population (Gee, 1990). RR facilitates the removal of responsibility for learning problems from teachers. Although some teachers practice keeping a smooth, regular classroom, others are disinterested; yet, as Clay (1992) puts it, "the majority of children...survive the various and different programs quite well" (p. 24). The progress that students in RR experience may later be lost in disorganized regular classroom programs. This can be a result of what Michael Apple (1993) calls "intensification": Teachers are so overburdened by the demands on their time and the nonsocial and disciplinary needs of their students that they have little time to reflect on their practice or provide individual support for their students.

RR advocates (Lyon & DeFord, 1993) state that many spin-offs are realized from the implementation of the program that have provoked system-wide change. The number of students retained and others placed in special programs as well as the cross-fertilization of techniques used in RR for implementation in the regular classroom are some examples. Although remedial programs such as RR have provoked curriculum changes in certain jurisdictions thanks to serendipity or the efforts of certain individuals who took up the cause, these programs should attempt to overtly aim to build in strategies for effecting systemic change. The reform efforts should include issues broader than merely how to conduct reading tutorial sessions (Dudley-Marling, 1997).

In terms of the reading process itself, RR does not acknowledge the sociocultural aspects of reading. Reading is more than a technical activity. It is a process of building on life experiences, personal interests, and decoding/comprehension skills that facilitate students' expansion of literate knowledge. Because the RR Program has justified its success in improving reading performance through standardized and norm-referenced measures in efficacy studies assessing its effectiveness, the program results in sustaining the rational structures of schooling that offer few opportunities of diverse definitions of literacy (Dudley-Marling, 1997).

Although RR uses informal measures on a daily basis, use of standardized measures for school district/state/national assessments effectively hide the literate practices that people (Taylor, 1991) generally agree are everyday forms of reading and writing. The result is that these positive skills of RR effectively become

eradicated because they do not show up on tests; the institution's instruments do not recognize them.

In portraying reading as a technical process, RR masks the ideological implications of literacy and literacy instruction. People do not learn to read; rather, they learn to read texts in particular ways relative to their social group (Gee, 1990). From this perspective, school literacy does not simply involve a set of rules to make sense of print but also to learn to read in ways appropriate to dominant groups. The attitudes and perspectives we read into texts are more than just about reading; they are about learning to read, talk, and write like White, middle-class people (Gee, 1990).

Pretending that reading is no more than a technical activity facilitates schools to privilege the literacy practices of middle-class students and at the same time undervalue the literacy skills of students from nondominant groups. Recognizing literacy as social practice facilitates our challenging school discourse practices from an ideological perspective. Instead of seeing students as illiterate, we can view them as differently literate, not as underprivileged with respect to literacy experiences but rather as having different literacy experiences. RR reinforces the assumption that literacy is a technical activity with its instructional routines and reliance on standardized measures in efficacy studies (Dudley-Marling, 1997).

At the same time, the issue of assessment in RR could be identified as a plus for nondominant, White children. In the day-to-day instructional assessments used in the program, RR measures are very closely tied to instruction. The program could also be defined as providing explicit instruction to students from minority groups and, therefore, reducing some of the advantages of White, middle-class students. However,

it is more probable that the RR Program utilizes the credibility of past assessment techniques to legitimize its own (Dudley-Marling, 1997). Continuing this practice in the beginning of the program would be acceptable; given its long history at this point, RR efficacy studies should refrain from such measures given their contradictory messages (Brown, Denton, Kelly, Outhred, & McNaught, 1999; Lyons, 1998; Pinnell, 1989; Grossen, Coulter, & Ruggles, 2004; Hiebert & Taylor, 1994).

RR supports the structure of our education system by giving the appearance of solving the literacy crisis. The systemic reasons for discrimination and poverty within our educational system cannot be solved by administrative decisions such as implementing a particular program (Mitchell, 1991). In fact, RR proponents note that the program is not a panacea for eliminating illiteracy (Pinnell et al., 1991). However, by giving the appearance that something is being done, schools seem to address the need for change while actually doing nothing (Skrtic, 1991). Although the improvement in reading skills of individual students is recognized, it is questionable whether schools have experienced meaningful change given that the structure of schooling has not really changed (Shanahan & Barr, 1988). Harvey Graff's (1979) study of nineteenth-century Canada indicates that an improvement in literacy itself did not provoke improvement in income or power for the poor. Rather, literacy skills provided advantages of vocational opportunities depending on race and ethnicity.

Even now, at the beginning of the twenty-first century, these systemic practices continue. Racism, sexism, and classism are more powerful predictors of future academic and employment possibilities than one's level of literacy. Addressing the literate needs of young elementary children through a program such as RR may

only render a more literate lower underclass. Although the program does provide “something extra” (Pinnell et al., 1991) to the lowest-achieving first-grade students (including a disproportionate representation of poor, Black, and Hispanic students), it does so for those needs that are rarely met in the regular classroom.

Herein lies the dilemma. Even though the technical aspects of reading can be achieved through programs such as RR, it is the ongoing literate practices of schools that deny the identity of these same students because reading is as much an act of an interpretive community as it is skill. Reading reform initiatives must address this to render meaningful systemic change (O’Shaussey, Lane , Gresham, & Beebe-Frankenberger, 2003; Walker, Irvin, Noell, & Singer, 1992).

Intrinsic Causes of Reading Disability

Given the challenges that students with a reading disability face in terms of trying to remediate the characteristics of difficulty, it is important to consider what could be done to help alleviate or even prevent such difficulties from even beginning to become an issue for such a student, given that other exceptionalities can be prevented from even originating in a person. Rowitz (1986) and Scott and Carren (1987) defined a three-tiered model of preventative efforts: primary, secondary, and tertiary. Primary prevention involves changing the conditions so that the disability does not even occur. Secondary prevention involves identifying the disability at the earliest possible point and changing the environment so that the person is affected as little as possible and the duration of the disorder is shortened. Tertiary prevention involves the provision of support in educational and social environments to maximize

the level of functioning and prevent further deterioration in skills.

Although it is difficult to agree on how to define a reading disability as well as who has one, it is even more challenging to identify the causal factors. In most student cases, one cannot infer a specific cause for the reading disability from the student's performance or history. If it is possible to determine the cause in rare cases, it rarely helps determine specific remedial or preventative actions for the student. If causes cannot be reliably pinpointed, primary and secondary preventative efforts are next to impossible. Teachers must resort to tertiary prevention efforts to improve the academic skills of the learner given the disorder (Rowitz, 1986).

Reading disabilities are viewed as being attributed to either within the person (intrinsic) or causal factors in the environment (extrinsic to the individual). Intrinsic factors would include the genetic etiology as advocated by Thomas (1905) and Hallgren (1950), and proven most recently in the research study of DeFries and Alarcon (1996), which identified chromosome six as the location of the genetic etiology of reading disability. Other research (Gayan & Olson, 2001; Gayan, Smith, Cherny, Cardon, Fulker, Brower, Olson, Pennington, and DeFries, 1999; Olson, Forsberg, & Wise, 1994) indicates that one of reading disability's cognitive correlates, phoneme awareness (the ability to isolate and manipulate phonemic segments in speech), is also due at least in part to heritable influences—influenced by the same genes that cause disability in reading. Another cognitive correlate, rapid naming, is considered to be a significant predictor of a child's later reading performance (Davis, Gayan, Knopik, Smith, Cardon, Pennington, Olson, & DeFries, 2001).

Brain injury is a second example of an intrinsic cause for learning disability (Raymond, 2004). Research (Begali, 1992; Savage & Wolcott, 1994) has clearly demonstrated that children's memory, an underlying characteristic of reading disability, declines after traumatic brain injury. When a learning disability preexisted the brain injury, this injury will exacerbate prior learning difficulties (Plotts, 2001). Hux et al. (1999) found that the most common special education verification categories for students who had sustained a traumatic brain injury were speech-language impairment and specific learning disability (reading disability). The younger the child at the time of injury, the greater the likelihood was of being identified. Given that most traumatic brain injuries occur between 15 and 25 years of age, the tendency for these students not to have their academic needs addressed has significant long-term vocational ramifications.

With attention deficit hyperactivity disorder (AD/HD) being comorbid with reading disabilities in the range of 40 to 60% of cases, there is a causal element of biochemical imbalance (Kessler, 1998; Raymond, 2004). This involves a dysfunction or dysregulation in the neurotransmitters of the brain. They have an essential role in attention, distractibility, and motor behavior.

A final intrinsic factor relates to actual differences in the brains of students with reading disabilities as compared to normally achieving peers. For more than a century, scientists and physicians have suspected that reading disabilities have neurobiological origins (Shaywitz, 2004). This characteristic has been confirmed across languages and cultures by Paulesu, Demonet, Fazio, McCrory, Chanoine, & Brunswick (2001). The actual reading decoding process—sounding out words—calls

on areas in the front of the brain (Broca's area) and the back of the brain (the parieto-temporal region). An equally important aspect of reading is fluency: rapid, automatic reading that does not require attention or effort. Shaywitz et al. (2002) found that the more proficiently a child read, the more he or she activated the occipito-temporal region (word form area) in the back of the brain. Students who have dyslexia experiencing difficulties with automaticity in reading develop alternate reading systems in the front of the brain and on the right side—a functioning system, but not an automatic one (Shaywitz, 2003). By not developing the critical left-side word form region that is necessary for rapid, automatic reading, they use alternate secondary brain pathways, which still allows them to read but at a slower pace and with greater effort than their classmates.

Extrinsic Factors of Reading Disability

Extrinsic factors of reading disability refer to events that may occur after birth that cause injury to the brain. Children and adults who previously had no history of reading disability may develop symptoms synonymous with people who are considered reading disabled yet have no documented history of central nervous system trauma. Motor vehicle accidents, bicycle accidents, falls, child abuse, and neglect can all result in head injuries. Although all are theoretically preventable, it is estimated that head injuries as the result of abuse range from 480,000 to 2,000,000 annually (Smith, Dowdy, Polloway, & Blalock, 1997). For mild head injuries, medical attention is not often sought, perhaps due to a child's rapid recovery from related symptoms or possibly for a perpetrator to evade criminal charges stemming

from abuse. Segalowitz and Lawson (1995) comment that the reported rate of 3% for head injuries of children 16 years of age and younger may be closer to 10 times that number due to a low reporting rate.

Soong, Chao, Jang and Wang (1999) conducted a study to assess the effects of lead levels on intelligence from children ingesting lead who lived near a lead-recycling plant in Taiwan. The study was based on a comparison analysis of two kindergarten centers: one located next to the lead-recycling plant and another located five kilometers away. The results indicated that there was a significant difference between the two groups. Children who attended the kindergarten next to the lead-recycling plant had lower intelligence levels. Following this finding, students from the lead-recycling plant area kindergarten moved two kilometers away. When this group was reassessed two years later, the difference in intelligence levels disappeared. Soong, Chao, Jang and Wang (1999) concluded that ingesting lead does impair intelligence but is at least partially reversible.

A third hypothesized cause of learning disabilities relates to diet. Benjamin Feingold (Burlton-Bennett & Robinson, 1987) has been a well-known proponent of diet restriction in order to control hyperactivity. His Kaiser-Permanente (K-P) Diet suggests the omission of artificial colors and flavors as well as foods containing salicylates with the aim of reducing hyperactivity and behavioral problems associated with learning disabilities. Thirty to 50% of those who adhered to the K-P diet experienced behavioral improvements. Feingold also commented that such food additives may have teratogenic effects on the developing fetus, provoking behavioral and learning problems later in life. Other researchers (e.g., Boris & Mandel, 1994)

have suggested that other foods such as milk, wheat, and eggs, which may be allergenic, are associated with increased levels of activity. Further research is required to establish a causal link between diet and learning disabilities (Rojas & Chan, 2005; Smith, 1997).

Child rearing practices and home variables have been associated with school achievement problems and cognitive disabilities. Although a variety of factors have often been identified as potentially causative, it would be inaccurate to isolate one factor (e.g., father-absent homes) and hypothesize the result of a learning disability. Research (Polloway & Smith, 1994; Ramey, Bryant, Sparling, & Wasik, 1985; Whitman, Borkowski, Schellenbach, & Nath, 1987) has identified a common cluster of factors such as: lack of stimulation, lack of parenting preparation or readiness, cognitive limitations of parents, and others. Of particular concern is teen mothers who can experience increased risk themselves of poor health and nutrition, substandard housing, and limited education, each of which may have significant implications for their children (May, Kundert, & Akpan, 1994).

A final area of causation of reading disabilities relates to the child's school experiences. Cohen (1971) introduced the concept of "dyspedagogia" to name this type of phenomenon: poor teaching or curricular inadequacies at a pseudoscientific level relating to causation of learning difficulties. Because reading disabilities are identified on the basis of school failure, and poor teaching is clearly a precursor or correlate of numerous cases of school failure, poor teaching may be a secondary etiological causal agent of many cases of learning disabilities. Although "dyspedagogia" does not rival chromosomal disorders as a specific cause of cognitive

difficulties, it is a major component of concern. This issue is further exacerbated by the possible mismatch between the school curriculum and the learning needs of the individual student. The concept of whole language versus a phonics-based approach to the teaching of reading has provoked much debate ("Reading First," 2002; Allington, 2002; National Institute of Child Health and Human Development, 2000; Yatvin, 2000) as to the most effective methods in facilitating students' learning to read.

Socioeconomic Status' Link to Reading Disability

Issues related to socioeconomic bias in standardized assessments and expectations of classroom practices and schools' academic standards already discussed provoke the issue of the degree to which there is a documented link between being identified with a reading disability and being in a low socioeconomic group. Samuels (1986) associates conditions in a student's home environment which affect academic performance at school: level of support for school efforts and moral standards and values fostered by the family. If school and family resources can be coordinated, student learning can be promoted (Christenson, 1990; Conoley, 1987). Although considerable evidence exists of a link between low socioeconomic status (SES) and learning problems (Blair & Scott, 2002; Bradley, 1993; Bradley et al., 1989; Molfese, DiLalla, & Lovelace, 1995; Schaimberg & Lee, 1991), there is no unanimous consensus on how students with academic challenges differ in terms of achievement, intelligence, and age relative to SES (Fletcher et al., 1998).

One central aspect of the debate hinges on the difference between low

achievement and learning disability. Whereas the IQ/achievement method of diagnosis defines reading disability as impaired learning processes within the person, low achievement is thought to be a discrepancy between age and achievement due to SES environmental factors (Blair & Scott, 2002). Fuchs, Mathes, Fuchs, & Lipsey (2002) found that the differences between the children who have a specific reading deficit and those who have a general reading delay do represent distinct populations. The degree of overlap is relative to the types of assessments being used. In general, children with reading disabilities are in the lower third of the range of scores on any given achievement instrument (Kavale et al., 1994).

Although the role of the environment is a contentious issue in the low achievement/learning disability distinction, other exceptionalities are considered to be caused by environmental factors. As much as 75% of mental retardation is considered to be caused by child abuse and other environmental factors (Raymond, 2004). Fetal alcohol syndrome has been found to be a link with students having a LD (Cone-Wesson, 2005). The physical disability of spina bifida can be largely prevented by the mother's taking 400 mcg of folic acid every day during pregnancy and before she becomes pregnant (Spina Bifida Association, 2005). When combined with poverty, the teratogenic effects of these substances/conditions exacerbate learning problems for the children affected (Cone-Wesson, 2005).

The significance of a link between SES and RD could have an important impact on prevention and remedial strategies for students with RD. Lower-class children are likely to experience difficulty with primary linguistic skills when they enter school. These deficiencies in linguistic skills affect the secondary skills of

reading, writing, and arithmetic. It is difficult for students to achieve academic success without some degree of proficiency in these skills (Kealy & McLeod, 2001).

Although it would be expected that students from lower SES families would experience more difficulties with academics than their upper-class peers, Harry (2002) comments that the exclusionary clause of the federal learning disabilities definition—economic disadvantage should not be related to a delay in academic progress—contributes to school personnel not seeking LD services for such students. LD has been traditionally a category for mostly White, middle class students because their difficulties with academics contrasted with their family/community status and general verbal skills. Coleman (1985) found that students with mild disabilities from high SES groups and continue to struggle academically had significantly lower self-concept than all other students. Research (Badian, 1998; Mantzicopoulos & Morrison, 1994), however, has contradicted these observations. Badian (1988) conducted a longitudinal study of students (N=116) from kindergarten to late eighth grade. Four of the students, who appeared to be slow starters and possibly have a RD by third grade due to being the poorest readers by this point in school, showed improvement by fifth grade and were low average readers by eighth grade. Badian (1988) found that higher SES status was a contributing factor to this progress. Four students who were considered average readers at third grade declined in reading ability by eighth grade. Contributing factors were a family history of having a LD, emotional problems, chronic illness, and low SES. Mantzicopoulos and Morrison (1994) investigated a second-grade early identification measure, SEARCH. They found that students from higher SES backgrounds were under identified while students from lower SES

families were over identified. Classroom teacher input and individual assessments provided insightful information to help identify those students who were at risk and would benefit from remediation services.

Parents' SES and level of education and those of the children with learning disabilities are strongly, positively correlated. The SES of the father in particular can have a strong influence on a child's success at school and later as an adult. If he is in a low SES category, the father will be less able to offer the financial resources for special help, offer motivation for educational objectives, offer employment opportunities for the child, have the time and conceptual understanding of the reading disability construct, and so on. Thus, the cyclical nature of school difficulties become passed on from one generation to the next (O'Connor & Spreen, 1988).

RR is intertwined with SES given the large amounts of government funding that the program has received over the years through initiatives aimed to address students living in poverty. In 1965, Congress passed the Elementary and Secondary Education Act. This was part of President Lyndon Johnson's "War on Poverty" which sought to improve the educational opportunities for students with low SES. Following the passage of this legislation, federal funds for education increased by more than 200% (History of the Federal Role in Education, 2005).

Although President Reagan later cut federal education spending by 21% and sought to abolish the federal department of education created by President Carter, he influenced educational standards for students in other ways. The national Commission on Excellence in Education was created to report on the quality of American education. The concluding report, *A Nation At Risk* (U.S. Department of

Education, 1983), concluded that the nation's education system was producing mediocre results. The prescribed remedy was the establishment of a core curriculum (academic standards) which President Reagan left each individual state to create on its own. These academic standards later provoked the issue of common standards for all students—including those with low SES.

President G. W. Bush furthered the education agenda by declaring that by 2000, all students should arrive at school ready to learn and graduation rates should be at least 90%. Although Congressional Republicans opposed an increased federal role in education, President Clinton attained passage of the Improving America's Schools Act (1994). Among the requirements, states had to use the same academic standards and standardized assessments system to measure Title I students (students with low SES) that the states use to measure the performance of all other students. In other words, a unitary system needed to be created (History of the Federal Role in Education, 2005).

President G. Bush came into office with education as a key element of his agenda. By building on the Improving America's Schools Act (1994), he aimed to create a new federal role in public education. Initially, President G. Bush's education bill (No Child Left behind Act, 2001) was well received by the Congress. However, when the General Accounting Office discovered that many schools would be defined as in need of improvement. Providing states some flexibility in defining proficiency and annual yearly progress helped resolve the concerns. With the passage of No Child Left Behind Act (2001), education spending increased once again by more than 24%. The Reading Recovery Council of North America's website includes information for

how school districts can apply for federal money to fund RR. Title I Grants are one suggested method. Title I provides financial assistance to school districts with high numbers children in low SES (Funding the Reading Recovery Implementation, 2005)

This current RTI study on RR uses free/reduced lunch status as a covariate predictor variable of SES for students identified as having a RD by 3rd-5th Grade. This aspect of the study is hindered given that IQ is deflated for low-income students; therefore it is harder for students to attain the IQ/achievement discrepancy. Also, the RR program is funded through programs aimed at students with low SES.

Faults of the Current Identification Method for RD

Although the concept of LD is stated in federal legislation (Federal Definition, 1977), regulations left the exact means to identify students for LD identification to individual states. The regulations did establish guidelines that allowed for a student's level of underachievement to be calculated with a discrepancy formula. This was met with strong negative reactions (Hallaghan & Mercer, 2002); nevertheless, the aptitude/achievement discrepancy method remained permissible, with the result that the vast majority of states were using it by the 1990s (Kavale, 2002; Reschly, Hosp, & Schmied, 2003).

Three approaches have been widely used for this purpose: ability-achievement discrepancy; low achievement for grade; and scatter or variation among various abilities possessed by a student. Ability-achievement discrepancy and scatter among abilities represent intraindividual discrepancy means of identification; low-achievement criteria consider differences between individuals relative to population

norms (Raymond, 2004).

The ability/achievement method for identification of reading disabilities originated with Barbara Bateman when she introduced the idea of discrepancy between ability (intelligence) and achievement (academic ability) in 1965 (Aaron, 1997). This intraindividual method is defined as a student's having a specific difference (e.g. 10 or more points) between an intelligence test score (e.g. WISC-R) and a standardized achievement test (e.g. Woodcock-Johnson Tests of Achievement). Other variations include the use of a regression formula to transform the achievement test's standard scores into a more comparable form to the scores obtained from an intelligence test. A systemic area of concern in using this method is that the federal government has never operationalized the formula in terms of what standard/cutoff scores should be used thereby leaving it to individual states to create their own. This leaves students who migrate from one jurisdiction to the next as being eligible in one location but not necessarily the other (Raymond, 2004).

Intelligence is such a central component of the assessment for reading disabilities in virtually all jurisdictions and universities, so much so that a student cannot be identified without an assessment of intelligence being administered (Siegel, 1999). The common argument for this is that an intelligence test provides a measure of the student's potential—that a person's IQ sets a limit as to what he or she can learn. Intelligence is defined as being comprised of logical reasoning, problem solving, critical thinking, and adaptation. However, IQ tests actually contain questions about factual knowledge, definitions of words, memory, fine-motor coordination, and fluency of expressive language; they do not measure reasoning or

problem-solving skills. They are more an assessment of what a student has already learned than of what a student can learn in the future. Furthermore, it is a paradox that a student with characteristics of reading disability would be required to take an intelligence test, given that these students have deficits in one or more of these subcomponents of intelligence tests: Their IQ score would be an underestimate of their competence. “It seems illogical to recognize that someone has deficient memory, language, and/or fine-motor skills and then say that they are less intelligent because they have these problems” (Siegel, 1999).

The most popular intelligence tests used in reading disability identification (the WISC-R and the WAIS-R) are actually composed of two subscales: a verbal (language) component (the basis for calculating language IQ) and a performance scale (the basis for calculating performance IQ). It is also possible to calculate a Full Scale score. The establishment of a cut-off score in identifying disability is an arbitrary practice and inevitably includes an element of measurement error (Francis, Fletcher, Stuebing, Lyon, Shaywitz, & Shaywitz, 2005). When students’ scores are near the cut-off, misclassification may result.

The issue of which IQ score should be used in terms of discrepancy is another question: verbal, performance, or full scale score? Research (Proctor & Prevatt, 2003) has found that although the different components of IQ identified similar numbers of students, each model identified different students. Other research (Siegel, 1988) indicates that when students with reading disabilities are divided into groups based on their IQ and compared on a variety of reading, language, memory, spelling, and phonological tasks, no differences existed between the IQ groups on the reading-

related tasks. The reading disabled group was quite homogeneous relative to reading related skills. Therefore, administering an IQ test would provide insightful information about performance differences on reading-related tasks. In terms of IQ tests being used as a component to measure the discrepancy between intelligence and academic achievement, a large number of studies (Fletcher, Francis, Rourke, Shaywitz, & Shaywitz, 1992; Fletcher et al., 1994; Jiménez-Glez & Rodrigo-Lopez, 1994; Stanovich & Siegel, 1994; Tal & Siegel, 1996) found no difference between the reading, spelling, phonological skills, and reading comprehension of individuals with reading disabilities with high IQ scores versus low IQ scores; there are no differences between individuals with dyslexia and poor readers on measures of the processes most directly related to reading. Furthermore, IQ tests do not help predict those students who would benefit from remediation (Kershner, 1990; Van der Wissel & Zegers, 1985). Other research (Stanovich, 1986, 1988a, 1988b) indicates that difficulties with reading may impede the development of language, knowledge, and vocabulary skills—the concept of the “Matthew effect.” This further complicates the relationship between reading and IQ and, therefore, the justification for using IQ in the identification of reading disabilities.

In considering intelligence assessments being replaced with RR assessment elements as predictors of students later identified as LD, the standards of predictive validity as they relate RR need to be considered. Predictive validity is defined as how well an assessment measures one’s potential for success. Principles to be addressed for predictive validity in practice are: (a) what criterion measure is being used to evaluate validity; (b) what is the rationale for choosing this measure; (c) is the

distribution of scores on the criterion measure adequate; (d) what is the overall predictive accuracy of the test; and (e) how accurate are predictions for individuals whose scores are close to cut-points of interest (Rudner, 1994)? This study's response to these criteria will be addressed later.

Students would need to demonstrate that they can learn and apply the strategies presented in the program so as to make progress through the book levels. Students who do make progress to book fifteen (considered to be representative of the end of first grade level of ability) would also need to maintain the progress made in the days, weeks, and years after the intervention was ended. If the student ended the RR Program successfully (defined as "discontinued" in the RR Program), the student would need to continue to demonstrate reading skills progress (without the daily, intensive, thirty-minute sessions) commensurate with peers in the regular classroom. This method of assessment differs with the use of intelligence tests where the difference between an IQ and achievement score determines if the required discrepancy was attained for identification.

Hovest (1997) found that about 70 to 90 percent of RR students are successfully discontinued. Research (Pinnell, 1990; Sylva & Evans, 1999) on the relationship between students' success and maintaining the success over time indicate that the RR Program has demonstrated meeting this criterion; students who begin as non-readers benefit the most from the skills learned and maintain them longer.

Because the RR Program focuses on the skills related to RD, RR has been found to be effective with a large percentage of students, and research (Pinnell, 1990; Sylva & Evans, 1999) indicates the maintenance of these skills over time, the

predictive validity assumptions of the program for possible RD identification would largely be supported. The fact that the program does not remediate all students (no one would expect it solve every student's reading problems) helps define those students who demonstrate characteristics of having a RD from those who do not. With RTI requiring demonstrated measures of predictive validity (Vaughn & Fuchs, 2003), this study would determine the predictiveness of the RR Program for RD identification. If assessment elements (beginning text level, ending text level, number of weeks) are found to be significant predictors, the RR Program as an RTI method would have evidence of predictive validity. This would support discontinuation of the IQ/achievement discrepancy method.

Conceptual Design of Response-To-Instruction

The concept of response-to-instruction as an assessment method for reading disabilities stems from a National Research Council Study (D. Fuchs et al., 2003; Heller, Holtzman, & Messick, 1982) that proposed that special education classification be determined by three criteria. First, does the quality of the general education program reflect practices that promote adequate learning? Second, is the special education program of sufficient value to improve student outcomes and thus justify the classification? Third, is the assessment used for classification accurate and meaningful? When all three are met, classification for special education is deemed valid.

Fuchs (1995) operationalized the Heller et al. (1982) model by defining the assessment process with four phases. Phase one, class-wide assessment, is tracked so

as to determine whether the classroom practices are representative of what typically happens across the school, district, state, and nation. If the mean class performance is low, then it would be appropriate to intervene at the classroom level with the aim of developing a stronger instructional program. Phase two, assessments, are completed to identify who the dually discrepant students are—those who are not meeting grade-level expectations and are not progressing over time. RR demonstrates this concept through its use of story books (in increasing levels of difficulty 0–25). If students are not progressing through the book levels during the 20 weeks, students would be meeting the criteria of dual discrepancy.

In phase three, assessment continues to determine whether classroom adaptations aiming to render the general education classroom environment more productive for any students who are seen as being at risk are effective. The assumption is that if corrective strategies fail to produce growth for the student, then there must be some type of intrinsic deficit (i.e., disability) that hinders the student in deriving benefit from an instructional environment that benefits other children. With this lack of responsiveness to instructional adaptations to general education classroom practices, phase four assesses the effectiveness of special education services for the student. If improvement cannot be documented, then there is no compelling rationale for the classification as reading disabled. These assessment phases conceptualized by Fuchs (1995) were operationalized based on the practices of curriculum-based measurement (Deno, 1985), an assessment system that facilitates modeling of students' responsiveness to instruction.

It is interesting to note that the practices of “special education services” are

not described and defined (Fuchs, 1995). Inclusion and pull-out (self-contained) programs both provoke strong arguments for and against their use. Defining the practices within a special education program facilitate fidelity of treatment and remediation goals. Reading Recovery has high fidelity of treatment among schools that implement the program (Clay, 2002).

Since Fuchs (1995) created this version of the response-to-instruction model, government agencies (Gresham, 2002) and even the President's Commission on Excellence in Special Education (2002) highlighted response-to- as an alternative to current identification methods for reading disabilities. The National Academy of Sciences (Donovan & Cross, 2002) also advocated response-to- as a method to address the overrepresentation of minorities in special education. The recent reauthorization of the Individuals with Disabilities Education Act (I.D.E.A.) (2004) provides for states and school districts to consider and use response-to- as an option for reading disability identification.

The recent discussions (Donovan & Cross, 2002; Gresham, 2002; President's Commission on Excellence in Special Education, 2002) of RTI have reinterpreted phase three of Fuchs (1995) model from a consultative, problem-solving approach consisting of adaptations in the general education classroom to a recognized, standard protocol approach (Vellutino et al., 1996) involving remediation of a student's difficulty with a relatively intensive, fixed duration (i.e., 10–15 weeks) of small-group or individual tutoring. This standard protocol approach is similar to RR (Clay, 2002) in that students are removed from the regular classroom to receive an intensive intervention in reading skills and strategies. Although this standard protocol approach

(Vellutino et al., 1996) may include small-group instruction, RR (Clay, 2002) is solely based on an individual instruction model.

Responsiveness to this intensive remediation is the operative characteristic of this response-to- model. If the student responds to this intervention, then he or she is disability free; the student would then return to the general education classroom as remediated (disability free). If the student does not respond to the intervention, the presence of a reading disability is confirmed. The persistent academic problem warrants identification for special education services.

Response to instruction provides a number of advantages over the traditional IQ/achievement discrepancy method—the “wait to fail” model. Students would be identified within an intervention context as opposed to being assessed with a “deficit.” Without standardized/norm-referenced assessments determining a deficit, racial and socioeconomic bias would be reduced. Finally, student performance with the interventions being employed with the student would be the main focus of the process (Vaughn & Fuchs, 2003).

Although these positive aspects of response-to-instruction have definite benefits, key conceptual issues about this alternative method of diagnosis for reading disability should receive further study and specificity. In the response-to-instruction model, is reading disability in fact “real”? The concept of disability has been traditionally viewed as a deficit within the individual. The existence of the disability may be influenced by the environment (general education classroom instructional methods) but not created by these contextual variables (Doris, 1986; Hammill, 1990). It may seem surprising that the response-to-instruction assessment approach focuses

on the classroom environment (adaptations to general education classroom programming) in terms of a problem-solving model, or intensive prevention trial, to index the student's response. Some might consider that students identified for special education services through such an assessment method would not have a true "disability," because no description of cognitive deficits have been included. However, the key aspect of response to instruction in the identification process is to factor out the contextual variables for possible academic failure. For those students who fail to respond to a program in which the vast majority of children learn, the failure to respond rests within the individual, not the classroom program (Vaughn & Fuchs, 2003).

Within the response-to-instruction model, an individual child's learning is measured along a continuum of academic response to instruction. Disability is determined as a fixed point on that continuum. Although some may view this process as arbitrary, many disorders are in fact determined in this fashion (i.e., emotional and behavioral disorders). Reading disabilities are far from unique in the struggle with consistent and reliable definition. Autism, mental retardation, and Asperger Syndrome are just as elusive in definition and justification. In terms of reading disabilities, they are real because they provoke challenging and lifelong effects for students and their families (Gerber, 2001).

Given the large number of students who experience comorbid conditions (i.e., attention deficit/hyperactivity disorder) with reading disability, is the deficit in learning best described as reading disability? Some researchers (Baroff, 1999; Gutkin, 1979) argue that differentiating between mild mental retardation and learning

disability renders little difference in instructional planning, although MacMillan, Spiperstein, & Gresham (1996) comment that protecting the distinction between learning disabilities and mental retardation has resulted in improved services for students with learning disabilities. In contrast, it is possible that knowledge of the contribution of conduct disorders might be valuable in planning instructional programs. These arguments would allude to the potential value of further diagnostic procedures in cases of comorbidity.

A second question is whether Heller et al.'s (1982) second criterion—whether the special education program is of sufficient value to warrant identification—can be met. If identification can be warranted only when services result in academic improvement, the assessment phase would need to be continued. Fuchs et al. (2002) described such an attempt in a Nashville school district using the response-to-instruction model. Following a failure to respond to instruction, curriculum-based measurement continued to document whether special education services were enhancing academic performance (reducing the student's dual discrepancy of low achievement and progress over time). When successful progress was demonstrated, the intervention continued and an Individual Education Plan was created. When progress was not demonstrated, the extended assessment plan was continued. The assessment team, in collaboration with the parents, collected other assessment information and considered options to describe and address the dual discrepancy. The options included, but were not limited to: (1) Using accommodations that teach the student how to access the general education curriculum despite basic skill limitations; (2) continuing the diagnostic trial period for a designated period of time; (3)

continuing the diagnostic trial period in a more restrictive placement offering additional resources for facilitating progress; and (4) continuing the special education diagnostic trial in another school building where other special education teachers/resources were available for addressing the student's needs. Thus, the extended assessment plan could lead to identifying students for whom alternative accommodations would be appropriate or possibly investigating more intensive models of special education services. With either format, curriculum-based measurement was used (Vaughn & Fuchs, 2003).

The intensity of instruction in a response-to-instruction model for reading disability identification provokes issues for further study depending on the model. Fuchs & Fuchs (1998) conceptualized instruction in terms of effective general education. Marston (2003) would allocate substantial resources to use a problem-solving approach in general education classrooms. Regardless of which of these approaches one would choose, the implication is clear that when a student demonstrates responsiveness, the presence of a disability is disconfirmed. If a student fails to respond, more intensive interventions (e.g. special education) are required. With instruction that involves short-term, intensive tutoring using a standard protocol, the implications of the assessment are somewhat less clear. If a student responds to this intensive instruction, has the presence of a disability (along with the need for special education services) been disconfirmed? Should the student be returned to the general education classroom without further support? Some children will return to the general education classroom with their academic difficulties permanently remediated whereas others will have problems resurface later. Research is needed to investigate

how many children may be false positives, true positives for whom response to instruction has remediated their difficulties, and false negatives for whom problems will later resurface (Fuchs, 2003; Fuchs, Mock, Morgan, & Young, 2003).

RTI provokes a paradigm shift in the concept of assessment and instruction. The educators will need knowledge and skills for implementing validated instructional protocols or to conduct research-based problem solving models. They will also need knowledge of curriculum-based measurement of student learning so that they know how to interpret the assessment results (Reschly, Tilly, & Grimes, 1999; Reschly & Ysseldyke, 1995).

Finally, there is the issue of due process and parental involvement to consider. It could begin when adaptations to the general education program are being considered or with short-term preventative tutoring. It could be delayed until unresponsiveness is demonstrated and a special education classification is imminent. Invoking due process early may help keep students from getting caught between general education and some type of services approaching special education. Invoking due process later would be costly in terms of personnel and time requirements for identification. Further discussion is needed (Vaughn & Fuchs, 2003).

Various Methods Used in RTI

Two identifiable groups (see Figures 2.1, 2.2) have been vigorously promoting response-to-intervention. An early intervention/prevention group (early reading researchers) is advocating use of a standard and validated treatment protocol. The second group, behaviorally oriented school psychologists, prefers the problem-

solving model. The problem-solving model has become the most widely used of these two approaches (Fuchs, Mock, & Young, 2003).

Behavioral problem-solving model. As described by Bergan and Kratochwill (1990) and Tharp and Wetzell (1969), the behavioral consultation's problem-solving approach is inductive, empirical, and behavioral in nature. The key element is "inductive" in that a student's diagnosis is based on observations made during a classroom intervention of what the student can or cannot do. Proponents of the problem-solving approach believe that no student characteristic (disability label, race, SES, and so on) is a predictor of what intervention will be effective for a student or group of students however defined.

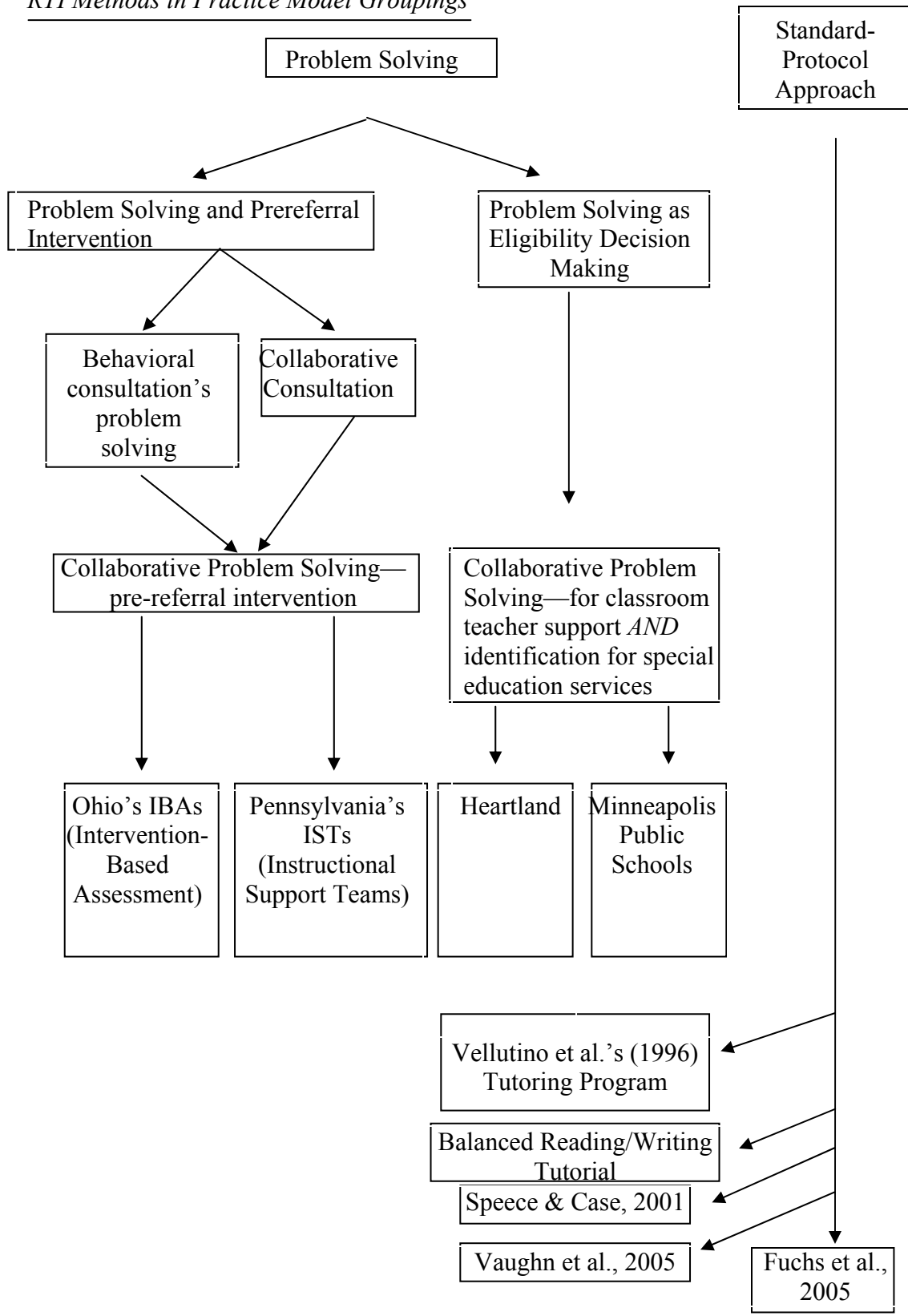
Instructional and behavioral solutions are created by evaluating students' responsiveness to a four-stage method: problem identification, problem analysis, plan implementation, and problem evaluation. *Problem identification* defines the problem through observation to ascertain a reliable estimate of its frequency, intensity, or duration. In *problem analysis*, the objective is to confirm the existence of the difficulty, determine instruction and student variables that may be part of a solution, and then put together a suitable plan. As *plan implementation* unfolds, the consultant observes the intervention and offers corrective feedback so that the intervention is implemented as planned. At the *problem evaluation* stage, the consultant and teacher assess the intervention's effectiveness. If it has been ineffective, they strategize as to how the intervention should be modified. With the behavioral problem-solving approach, there may be numerous possible solutions to a given student's difficulties in the classroom. Through trial and error, successful solutions are often achieved;

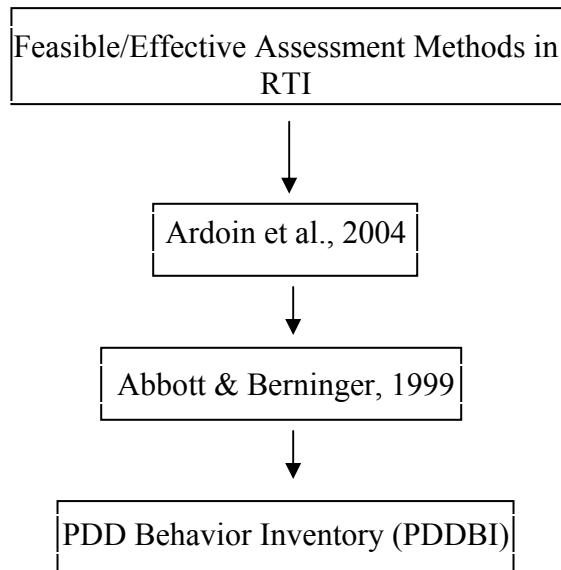
these interventions are not attempted at random but rather through thoughtful and planned instruction (D. Fuchs et al., 2003).

The behavioral problem-solving approach, as a trial and error method, requires collection of student data about the student's comportment or academic performance in RTI. Observational and performance measures are taken to establish a baseline: "Dolly was off task 75 percent of the time she was observed during math instruction; her peers, only 25 percent" (D. Fuchs, et al., 2003, p. 160). Another example is: "She correctly reads three words per minute in first-grade text, whereas the local norm is 27 words" (D. Fuchs, et al., 2003, p. 160). These comparisons both define the severity of the problem and inform goal setting.

The consultant and teacher together determine the academic improvement objectives. For example, the discrepancy of 24 words will be reduced by half in three weeks. This illustrates the "behavioral" aspect of behavioral problem solving: problems are defined within the context of student-environment situations as opposed to being characterized as facts of mental retardation, insolence, or low SES. Also, this method is triadic in nature. It involves a consultant, a teacher, and a student. The consultant should have a collegial relationship with the teacher who participates on a voluntary basis (Bergan & Kratchwill, 1990). Qualitative (e.g., Sheridan, Welch, & Orme, 1996) and quantitative (e.g., Medway & Updyke, 1985) research has concluded that consultants using behavioral problem solving are often successful in addressing a variety of student difficulties, resulting in the perspective of consultants and teachers that the method is effective and worthwhile.

Figure 2.1
RTI Methods in Practice Model Groupings





Prereferral intervention. The United States experienced a dramatic increase in the number of students receiving special education services between 1977 and 1994—3.7 million to 5.3 million; 8.3 to 12.2 percent of the general student population. This situation prompted educational administrators, politicians, and other stakeholders in education to call for action (Viadero, 1991). With the apparent overidentification of students with disabilities, prereferral intervention became the chosen solution of many. Prereferral intervention refers to the general education classroom teacher modifying instruction or the learning environment to better accommodate a student seen as being at risk prior to formal referral for testing and placement in special education. A consultant or team often consults with the teacher about the prereferral activity. The intent is to prevent inappropriate referrals by

Table 2.2
RTI Methods in Practice

Intervention	Advocates	Researchers	Participants
Ohio's IBAs	Behaviorally oriented school psychologists	Telzrow et al., 2000	N=227 IBA schools
Pennsylvania's ISTs	Behaviorally oriented school psychologists	Hartman & Fay, 1996	N=1074 schools
Heartland	Behaviorally oriented school psychologists	Ikeda & Gustafson, 2002	Not specified
Minneapolis Public Schools	Behaviorally oriented school psychologists	Reports that were completed lack descriptive data—none peer reviewed	Not specified
Vellutino et al.'s (1996) Tutoring Program	Early reading researchers (cf. Lyon et al., 2001) and professional organizations (e.g. International Dyslexia Association)	Vellutino et al., 1996	N=193

Table 2.2, Page 2
RTI Methods in Practice

Intervention	Elements of Intervention
Ohio's IBAs	Definition of the problem, baseline data, identified goal, hypothesized reason for the problem, systematic intervention plan, evidence of treatment integrity, data indicating student response to intervention and comparison of student performance to baseline
Pennsylvania's ISTs	Reading and mathematics concerns, and to a lesser extent inappropriate classroom behavior
Heartland	Level 1: Teacher confers with parents; Level 2: Teacher and school's Building Assistance Team (BAT) help the teacher select, implement, and monitor the effectiveness of an intervention; Level 3: Heartland district staff use behavioral problem solving to refine or revise the intervention and coordinate its implementation thereafter
Minneapolis Public Schools	Level 1: Teachers identify a struggling student based on achievement data collected systematically and repeatedly; Level 2: Teachers consult informally with colleagues to modify the learner's environment and facilitate growth; Level 3: A problem-solving team from within the school building considers causes of the problem, produces intervention
Vellutino et al.'s (1996) Tutoring Program	Tutoring focused on phonemic awareness, decoding, sight word practice, comprehension strategies, and reading connected text

Table 2.2, Page 3
RTI Methods in Practice

Intervention	Time in Treatment	Criterion Level of Responsiveness
Ohio's IBAs	Not specified	Not specified
Pennsylvania's ISTs	50 days	Academic learning time (ALT)—the amount of time a student spends on academic tasks of appropriate difficulty. Three observable behaviors were used as measures of ALT: Time-on-Task, Task Completion, and Task Comprehension.
Heartland	An intervention should proceed long enough to collect sufficient progress monitoring data for a decision about progress and student needs. The collection of sufficient data points on a graph usually takes 6-9 weeks.	Do not assign specific cut-off scores. The entitlement process is based on convergent data regarding (1) the size of a discrepancy between a student's performance and that of a standard (usually a peer performance standard), (2) the rate of progress during the implementation of a systematic general education intervention, and (3) a determination of student needs.
Minneapolis Public Schools	Not specified	Do not use standardized tests or label for identification; instead, students in need of assistance are referred to as SNAPs—students needing alternative programming
Vellutino et al.'s (1996) Tutoring Program	70—80 tutoring sessions (30 minutes per day, 5 days per week). Students who scored below the 40 th percentile on a basic reading skills test received an additional 8—10 weeks of tutoring in second grade	A score above the 30 th percentile on subtests of the Woodcock Reading Mastery Test-Revised

Table 2.2, Page 4
RTI Methods in Practice

Intervention	Advocates	Researchers	Participants
Speece & Case, 2001	Speece & Case	Speece & Case	First- and second-grade children in the three schools (N=694)
Ardoin et al., 2004	Ardoin et al., 2004	Ardoin et al., 2004	Third-grade students (N=77)
O'Connor & Harty, 2005	O'Connor & Harty, 2005	O'Connor & Harty, 2005	Special and general education students in two schools (N=210)
Vaughn et al., 2005	Vaughn et al., 2005	Vaughn et al., 2005	First-grade Spanish and bilingual students (N=105)

Table 2.2, Page 5
RTI Methods in Practice

Intervention	Elements of Intervention
Speece & Case, 2001	The intervention compared the dual-discrepancy method with IQ-reading achievement discrepancy and low reading achievement definitions on (a) age, racial, and gender proportions and (b) socioeconomic status (SES), reading, phonological processing, academic competence, and social skill variables.
Ardoin et al., 2004	There was no particular treatment employed. Instead, the aim was to determine the validity of reading curriculum-based measurement (R-CBM); using the median of three R-CBM would be better than in predicting WJ-R scores than one R-CBM probe, and to determine the predictive validity of R-CBM versus group-administered norm-referenced achievement tests.
O'Connor & Harty, 2005	Students were tracked (assessed) from kindergarten to fourth grade on their success with instruction in scientifically based reading instruction through the Reading First Initiative.
Vaughn et al., 2005	Phase I: English intervention for students at risk for RD (phonemic awareness, letter knowledge, word recognition, connected text fluency, comprehension activities); Phase II: Language support for the English intervention of past English Language Learners (ELLs); Pahas III: Development of the Spanish intervention for At-Risk readers who are ELLs (syllable reading, word recognition, connected text fluency, and comprehension); Phase IV: Oracy component for the English and Spanish intervention.

Table 2.2, Page 6
RTI Methods in Practice

Intervention	Time in Treatment	Criterion Level of Responsiveness
Speece & Case, 2001	One academic school year	Low reading achievement was defined as a standard score less than 90 on the WI-R Basic Reading Skill Cluster
Ardoin et al., 2004	Not specified	Results suggested that administering one R-CBM probe (as opposed to an average of three) was an effective means for identifying students in need of intervention through universal screenings.
O'Connor & Harty, 2005	Eight weeks to several years	Students who did not attain 2/3 of the progress of the rest of their class or in terms of absolute skill levels (.75 standard deviation below classmates on the measured skills).
Vaughn et al., 2005	Eight-month daily intervention (October to May)	Effectiveness was measured by statistically significant differences between intervention and comparison groups. No defined level of responsiveness was stated.

Table 2.2, Page 7
RTI Methods in Practice

Intervention	Advocates	Researchers	Participants
Fuchs et al., 2005	L. Fuchs, Compton, D. Fuchs, Paulsen, Bryant, & Hamlett	L. Fuchs, Compton, D. Fuchs, Paulsen, Bryant, & Hamlett	41 first-grade classrooms in 10 schools
Abbott & Berninger, 1999	Abbott & Berninger, 1999	Abbott & Berninger, 1999	Fourth- through seventh-grade students (N=20)
PDD Behavior Inventory (PDDBI)	Cohen, Schmidt-Lackner, Romanczyk, & Sudhalter, 2003	Cohen et al., 2003	Parents and teachers who completed behavior inventories (N=270), groups of two teachers who completed the behavior inventories (N=49) on the same student
Balanced Reading/Writing Tutorial	E. Abbott, Reed, R. Abbott, & Berninger, 1997	E. Abbott, Reed, R. Abbott, & Berninger, 1997	First-grade students (N=16)

Table 2.2, Page 8
RTI Methods in Practice

Intervention	Elements of Intervention
Fuchs et al., 2005	Intervention consisted of small-group tutoring and individualized computer practice in 40 minute sessions. Tutoring occurred in groups of two to three students, three times per week for 16 weeks. At the end of each session, students worked individually for an additional 10 minutes on software designed to promote automatic retrieval of math facts.
Abbott & Berninger, 1999	One half of the students received structural analysis and alphabet principle training; the other group received only alphabetic principle training; all were instructed in orthographic and phonological skills, practice in oral reading of connected text, and monitoring strategies for comprehension.
Cohen et al., 2003	The PDDBI (Pervasive Developmental Disorder Behavior Inventory) includes Likert-type scales that independently address maladaptive or adaptive behaviors. This facilitates behaviors being assessed over different lengths of time (i.e. aggressiveness, expressive language skills).
E. Abbott; Reed, R. Abbott; & Berninger, 1997	Consisted of standard, scripted lessons including: orthographic and phonological coding, phonics based on a connectionist framework, word families, sight words, contextual reading to promote decoding and fluency, comprehension (question answering and story retelling), handwriting automaticity, spelling, and composition.

Table 2.2, Page 9
RTI Methods in Practice

Intervention	Time in Treatment	Criterion Level of Responsiveness
Fuchs et al., 2005	Tutoring occurred three times weekly for 16 weeks.	To identify at-risk students, their CBM scores were averaged across weeks 3 to 5 (e.g. in September), using a cutpoint of less than 11 correct problems.
Abbott & Berninger, 1999	16 one-hour individual tutorials over a four-month period	There were no pre-determined criteria stated. Significant differences between groups were investigated with standardized reading and related measures.
Cohen et al., 2003	Not specified	None specified. Component factor analysis was used to determine the construct validity of PDDBI.
E. Abbott, Reed, R. Abbott, & Berninger, 1997	A year-long individual tutorial—one hour, once a week, from the end of first grade to the end of second grade	None specified. Hierarchical Linear Modeling(HLM) and Analysis of Variance (ANOVA) were used to analyze students' growth.

helping the teacher be more effective with a greater range of children (D. Fuchs et al., 2003).

Collaborative problem solving. Two versions of prereferral intervention have developed: behavioral consultation problem solving (e.g., D. Fuchs & Fuchs, 1989; D. Fuchs, Fuchs, & Bahr, 1990; D. Fuchs, Fuchs, Bahr, Fernstrom, & Stecker, 1990; D. Fuchs, Fuchs, Harris, & Roberts, 1996; Ponti, Zins, & Graden, 1988) and collaborative consultation (e.g., Friend & Cook, 1992; Pugach & Johnson, 1995) that gives more attention to interpersonal relations. Chalfant, Pysh, and Moultrie's (1979) Teacher Assistance Teams have become well-known and widely implemented. It is meant to be a team approach "of teachers and for teachers." Specialists normally are not part of the team. However, the effectiveness of collaborative consultation and Teacher Assistance Teams is not well documented in research (Sheridan et al., 1996).

Some states have combined "behavioral consultation's problem solving" and "collaborative consultation" into their new creation: "collaborative problem solving." Multidisciplinary teams composed of specialists (behavioral problem solving) and teachers (collaborative consultation) are trained in both the four-stage problem-solving process (dual discrepancy) and interpersonal relations. Part of the reason for this combined method's popularity relates to its efficiency in delivering prereferral intervention to many teachers in a school as well as many schools within a district (D. Fuchs et al., 2003). They also reflect a movement in education that promotes collegiality, bottom-up decision making, and egalitarianism (D. Fuchs & Fuchs, 1996).

Two states have implemented versions of collaborative problem solving: Ohio

and Pennsylvania. Ohio's Intervention Based Assessment (IBA) began in 1992-1993 as a voluntary school-based initiative. The aim was to produce treatment plans for nondisabled students who have behavior/learning problems or as part of an evaluation for students with suspected disabilities specifying effective interventions to be incorporated into their IEPs. Telzrow, McNamara, and Hollinger (2000) describe IBA as a behavioral problem-solving model with collaborative consultation components that include: a behavioral definition of the problem; baseline data; explicit goal setting; a possible reason for the problem; an intervention plan; evidence of fidelity of treatment implementation; student responsiveness-to-treatment data; and comparison of student performance to baseline. Multidisciplinary teams conduct these activities. The teams are to at least include the principal, school psychologist, special education teacher, and classroom teacher.

A statewide evaluation (Telzrow et al., 2000) of the program found that Ohio's IBA multidisciplinary teams' problem-solving implementation was often inconsistent and below desired levels of consistent practice. For example, the problem-solving component was found not to be implemented in a standardized fashion; instead, the respondents often merely indicated that a treatment had occurred—implying that it was not necessarily the intended treatment. These findings are all the more noteworthy given that Telzrow et al. (2000) deliberately invited schools to participate and gave them sole discretion over the student cases submitted—those cases that were most accurate and effective in the implementation of the collaborative problem solving method.

Pennsylvania's Instructional Support Teams (ISTs) are possibly a well-known

statewide prereferral intervention program. Like Ohio's IBAs, the ISTs exemplify collaborative problem solving with the objective of providing prereferral intervention. However, in ISTs, a support teacher supports the classroom teacher implementing the prereferral intervention. IST membership also consists of the student's teacher, the principal, and specialists as needed (Kovaleski, Gickling, Morrow, & Swank, 1999).

Prereferral collaborative problem solving provides the intervention component of RTI, but there is no predetermined cut-off measure that defines whether the student has met the goals of the remediation. These programs are so individually based that measures of success are determined solely on individual students' cases.

In using curriculum-based assessment (for academic concerns) and behavioral assessment (for behavioral concerns), ISTs aim to empirically define a student's difficulties. Based on assessment data, a goal is set and an intervention plan is created. The instructional support is restricted to fifty days. At this point, the IST meets to review the student's progress and decide whether further assessment is necessary. If little progress is being made, a multidisciplinary evaluation is administered for possible special education placement (Conway & Kovaleski, 1998).

Although research (Kovaleski, Tucker, Duffy, Lowery, & Gickling, 1995) indicates high fidelity of implementation (98%) of Pennsylvania IST members, there is no explanation of what schools had to do to achieve "validation" nor the means of calculating the 98% figure (D. Fuchs et al., 2003). Hartman and Fay (1996) investigated IST implementation in 1,074 schools between 1992 and 1994. The use of ISTs led to fewer special education referrals, a decrease in special education placements, and a reduction in grade retentions.

Another variation of the collaborative problem-solving model used in Ohio and Pennsylvania is a three- or four-level version that seeks to both provide support to classroom teachers and to identify students for special education services. When a student fails to respond at one level of assistance, more resources and expertise are incorporated into the next level of support. Two of the best-known examples are Heartland Area Educational Agency and Minneapolis Public Schools (Grimes, 2002).

Heartland is one of 15 Iowa educational agencies. As part of a reform initiative to provide educational assistance for students seen to be at risk, a four-level problem-solving model was created. Level one involves a teacher conferring with a student's parents to try to remedy the academic or behavioral issue. Level two consists of the teacher and Building Assistance Team (BAT). They convene to identify and analyze problems to help the teacher select, implement, and monitor the success of an intervention. If this level does not achieve success, level three incorporates Heartland staff; they are mostly doctoral-level or master's-level school psychologists and special educators who use behavioral problem solving to revise or redesign the intervention and oversee its implementation. Finally, at level four, special education assistance and due process protections begin.

At all four levels, the practices of the problem-solving process are meant to be identical: practitioners determine the extent of the problem, consider its causes, devise a goal-directed intervention, implement it as planned, monitor the student's growth, modify the intervention relative to student responsiveness, evaluate effectiveness, and plan future action (Grimes, 2002). Ikeda and Gustafson (2002) comment that Heartland's recursive, multilevel problem-solving model offers several

advantages over the traditional psychometric approach to identifying students for special education services: (a) The model leads practitioners to collect thorough and instructionally relevant assessment data; not using cut scores (i.e., a standard score of 85 on an achievement test) forces decisions to be made using multiple sources as convergent evidence (Ikeda & Gustafson, 1996); (b) Heartland's model provides for a means to associate the originating problem, methods of assessment, and interventions; and (c) the model is noncategorical (students found to be eligible for services are not labeled as reading disabled, for example), thereby rendering the positive aspect of students receiving services who might otherwise not have qualified.

As with Ohio's IBAs and Pennsylvania's ISTs, the research (Ikeda & Gustafson, 2002) documenting the results of Heartland's program is inconclusive according to D. Fuchs et al. (2003). Although Ikeda and Gustafson (2002) conclude that the number of problems addressed without special education resources was 75%, only 4% of Heartland's schools were involved in the Year 1 evaluation; also, it was not stated whether the study's participants are representative of Heartland. They also report that in Year 1, 25% of students brought before BATs were seen previously; in Year 2, 34% were referred to BATs. This implies a large proportion of false-negatives (students whose difficulties were determined as "resolved" by BATs yet continued to perform poorly in general education). This study therefore does not support the claim that Heartland's multilevel problem-solving model provides "educational assistance in a timely manner" (Grimes, 2002).

The Minneapolis Public Schools' Problem-Solving Model (PSM) is very similar to Heartland with its use of a four-level, behavioral problem-solving model,

and non-use of commercial tests, cut scores, and labels for special education services. One variation is that Minneapolis's team consists of personnel from within the school building whereas Heartland's consultants were staffed from outside the school. Minneapolis Public Schools (2001) states that its PSM has undergone considerable evaluation; however, D. Fuchs et al. (2003) found few either published or unpublished evaluations, and none appeared in peer-reviewed journals. For example, one of the evaluations commented that reading gains on a school-wide level were significantly higher at PSM sites than at non-PSM sites. However, no data were presented about the academic performance of the children or about the definition of "superior" for the superior-quality PSM interventions. Hence, no rigorous data exist about the academic progress of students who participate in PSM or even about the nature of PSM interventions (Deno, Grimes, Reschly, & Schrag, 2001).

Minneapolis' objective in using RTI as the method of identification for reading disabilities as opposed to the traditional method was to change the number and type of students identified. However, although PSM aims to provide interventions that reduce the need for identification, it did not reduce the number of students classified as needing special education services (Marston, 2003). Students who required SNAPs (Students Needing Alternative Programming) would theoretically perform lower on achievement tests than students identified by traditional methods, given that SNAPs would have demonstrated unresponsiveness to three increasingly intensive levels of service. Research (Heistad & Spicuzza, 2000; McNamara & Hollinger, 2002) gives evidence of this likely outcome.

Problem solving models summary. All four models (Heartland, Minneapolis,

Ohio, and Pennsylvania) use response-to-instruction to offer instructional support in a timely manner and identify students for special education services. However, they differ in several respects. Ohio and Pennsylvania have the teachers (or teacher helpers) explore responsiveness to student prereferral intervention programs with a time-limited intervention in the general education classroom. If the students do not make adequate progress, the student is referred to a multidisciplinary team for formal evaluation and possible identification as an exceptional student. In contrast, Heartland and Minneapolis offer multiple levels of treatment to the teacher and student; as the unresponsive student moves on, more resources and increased expertise are included. Hence, Heartland and Minneapolis use a recursive and increasingly intensive prereferral intervention process. The primary goal is remediation rather than identification.

Second, Heartland and Minneapolis students for whom the multilevel approach is not effective usually move directly into special education services without formal testing by multidisciplinary teams—in contrast to students in Ohio and Pennsylvania. Third, Heartland and Minneapolis do not use labels: Heartland refers to these students as “eligible for special education”; Minneapolis refers to them as SNAPs. Finally, although there is insufficient evidence for the RTI approaches in Ohio and Pennsylvania, this is especially true for Heartland and Minneapolis. Studies on these last two sites are few in number or unpublished; involve small or undefined samples of schools, teachers, and students; contain little information about the interventions that were implemented and their degree of accuracy or effectiveness; and do not report on how long the unresponsive students remained unresponsive

before receiving effective remediation. These factors weaken the assumption of the concept of RTI given that it must provide timely, feasible, and effective interventions for students as well as distinguish struggling students with disabilities from others having difficulty due to inadequate instruction (D. Fuchs et al., 2003).

Standard protocol method of RTI. In contrast to the problem-solving model, a standard protocol approach to RTI mandates the use of a standard empirically validated treatment for all children with similar problems in a given domain. The benefits of a standard protocol approach are that everyone knows what to implement, it is easier to train practitioners to implement one intervention correctly, and this method facilitates assessment of implementation. If validated by previous rigorous research, another advantage would be that many students would participate in a generally effective treatment protocol (D. Fuchs et al., 2003).

One example of this model (Velluntino, Scanlon, Sipay, Small, S. Pratt, R. Chen, et al., 1996) asked first-grade teachers to nominate the poorest readers in their classes at the beginning of the school year. Students who score in the lowest fifteenth percentile on either the Word Attack or Word Identification subtests of the Woodcock Reading Mastery Test-Revised (WRMT-R) (mean of one hundred, standard deviation of fifteen) were potential study participants. Velluntino et al. (1996) excluded those who had characteristics of other exceptionalities (i.e., severe hearing or vision problems, severe emotional disturbance, and frequent ear infections). Other students not considered were those who took daily medication, spoke English as a second language, and had a diagnosis of pervasive neurological disorder. Students were also eliminated as participants if their Verbal or Performance IQ was 90 or below.

At the beginning of the second semester of first grade, the students with low reading skills who remained were put into tutoring and contrast groups. Tutored students received 30-minute, one-to-one intervention five days each week (about 70–80 tutoring sessions). Velluntino et al. (1996) trained the instructors (certified teachers) for 30 hours in how to administer the program. The program focused on phonemic awareness, decoding, sight-word practice, comprehension strategies, and the reading of connected text. If by the fall of second grade tutored students were still below the fortieth percentile on the Basic Skills Cluster, they participated in an additional eight to ten weeks of tutoring.

Between the winter of first grade and spring of second grade, students continually completed the Word Attack or Word Identification subtests of the Woodcock Reading Mastery Test-Revised (WRMT-R). RTI was based on linear regression analysis of the WRMT-R data. There were four levels of responsiveness: “very limited growth,” “limited growth,” “good growth,” and “very good growth.” After one semester of tutoring in first grade, two-thirds of the tutored students demonstrated good to very good growth; they had basically caught up to their normally achieving peers. The other third of the students remained in the lowest thirtieth percentile even with receiving tutoring in first and second grade. Whereas the top two-thirds of the class who had shown progress were considered not as reading disabled but “instructionally disabled,” this bottom third was defined as “difficult to remediate” by Velluntino et al. (1996).

RR would compare to the standard protocol approach in that it is a daily, early-elementary remedial program to address areas of weakness in reading skills.

However, RR is more of a strategies-based method of instruction as opposed to focusing specifically on phonemic awareness, for example. RR does not involve worksheets or wrote memorization drills. Rather, students are led to experience and learn through text in a variety of forms with the leveled books used in the program (Clay, 2002). Instead of doing scripted lessons, RR's tailored, non-scripted lessons to the individual student's needs should promote literacy skill growth for each student who participates in the program; this would encourage progress for each individual student to occur over the course of the 20 week, 30 minute, daily intervention (100 sessions in total).

This example of the standard-protocol approach for RTI exemplifies rigorous experimental work to exemplify the standard-protocol approach's capacity to help improve young students' reading development. Although the strategies employed in this example method could be defined as "rich" and "comprehensive," it is questionable to what degree it is appropriate for all struggling readers (i.e., students with an IQ below 90). Although the intervention (Vellutino et al., 1996) is adequately described to be replicated, how many schools have the resources to provide all poor readers with 70 to 80 sessions conducted by well-trained staff?

Other examples (Fuchs, Compton, Fuchs, Paulsen, Bryant, & Hamlett, 2005; O'Connor & Harty, 2005; Speece & Case, 2001; Vaughn, Mathes, Linan-Thompson, & Francis, 2005) of the standard protocol approach to RTI contain variations of Vellutino et al.'s (1996) approach. Vaughn et al. (2005) created an intervention for English Language Learners (ELLs) who were at risk for RD. The actual intervention consisted of activities to address the English and Spanish language needs of the

students served on a daily basis over an eight-month period. Effectiveness of the intervention was measured by a statistical analysis to a comparison group. Fuchs et al. (2005) created an intervention for first-grade students requiring assistance in mathematics. In small groups (two to three students) meeting three times a week for 16 weeks, students were tutored for 40-minute sessions and worked individually on math fact retrieval for an additional 10 minutes. Success with the intervention was measured by an average of their curriculum-based measurement scores over a three-week period. Speece & Case (2001) compared the dual-discrepancy approach with the IQ-reading achievement discrepancy method. Success with the intervention was determined with a standard score of less than 90 on the Woodcock-Johnson-Revised Basic Skills Cluster.

Some RTI researchers (Abbott & Berninger, 1999; S. Abbott, Reed, R. Abbott, & Berninger, 1997; Cohen et al., 2003) have chosen not to specify criterion levels of responsiveness. Instead, they have looked at their measures of student growth in terms of statistical significance. Abbott & Berninger (1999) found that after 16 one-hour individual tutorials over a four-month period, students who received structural analysis and alphabetic principle training improved reliably in reading and related measures. S. Abbott, Reed, R. Abbott, and Berninger (1997) found that after a year-long reading and writing intervention of 16 first-grade students, the lower-performing students resulted in being treatment responders. Cohen et al. (2003) investigated a means to assess an intervention with a rating scale (Pervasive Developmental Disorder Behavioral Inventory [PDDBI]). The PDDBI was found to be a consistent and reliable measure for diagnosing PDD.

In comparing the two approaches to RTI (standard-protocol approach and the problem-solving model), the standard-protocol approach seems more likely in principle to provide for better quality control. The problem-solving model is likely to be more sensitive to each student's academic and behavioral characteristics.

Although Velluntino et al. (1996) have indicated a cause-and-effect relationship, educators using the problem-solving model have been unsuccessful. Although the standard-protocol approach has been used exclusively by researchers, it is yet unknown how it would work out if adopted by schools. Given the Bush administration's call for "scientifically based" methods to be used in schools, proponents of the standard-protocol approach and the problem-solving model must still prove their worthiness of being defined as "scientifically based" (D. Fuchs et al., 2003).

This study's use of RR would incorporate the standard-protocol approach of RTI. This research will further the educational field's knowledge of RTI and its effectiveness in identifying students as RD at an early point in elementary school based on the current definition of RD as practiced by school districts. Created definitions of RD that include the low levels of academic abilities in reading that are common in students with RD will be analyzed for comparison. These findings will illustrate the degree of effectiveness in the RR Program being used for RTI as well as illustrate the process of identification excluding the use of IQ.

Psychometrics of Running Records

Psychometrics is defined as a measurement of a person's measuring

knowledge, skills, abilities, or personality (Psychometrics, 2005). This study of the RR Program includes an investigation students' reading level. This is assessed with a form of oral reading assessment called a running record. They are a key assessment component of the RR Program because a student must attain a score of 90% on a book level running record to progress to the next book level. It is the underlying psychometrics of running records that define the processing skills and weaknesses of students' oral reading and literacy skills.

Based on the format of reading miscue analysis (Goodman, Watson, & Burke, 1987), they involve a kind of shorthand notation of a child's reading of a 100-word text. Elements of this assessment process include a calculation of the number of the 100 words read correctly (accuracy rate, often also called error rate), the number of self-corrections per the number of errors (self-correction rate), and a determination of each error as to whether it stems from a student's difficulty with meaning (M), syntax (S), or visual (V) elements (letter, cluster, or word) of the text (Clay, 2002; Pinnell, DeFord, & Lyons, 1988).

Clay (1991) contends that students who are reading for meaning will notice an error as soon as they have made it. The reader must make a decision as reading continues. At this point, the reader is metacognitively entertaining choices as to which possible response should be kept and which should be discarded. As a beginning reader performs this self-regulatory action, self-observation and assessment of the reader's behavior is performed—has the word been solved; is it right? When the chosen word makes sense with the student's known world, the search for the now-recognized word is over.

Typically achieving students are resourceful in using their experience to find cues, strategies, and solutions. They ask what resource might help me? How do I know this? Does the sentence make sense in context? Students who experience difficulty with the reading process, however, will need individual and special instruction to help develop these skills of strategic reading. The running record assessment is a means to analyze students' metacognitive reading processes with the aim of developing students' problem-solving strategies in reading.

Schmitt (2001) investigated 27 first-graders' development of strategic reading processes for detecting and correcting errors, problem solving new or difficult words, and confirming responses as they participated in the RR Program (Clay, 2002) instead of focusing only on the students' recognition of words and letters, as often occurs in special assistance programs. Oral reading of continuous text was analyzed at three points during the study: at the beginning of the research study, at text level five, and at text level ten. Running records were collected and analyzed for the 27 children at each of the three levels based on their having achieved a 90 to 94% accuracy rate with the text being used. The results indicate that the students make significant gains in self-monitoring (recognizing dissonance, searching further to make information sources match, and so on) and problem solving (rereading to confirm, self-correction, and so on), and they decreased the proportion of attempts made for each target word (from 96 to 56%). A qualitative analysis of two of the students' running records who had reached level 10 demonstrated the differences in gains that students will experience; for example, one student improved his self-monitoring skills by 70% whereas another gained by 24%. Analyzing student changes over time can help to

inform instructional practices. Estice (1997) concurs with this perspective by commenting that it is the pattern of students' responses that inform teaching priorities. One other interesting finding from this study (Schmitt, 2001) was that no main effects were found for students regardless of their entry-level point at the beginning of the study. This finding suggests that instruction that includes the use of running records can be successful regardless of entry point and that success or failure cannot be predicted with entry-level skills. This study includes beginning text level as a predicting variable (PV) to support this finding as well as the concept that one assessment is not a meaningful means to determine special education eligibility. A student's progress over time in an intervention which addresses the area of academic difficulty should be more comprehensive in defining RD/non-RD status.

Kelly, Klein, and Neal (1993) analyzed 30 running records of first-grade children participating in Reading Recovery. Although self-corrections were infrequent during the initial sessions, they became much more frequent as the students progressed during the program (from minimal and unrelated use of cueing sources to a self-correction ratio of 1:2 by lesson 30). Meaning and structure appeared to be the primary cueing sources for solving difficult text; this also supported students' development of using visual cues to self-correct reading errors. This parallels Schmitt's (1993) findings that students improved their metacognitive knowledge in learning to read. The research of Kelly et al. (1993) also indicate that at-risk emergent readers use their knowledge of the world and familiarity with language structure when they begin to learn to read.

In summary, the psychometrics of running records include observations and calculations of students' oral reading ability. With accuracy rate, self-correction rate, and visual/semantic/meaning cues, students' ability to decode words is measure and analyzed to determine what reading strategies can be modeled for the students to practice and employ in literacy tasks.

Reliability and Validity Research of the RR Program

Clay's (1966) dissertation research found that the reliability of trained observers' scoring of error and self-corrections five-year-old students' reading over a one-year period. The results rendered no significant differences between observers who scored the errors and self-corrections at the .01 level which demonstrates the consistency between observers' scoring There was a correlation of .98 for errors and .68 for self-correction rate. During the reliability tests, a number of trends were noticed: (a) For beginning readers, observers can use Running Records, which give reliable accuracy scores with a small amount of training; (b) the effect of poor observation is to reduce the number of errors recorded and increase the accuracy rate; (c) as the observer's skills in recording at speed increases, so the error scores will tend to rise; (d) to record all error behavior in full, as opposed to merely tallying its occurrence, takes much more practice (but provides more evidence of the child's processing strengths); (e) observations of poor readers require longer training to reach agreement on scoring standards because of the complex error behavior; (f) information is lost on taped observation, especially motor behavior and visual survey, but observation of vocal behavior tends to be improved; (g) reliability probably drops

as reading accuracy falls because there is more behavior to be recorded in the same time span (Clay, 2002).

Clay (2002) also comments about the various aspects of validity of the Observational Survey component of the RR Program. Content validity is defined as an assessment that reflects the curriculum as taught (McKenna & Stahl, 2003). Running Records assess areas of literacy such as letter identification, concepts about print, and the process of word reading. These tasks represent what is actually taught in the classroom. Because the tasks are reasonable and usable for the five-year-old age group, Running Records have content validity.

Concurrent validity relates to the scores for an established measure (i.e., curriculum assessment) and a new measure (i.e., Running Records); if the two scores are highly correlated, this would be regarded as validity for the new test (McKenna & Stahl, 2003). Clay (1966) reports that in a study of test and behavior variables with 100 New Zealand school children six years of age, concepts about print with word reading had a correlation of .79, and letter identification with word reading was .85. In terms of predictive validity (predicting future performance or success), correlations between these measures continued to remain high (.64 to .86).

In terms of this current research study on Reading Recovery's predictiveness for assessing reading disabilities, past research (Clay, 1966) on running records indicates that they are effective means to assess student's reading behaviors. With reading disabilities being characterized as difficulties with phonemic awareness, speech perception, vocabulary skills, phonetic working memory, and syntax and semantics, these processes are key aspects of the running record assessment. Students

who have difficulties with these skills will probably attain low running record scores—even though the text came from the RR Session the day before. Students who progress in reading skills will be able to achieve a score of 90% accuracy or more for a given book level; this will indicate that the student is ready for a new book level.

Summary of Literature Review

Students' ability to learn to read is based on a variety of factors. While their own biological characteristics and social and family background can have a definite impact, systemic educational practices developed over time such as classroom curriculum methods also play a significant role in students' demonstrating scholastic success at school. The result is a need to distinguish the students who are succeeding with reading skills from those who are not.

The current method, which relies on a discrepancy between IQ and academic achievement, is clearly not meeting the needs of many students because of standardized assessments' social and racial biases; it also delays identifying a student for special education services until age 9 or fourth grade, which is late in terms of the student's development. This situation has provoked the need for alternative means to identify students who experience difficulty with reading skills.

RTI is being advocated (Fletcher, Francis, Rourke, Shaywitz, & Shaywitz, 1992; Fletcher, Francis, Shaywitz, Lyon, Foorman, Stuebing, & Shaywitz, 1998; Shaywitz, Fletcher, Holahan, & Shaywitz, 1992) as an alternative method to replace the traditional means of assessment for identification. The central practice in this method is to provide students deemed dually discrepant in reading skills with an

intervention that attempts to address their reading weaknesses. Current examples in practice include the standard-protocol approach, which uses an empirically validated treatment for all students with similar difficulties in reading; however, students are nominated for this intervention based on scores from a standardized test (a practice deemed to be flawed with the IQ/achievement method of identification). The problem-solving model considers students as individual cases and augments the classroom intervention resources offered to individual students as they demonstrate academic need.

This study examines the predictiveness of RR variables as a method of identification for reading disabilities: beginning text level, ending text level, number of weeks of participation in the program, and free/reduced lunch status of the student participants. Although the effectiveness of the program may be debated, it is a widely used program to assist struggling first-grade students who are experiencing difficulty with literacy skills.

The RR Program meets the criteria of RTI research given its pass/fail component of students progressing to book 15 after 20 weeks of daily, 30-minute sessions. If variables analyzed are found to be significant predictors of students later being identified as reading disabled, this remedial program could be used with students in first grade to help them with their reading skills. It would also identify those in need of being deemed as a student with a reading disability in order for such students to receive intensive special education services after the intervention has ended.

Chapter 3

Methodology

Procedures

Data collection. Ten special education directors (Special Education Directors, Title I Directors, and RR Teacher Leaders) of school districts in a midwestern state were contacted to determine their interest in participating in a study about Reading Recovery's (RR) predictiveness for students later identified as reading disabled. Four responded (school districts A, B, C, and D) pending school district human subjects' approval. After this was obtained, RR Teacher Leaders and special education staff began compiling current third through fifth grade students' names of those who had participated in RR during first grade. Students were categorized as by now having been formally identified as reading disabled or nonreading disabled.

With the implementation of federal privacy legislation (Health Insurance Portability and Accountability Act, 1996), the four school districts chose to interpret this law and therefore assist in data collection in different ways. School district B provided the researcher with the names and addresses of students who fit the criteria for the two groups of the study. Parent permission forms were mailed by the researcher with a request that the parent sign the form and return it in the provided return envelope. This school district later agreed to provide additional student data anonymously without identifiers (i.e. names, school building) for the reading disabled group. Two other school districts (A and D) chose to mail parent permission forms themselves so as to protect initial parent/student confidentiality; parents who chose to have their children participate returned the permission form in the provided envelope

to the principal researcher. School district C would agree to participate if it could provide the data anonymously. Given the various methods used to attain the student data and an unknown exact number of parent permission forms mailed out by districts that chose this method, response rate cannot be calculated.

Data were provided to the researcher via mail or email or was collected from staff during a visit to the school district. Due to HIPA regulations, the researcher did not search students' files directly; school district staff provided all data in the form of a hand-completed chart or computer file (EXCEL, 2003). School district D later concluded that it could not provide the free/reduced lunch statistics for its students due to the district's interpretation of HIPA regulations. Hence, these students were not included in the sample.

Measures/Variables

Grouping variables. Students (N = 165) identified as RD or non-RD comprised the grouping variables (GVs) for Analysis 1 of the sample. The definition of RD for this analysis reflected that used by school districts: an IQ/achievement discrepancy of eighteen points (Division for Exceptional Learners, 2005). Students who were identified as having an LD based on this definition completed the Weschler Intelligence Scales for Children (WISC-R) assessment as the IQ component to determine identification. Of the 35 students having a LD (based on the school districts' definition) in the sample, School district A had 4 students, school district B had 20, and school district C had 11 students.

Analysis 2 was based on a researcher-created RD definition of reading composites scores <30 (N = 55 RD, 100 non-RD students). Analysis 3 (N = 35 RD, 120 non-RD students) used a second researcher-created definition of RD: reading composite <23. Analysis 4 (N = 21 RD, 134 non-RD students) used a third researcher-created definition of RD: reading composite <15.

Standard protocol for discriminant function analysis requires that the comparison-group size (RD group, in this study) be five times the number of variables in the equation (4 variables [beginning text level, ending text level, number of weeks, and free/reduced lunch status] x 5 = 20) (Tabachnick, & Fidell, 2001). Therefore, the RD group size was at least twenty students for each analysis.

WISC cognitive assessment. The recent version of the WISC (R, III, or IV) administered to students in this sample could not be definitively ascertained from school districts. These more recent versions of the assessment would be most probable. The Weschler Intelligence Scales for Children were originally created in Weschler (1949) as a means to assess children's cognitive skills ("Weschler: Intelligence Scales for Adults and Children [1939 – present]", 2005). The WISC-R (1983) version was created as a means for clinical researchers and practitioners to assess a student's intelligence. The test is considered appropriate for students aged 6—16 and can take 50—75 minutes to administer (M=100, SD=15). The assessment was standardized with a sample of 2,200 American children considered to be representative of the general student population on the basis of the 1970 U.S. Census. The actual test consists of 13 subtests divided into two scales: a Verbal Scale and a Performance Scale. The Verbal subtests are composed of language-based items. The

seven Performance subtests assess visual-motor skills that are less dependent on language. Five subtests from each of the two scales contribute to a Full-Scale Score. The scale of standard scores are categorized as follows: deficient (0—70), borderline (70—80), low average (80—90), average (90—110), high average (110—120), superior (120—130), and very superior (130—135) (“Weschler Intelligence Scales for Children-Revised” [WISC-R], 2005).

WISC’s validity and reliability. Smith, Buckley, and Shine (1996) compared the WICS-R and WISC-III versions of the cognitive assessment with native Alaskan students. Differences in scores were most likely to occur in the Performance subtests and least likely in the Verbal subtests. In comparing the concurrent validity of the WISC-III (1991) version of the cognitive assessment with the Woodcock-Johnson Tests of Achievement (2001) and Slosson Full-Range Intelligence Test (1993), Bell, Rucker, Finch, and Alexander (2002) found that 89% of the students’ S-FRIT Full-Range IQ scores were within one standard deviation of their WISC-III Full Scale IQ scores; there was an average discrepancy of 7.6 points. Correlations with the Woodcock-Johnson Tests of Achievement (2001) were not as high supporting the characteristics of the two tests, Slosson Full-Range Intelligence Test (1993) and the WISC-III (1991) cognitive assessment version, to be better methods to screen for intelligence than the Woodcock-Johnson Tests of Achievement (2001). In terms of students with language-based disorders and use of the WISC-R (1983), Ottem (2002) found that students with exceptionalities may demonstrate important characteristics of which are theoretically independent of what the test is supposed to measure but can affect test performance. Scatter amongst the Verbal and Performance subtests’ scores

could lead to small Verbal-Performance discrepancies rendering the unitary scaled scores not very meaningful or interpretable. This would require that the scatter of subtests' scores be taken into account. Ottem's (2002) sample of students with language-based disorders concluded that the Verbal-Performance IQ discrepancy does not differ very much from that of the normal student population; however, IQ values are lower. When the scatter of scores was taken into account, the Verbal-Performance differences became even lower. This indicates a limitation on the use of the WISC with students who have a language-based disorder.

The three components of the assessment's (WISC-R, 1983) results (Verbal, Performance, and Full Scale) have an internal consistency reliability coefficient of .89 or above in the standardization group for the entire age range covered by the scale. Average internal consistency reliability coefficients for the three assessment results' components are: Full Scale IQ (.96), Verbal Scale IQ (.94), and Performance Scale IQ (.90). Reliability of subtests ranges from .70 for Object Assembly to .86 for Vocabulary. Test-retest stability coefficients were: full Scale IQ (.95), verbal Scale IQ (.93), Performance Scale IQ (.90) ("Weschler Intelligence Scales for Children-Revised", 2005).

InView cognitive assessment. InView's Cognitive Skills Index (CSI) scores were in this study to factor out other possible disabilities (mental retardation, etc.). CSI scores are age-based scores that describe a student's performance on the InView test as a whole. The scores indicate a student's overall cognitive ability relative to students of similar age without regard to grade placement (CTB/McGraw-Hill, 2002).

InView (CTB/McGraw-Hill, 2002), Level 2, was administered in the spring of students' third-grade year (Mean = 100, SD = 15). This assessment seeks to assess concepts such as logical thinking ability, abstract thinking skills, and verbal and quantitative reasoning at grades two through 12 in a multiple-choice format. The subtests measure cognitive abilities in two domains: nonverbal (sequences, analogies, and quantitative reasoning), and verbal ability (words and context). The results can be used to identify both for giftedness and students with special needs. Creators of the InView assessment consider the test to be a good indicator of academic achievement when used with the TerraNova test (CTB/McGraw-Hill, 2001). Students' results of these two tests provided a cognitive score for every student in the sample of this study.

InView's validity and reliability. InView assesses components of cognitive ability that relate to success in school (CTB/McGraw-Hill, 2001). InView is part of a lineage of CTB/McGraw Hill cognitive assessments that began with the company's first cognitive abilities instrument in 1936. InView test items have been reconceptualized to better relate to school success. Consideration for students from diverse linguistic and ethnic backgrounds is also incorporated into the assessment. Teacher and student questionnaires provided feedback to test developers on the overall effectiveness of the instrument. Construct validity is incorporated into InView by having a variety of cognitive skills that pertain to education. Correlations of InView subtest scores that measure similar cognitive reasoning abilities as scores from other tests demonstrate convergent and discriminate validity.

Developers of the InView cognitive test assert that this test demonstrates reliability. The Kuder-Richardson Formula 20 (KR-20) is a well recognized measure of internal consistency for dichotomously scored items. According to CTB/McGraw-Hill (2001), the test's creators, InView has a high degree of internal consistency amongst subtest items. KR-20 values were predominantly in the range of .85 to .90.

TerraNova Test. Academic achievement scores for the sample included results from the broad reading subtests of the Woodcock-Johnson Tests of Achievement (Woodcock & Johnson, 2001) as well as reading composite scores (National Percentiles) from the TerraNova (TN), Second Edition (CTB/McGraw-Hill, 2001). For descriptive purposes, national percentile scores are categorized as: 96—99 = highest level; 90—95 = high level; 78—89 = well above average; 60—77 = slightly above average; 41—59 = average; 23—40 = slightly below average; 11—22 = well below average; 5—10 = low level; 1—4 = lowest level.

TN (CTB/McGraw-Hill, 2001) is a test of reading administered in grades two through 12. Students in this study completed Level 12 in the spring of their third-grade year (Mean = 31.66, SD = 10.40). The multiple-choice format asked the following types of questions related to reading: oral comprehension, basic understanding, analysis of text, evaluation and extension of meaning, identification of reading strategies, introduction to print, sentence structure, writing strategies, and editing skills.

TerraNova's reliability and validity. Developers of the TN Test (1994) have described and researched the validity and reliability of the test. A comprehensive curriculum review was conducted with educational experts. Educational goals,

knowledge, and skills representative of classroom across the country were determined. This information guided the creation of the test. Assessments were designed to reflect the graphic design of materials used in the classroom. Developers of the TN Test comment that empirical data illustrate the content-related validity (instructional relevance) of the test given that students' scores have improved from one level of the test to the next (CTB/McGraw-Hill, 2001).

The TN Test (CTB/McGraw-Hill, 2001) is considered to have constructive validity—what test scores mean and the types of inferences they support. The test was found to correlate highly with independent measures of achievement and cognitive ability. When compared internally among subtests and with other tests that measure similar skills, the TN Test was found to demonstrate convergent and discriminate validity.

RR variable: number of weeks. RR data included the number of weeks the students had participated in the program and their beginning and ending text level. Number of weeks can vary from one jurisdiction to another. For the school districts who participated in this study, 20 weeks was considered a standard “round” for a student in the RR Program (Medsker, 2005). Students who attain book level 15 before or at week 20 are considered as “discontinued” (successful). Students who need to continue longer to reach book level 15 are considered “continued” (unsuccessful).

RR variable: book levels. RR book levels are chosen based on an extensive assessment process. Each book considered for widespread use is used by a group of RR teachers over a one-year trial period. Using the running records that were completed by students using the pilot book, a level is then proposed for the book. It is

then piloted by a larger group of RR teachers. Once agreed upon by RR educators, it is incorporated into the program's book level list. This list is reviewed periodically and changed so that students see and experience different forms of text (Reading Recovery, 2002).

Book levels begin at a pre-kindergarten level of "book A and B" (e.g. At the Farm [Runners Press, 2003]) where one word would be on the page indicating an object that changes color as the pages progress. Book level 5 (e.g. 1, 2 Buckle My Shoe) is considered as the representative of the beginning of first grade; the story could be based on a nursery rhyme, for example. Are You My Mother (Eastman, 1960) is an example of book level 15 (end of first grade). The place of text varies throughout the story (top, middle, bottom of page). Some pages have one sentence, some have three. There are also changes in verb tenses and types of sentences (interrogative, imperative). Book level 15 represents a more varied and challenging form of text relative to beginning levels. Book level 30 (early third grade) would be similar to an early third-grade chapter book series. (Melrose Primary School, 2005)

RR variable: running records. School districts initially had affirmed their willingness to provide running record data (error rate and self-correction rate), all but one later decided at the point of actual data collection that the time and effort to collect the data would be too costly. Also, school districts discovered that some school buildings had already discarded Running Record assessment score sheets from three to five years ago due to limited storage space at school buildings. Hence, inclusion of Running Record elements (error rate, self-correction rate, visual/meaning/syntactic clues) in the analysis was not possible.

Although running record data were not explicitly included in the analysis, running record data are directly implied in text level values. If a student is defined as having achieved book level 15, the student accomplished this task by completing a running record assessment on that book level resulting in a word accuracy score of 90% or higher. Text levels are representative of running records because they exemplify the degree of complexity in text structure, decoding, comprehension, and syntax that is involved in reading a given text level. These characteristics of the reading process relate to the components of RD: phonemic awareness, speech perception, vocabulary skills, phonetic working memory, as well as syntax and semantics. For a student with a RD, any or a combination of the following may pose difficulty: articulating the sounds within words, being able to hear the sounds within words when hearing them, retracting the sounds letters and letter clusters make from long-term memory, and a knowledge of punctuation sentence and paragraphs. The running record assessment incorporates all of these by having the student read a passage of text. When difficulties with recall of letter sounds, vocabulary, sentence structure present themselves, the student's oral reading accuracy score will lower and possibly drop below the 90% benchmark of success with that given book level. The types of errors (visual, semantic, and meaning) noted in the running record would also possibly relate to having a RD (Clay, 2002).

Free/reduced lunch status. This was used as a means to categorize socioeconomic status of students in the sample. The free/reduced lunch data is based on family income of the student during their participation in the RR Program in first grade. Children to participate in the free/reduced lunch program in two ways. First,

the household is a participant in Food Stamps, TANF (Temporary Assistance for Needy Families), or participates in the FDPIR (Food Distribution Program on Indian Reservations). Second, the student's household income is below a certain amount. To receive free meals, the household's income must be below 130% of poverty. If the household income is between 130 and 185% of the federal poverty level, the student is eligible for reduced-cost lunches ("National School Lunch Program", 2005).

Description of the Sample

The principal researcher contacted Midwestern school districts to generate interest in participating in this study. Four school districts agreed; however, one could not provide the free/reduced lunch portion so their student cases were eliminated from the sample. Therefore, three school districts (A, B, and C) provided the required data (N=155) for the sample in this study (see Tables 3.1, 3.2). With the aim of providing this study with sufficient student cases, school district C provided data without identifiers. School districts A and B requested that parent permission forms be mailed. Parent permission forms were mailed either by the principal researcher or by the school district directly; the method was defined by how the school district interpreted HIPA (1996). One of these school districts (B) later supplemented their portion of data by providing some students cases without identifiers.

School district A was the most ethnically diverse in terms of general student population. Conversely, school district C was virtually homogeneous White. The

Table 3.1
Descriptive Statistics (N=155)

<u>Gender</u>	
Gender Ratio ¹	M=97/F=58
<u>Age</u>	
Age M (SD)	9.97 (.764)
<u>Race/Ethnicity</u>	
Asian	1%
Black	30%
Hispanic	1%
Multiracial	3%
White	63%
Other	5%
<u>Current Grade</u>	
Grade 3	13%
Grade 4	43%
Grade 5	45%
<u>Receiving Special Education Services</u>	
No	77%
Yes	29%
<u>Retained in a Grade²</u>	
Yes (1 year)	23%
No	65%

¹ M=63%/F=37%

²One school district did not provide data for 25 students' *retained-in-grade status*.

Table 3.2

School District Demographic Data: 2004—2005 School Year

	School District A	School District B	School District C
General Student Population	31,557	10,396	1,380
Ethnicity: White	59%	73%	98%
Ethnicity: Black	26%	21%	0%
Ethnicity: Hispanic	10%	3%	0%
Ethnicity Asian	2%	0%	0%
Ethnicity: Native American	0%	0%	0%
Ethnicity: Multiracial	3%	4%	0%
Students on Free/Reduced Lunch	54%	45%	28%
Students Receiving Special Education Services	20.2%	20.6%	22.9%

number of students receiving special education services for each of the districts is an increase of 4 to 5% from 1997 levels.

Students (N = 155) who participated in RR during first grade provided data for the analysis (see Tables 3.1, 3.2). The sample consisted of mostly of White (61% of the total sample) and Black students (30% of the total sample). Thirty-seven percent of the students represented in the sample were female. Twenty-three percent were officially identified as having an LD (35 students) as defined by school districts.

Methods of Analysis

Purpose. The aim of this study is to examine whether a relationship exists between RR assessment scores and a student's subsequent identification as RD. Beginning text level, ending text level, number of weeks in the RR Program, and free/reduced lunch status (as a covariate) represent the predictive variables (PVs) of the function. Group membership (RD or non-RD) are the grouping variables (GVs).

Discriminant Function. Four different analyses were completed with the data. The first (Analysis 1) was based on school districts' definition of LD (80% of students having LD have it in the areas of reading (Roush, 1995); three others (Analyses 2—4) were created by the researcher. If Analyses 2 through 4 describe a significant amount of variance within the function and PVs of RR assessment elements with discriminant function and structure coefficients of about +/- .500 or more, this will support the argument for the RR Program's being a good intervention method for RTI (Tabachnick and Fidell, 2001). Amount of variance explained is

calculated by computing the difference between 1.00 and lambda (e.g. $1.00 - .828 = .172$ [17.2%]).

Independent Samples t Tests. Analyses were conducted to evaluate the differences between means of the two groups in this study (RD and non-RD) based on beginning text level, ending text level, number of weeks, reading composite, and IQ variables (Green & Salking, 2003). The results would indicate if the scores on a given variable are significantly different.

Analysis 1 rationale. As a baseline measure of predictiveness of the PVs (*beginning text level, ending text level, number of weeks in the RR Program, and free/reduced lunch status*), the school district definition of LD was used as the GV to define group membership. The three school districts involved in this study used the IQ-achievement discrepancy method of 18 points. Given that this method of identification is used by many other school districts across the nation (Ahearn, 2003), comparing the predictability of students later being identified as LD based on this IQ-achievement discrepancy method provides insight into the significance of each of the four factors and the variance explained by the function as a whole.

Analysis 2 rationale. Based on Vellutino et al.'s (1996) research with a cut-off RTI score of the thirtieth percentile on the Woodcock Reading Mastery Test-Revised (WRMT-R), the data for this study were analyzed based on an RD definition of reading composite scores being lower than the 30th percentile. Vellutino et al. (1996) used this cut-off score because this represents an average ability on the Basic Skills Cluster Subtest of the WRMT-R. Students scoring below this level would be demonstrating characteristics of a RD due to difficulties with: Visual-Auditory

Learning, Letter Identification (and a Supplementary Letter Checklist), Word Identification, Word Attack, Word Comprehension (Antonyms, Synonyms, Analogies), and Passage Comprehension (Woodcock Reading Mastery Tests-Revised-Normative Update, 2005). A second justification for using the criteria of a reading assessment cut-off score relates to the research that comments on the faults of using IQ in the assessment for RD; it is not a good predictor of students who would later benefit from remediation, nor does it adequately differentiate students who are poor readers from those who have an RD (Fletcher, Francis, Rourke, Shaywitz, & Shaywitz, 1992; Fletcher et al., 1994; Jiménez-Glez & Rodrigo-Lopez, 1994; Stanovich & Siegel, 1994; Tal & Siegel, 1996).

Analysis 3 rationale. Given that the TerraNova (1994) assessment of reading skills' scores between 23 and 40 represent the slightly below average range, a cut-off of 23 in the reading composite score was chosen to define RD for this third analysis. Whereas Analysis 1 defined RD as a discrepancy of 18 points regardless of how high or low the IQ and achievement scores are, Analysis 3 would better refine the definition because they would score at the bottom of the below average range or lower on the TN Test of reading skills.

Analysis 4 rationale. This analysis even further refines the definition of RD of *Analysis 3* by using a cut-off reading composite score of 15—with scores of 11 to 22 representing the well below average range of the TN Test. Because special education services should be aimed at the neediest of students, this more refined definition would identify the students who are even more in need of assistance due to low performance on the TN Tests of reading skills. If the assessment elements of the RR

Program can significantly predict at this low cut-off point the students who are later identified as RD, this RTI method of assessment would serve as a viable means for identification of students with RD and provision of special education support services.

Pilot Study

The purpose of the pilot study was to attain data on four students (two students from two different school districts). By examining trends and relationships among the variables, informed decisions about the selection of variables for the final analysis could be made.

RR data and descriptive information on four students (two students from an urban school district and two from a rural school district) were collected by school district personnel. Data elements included those described previously: age; race/ethnicity; current grade; years in school; if retained, number of years; receiving special education services; label; IQ score; reading achievement score; number of weeks in RR; beginning/end text level; error rate/self-correction rate; and free/reduced lunch status.

Pilot Study Results

The results included data on four students from two school districts (A and B) of the three school districts included in this study (see Table 3.3). During the 2004—2005 school year, school district A had a school population that was about 60% White, 25% Black, 10% Hispanic, 3% Multiracial, and 2% Other. About 55% of the

Table 3.3
Pilot Study Data Results

	Student A-1	Student A-2	Student B-1	Student B-2
Gender	Male	Male	Male	Male
Race/ Ethnicity	White	Multi-ethnic	White	Black
Receiving Special Education	Yes (LD)	Yes (LD)	No	No
IQ/ Achievement Discrepancy	29 points	3 points	Not Assessed	Not Assessed
Number of Weeks in RR	10	21	20	20
Beginning Text Level	5 (Running record data: accuracy [95%], error rate [1:20], self-correction rate [1:3])	2 (Running record data: accuracy [91%], error rate [1:11], self-correction rate [nil])	A (pre-kindergarten)	3
Ending Text Level	16 (Running record data: accuracy [93%], error rate [1:14], self-correction rate [1:2])	16 (Running record data: accuracy [91%], error rate [1:11], self-correction rate [1:2])	1	5

school population was on free/reduced lunch (School Data, 2005). During the 1997—2005 period, students receiving special education services increased by 4.9% of the general student population. School district A’s enrollment slightly declined during this period by about 1%. School district B’s student population was composed of about 75% White, 20% Black, 3% Hispanic, 4% Multiracial, and 0% Other. As with school district A’s increase in students receiving special education services, school district B’s augmented by 4%.

Although student A-1 had made great progress in the RR Program (from book level five to 16 after 10 weeks), the criteria of the school district’s standard method of learning disability identification was met and the diagnosis was made. However, the student A-2 had scores that resulted in a three point discrepancy, yet the student was identified. Furthermore, this student had made definite progress in RR from having begun at level two and progressing to level 16 after 21 weeks in the program. Relative to the school district’s method of RD diagnosis, RR was not a good predictor in this case.

An average of the two Running Record scores (entry versus exit assessment results) for student A-2 indicated an error rate of 1:11 (one error per every 11 words) and a self-correction rate of 1:2 (one self-correction per every second error). Because a self-correction rate of more than 1:4 is considered acceptable (Medsker, 2005), this student’s oral reading skills were sufficiently varied in nature to perform the task well—the student was reading for *meaning* as well as using *semantic* and *visual* cues—and had improved (having surpassed level 15, the book level considered to represent the end of first grade reading ability).

The other two students (B-1 and B-2) had both participated in RR for 20 weeks but had not made good progress (B-1 went from level zero to three, B-2 from one to five). No running record assessment data were reported from this district. This district also used the 18-point IQ/achievement discrepancy method. No assessment results were reported for these students; hence, they received no identification as learning disabled despite their demonstrated low reading ability during the 20-week intervention.

Based on the data of four students, the results of this pilot study indicate that the identification process is influenced by variables other than assessment scores. Although districts may have an 18-point IQ/achievement discrepancy standard for identification, this procedure is not always followed as in the case of the multiethnic student. (Lawson et al., 2002).

Second, the IQ/achievement method results in apparent misidentification. As with the case just mentioned (A-1), this student made good progress with literacy skills—from level two to 16 in RR. Yet the student was identified due to a sufficient IQ/achievement discrepancy. Similarly, student A-2 made good RR progress but was identified. The other students (B-1 and B-2) did not improve their literacy skills with RR, yet identification for special education services was not pursued. The assessments were either not yet completed or not planned.

In the case of school district A, the pilot study's results do not indicate ending text level as a good predictor of later LD status as was found in this study's results (see Table 4.3)—that the higher the text level, the less likely to be identified as LD. Both students (A-1 and A-2) succeeded well (book level 16) with RR yet were

identified. School district B's student cases (B-1 and B-2) did not make good progress, yet were not even considered for identification. This would highlight the procedural factors that are implied in a process including IQ/achievement discrepancy. If a procedural process includes consideration of a low ending text level in RR, students needing continued special education assistance following the RR intervention would be more likely to be considered for identification. The converse would also be true: that students who end RR with a higher ending text level, such as level 15, would not be demonstrating difficulties with reading skills that characterize a student with having a RD.

Using ending text level would highlight the benefits of considering identification for RD on an RTI method of assessment such as RR. Students would have their literacy skills' weaknesses addressed at an early point in elementary school during first grade; also, their status at their point of demission from the program would indicate whether they should be considered for special education services. Waiting for assessments to be completed or discrepancy formula requirements to be met would not be such a large factor in the process. Students' success or difficulty in making sufficient academic progress over time would provide a meaningful and directly related means to pursue identification status.

Considering the data that were provided through the pilot study, RR variables chosen to be included in the discriminant function analysis were: beginning text level, ending text level, and number of weeks. Running record data could not be provided due to lack of availability or school district time to attain it. School district RR teachers who provided the pilot study data did not have access to free/reduced lunch

status data. Later at the point of data collection, free/reduced lunch status information was attainable from school district staff.

Although the pilot study was inconclusive in terms of defining systemic methods of identification of RD, it did suggest that there are variations in the importance of IQ/achievement discrepancy in the identification process. The 18-point discrepancy is not always followed. This study seeks to illuminate the importance of book levels and what they mean in terms of identification for RD. The change in book level aspect of the pilot study results supported the decision to include them as PVs in the discriminant function equation.

Chapter 4

Results

Multivariate Assumptions

Normality. Descriptive statistics of the PVs define the degree of normality. Skewness and kurtosis should be within the +/- 1.0 range. Histograms provide a visual reference for distribution of each of the four PVs, reflecting a normal curve distribution.

Two variables, one descriptive (reading composite score) and one PV (beginning text level) were not within normal limits (see Table 4.). Beginning text level's skewness (1.942) and kurtosis (4.901) are not indicative of a normal distribution. It is expected that the PV of beginning text level would not have a normal distribution because students in the RR Program would be chosen for not being good readers; therefore, their beginning text levels would be expected to all be at a low book number in the program's series of increasing difficult book series (book levels zero to 25; book 15 representing the desired ending text level—end of first grade level of ability).

Multicollinearity. An intercorrelational analysis defines if there are any variables that are highly correlated. No correlational statistics went beyond the +/- 0.900 range (see Table 4.). Therefore, there is no indication of multicollinearity (Tabachnick & Fidell, 2001).

Equality of variances/covariances. The *Box's M Test* with the discriminant function analysis renders a significance statistic. Robustness cannot be guaranteed for two reasons: the two groups in this study (LD and non-LD) are unequal, and the

Box's M test for Analysis 1 rendered a significant result—indicating a violation of the equality of variance/covariance assumption. The results for Analysis 2, 3, and 4 indicated a nonsignificant Box's M Test, supporting the robustness of these analyses (Tabachnick & Fidell, 2001).

Missing Data

There were no missing data. Student cases (N = 155) that contained missing data for GVs and PVs were deleted from the sample. Therefore, only student cases with complete GV/PVs were used.

Preliminary Correlations and Results

Correlational analyses of descriptive variables and PVs indicate that no correlations resulted in a value beyond +/-0.900 (see Table 4.1). This demonstrates that multicollinearity is not an issue among the variables included in the Discriminant function. Multicollinearity invokes redundancy in the discriminant function because the variables in question are redundant—have overlapping variances (Tabachnick & Fidell, 2001). See Table 4.2 for descriptive statistics of PVs, Reading Composite, and IQ values.

For this study, the intercorrelational matrix indicates some interesting results. First, IQ does not correlate very highly with LD status (.007). Given that LD identification is defined as a discrepancy between IQ and achievement, this very small correlation supports this definition. IQ does correlate with reading ability (.494). This study's investigation of RR as an RTI method of identification therefore

Table 4.1
Intercorrelational Matrix (N = 155)

	1	2	3	4	5	6	7	8
1. Age	—	-.215**	-.019	.000	-.301*	-.073	.020	.191*
2. IQ ¹		—	.494**	-.002	.075	.247*	-.135	.007
3. Reading Composite ²			—	-.035	.007	.241*	.050	.256**
4. RR # of Weeks				—	-.428*	-.214*	.076	.149
5. Beginning Text Level ³					—	.150	-.043	-.061
6. Ending Text Level ⁴						—	-.250*	-.342**
7. Free/Reduced Lunch ⁵							—	.274**
8. RD Status ⁶								—

**Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05 level (2-tailed).

¹ InView IQ Test (Cognitive Skills Index).

² Terra Nova Academic Achievement Test (National Percentiles).

³ Reading Recovery instruction and assessment book series.

⁴ Reading Recovery instruction and assessment book series.

⁵ Students' free/reduced lunch status during first grade.

⁶ Student's RD or non-RD status as of his or her current grade.

would be supported by this finding, given that RR assessment methods serve as a replacement for IQ.

Second, ending text level has a correlation of -.342 with RD status. This means that as students' text level increases, the less they are to be identified as LD. This result in the correlational analysis would also support a premise of this study, which is that the more a student progresses with the increasingly difficult text levels of the RR program, the less likely the student will be to demonstrate characteristics of having an RD. Also, beginning text level did not have a lot of variance.

Table 4.2
Descriptive Statistics of PVs, Reading Composite, and IQ

Predicting Variable	Mean (Standard Deviation)	Minimum Score	Maximum Score	Skewness	Kurtosis
Beginning Text Level	1.19 (2.505) ¹	-1	14	2.505	4.901
Ending Text level	13.17 (16.54)	4	26	.490	-.073
Number of Weeks	16.54 (4.393)	4	26	-.479	-.559
Reading Composite	45.35 (24.675)	2	91	-.008	-1.142
IQ	92.35 (13.017)	62	124	.027	-.748

¹Indicates Standard Deviation

Third, text level entry (-.061) would support the premise that where a student begins in the program does not correlate with RD status given that students in RR begin at a very low book level in the 25-book series. This could be attributed to no variability in beginning text level.

Fourth, the number of weeks in the RR Program is positively related ($r=.149$) but not statistically significant to RD status.

Fifth, students who are receiving subsidies for school lunches due to low or very low family income are more likely to be identified as RD ($r=.274$). This would support the research (Espy et al., 2001; Grundmann, 1997; Molfese et al., 1997, 2003; O'Connor & Spreen, 1988) which associates a link between SES and LD.

Sixth, the older the student in this sample, the lower the IQ ($r=-.215$). Given that students with reading difficulties are impeded from learning relative to other students, this would become more evident as students grow older. Research (Siegel, 1999) discussed earlier in this commented on this aspect of IQ and how assessing students with reading difficulties.

Results of Discriminant Function

Analysis 1. As previously discussed, the objective of this study was to determine whether RR beginning text level, ending text level, number of weeks in the program, and free/reduced lunch status would discriminate between those students categorized as RD/non-RD. For this analysis, I categorized students as RD/non-RD based on the school districts' definition of LD: an IQ/achievement discrepancy of 18 points (Division of Exceptional Learners, 2005). Indiana's definition of LD reflects the criteria of the federal definition described earlier in this study (Indiana State Board of Education, 2002). The regression method uses measurement errors associated with IQ and achievement measures to identify for LD (e.g., Reynolds, 1990; Warner, Dede, Garvin, & Conway, 2002).

To qualify under this definition, a student is to exhibit specific severe deficits in perceptual, integrative, or expressive processes involved in understanding or in using language, spoken or written which impede the student's academic performance. The definition allows students to be labeled as LD if conditions exist or were previously referred to as perceptual handicaps, brain injury, dyslexia, and so on; this allowance relates to the federal definition's inclusion clause.

The LD may be manifested in any of the seven areas of the federal definition: listening, thinking, speaking, reading, writing, spelling, or arithmetic. A diagnosis of LD cannot be made if the student's academic difficulties are due primarily to learning challenges like visual impairment, hearing loss, or other physical or emotional conditions. This limitation parallels the federal definition's exclusion clause. Students to be considered for having an LD are to have completed a standardized test of

learning capability that indicates a severe discrepancy between academic achievement and potential—the IQ/achievement discrepancy of 18 points as practiced by school districts (Division of Exceptional Learners, 2005). Other elements to be included in the consideration for identification are as follows: an observation of the student in the general education classroom by a case conference committee member other than the student’s classroom teacher; a review of social and developmental history; effects of environmental, cultural, or economic disadvantages; and any relevant medical information. A case conference committee is to then consider the written results of these reports and conclude in writing that the committee’s decision reflects the opinions of the case conference committee members. Those committee members who disagree are to provide a written dissenting opinion.

To assess the validity of the hypothesis that beginning text level, ending text level, number of weeks in the program, and free/reduced lunch status would discriminate between those students categorized as RD or non-RD, a discriminant function analysis was conducted. The result of Analysis 1 (see Tables 4.3) was significant (Wilks’ Lambda = .828, $p < .001$). The analysis correctly classified 65.8% of the original grouped cases (see Table 4.4). Approximately 17% of the variance in the discriminant function using beginning text level, ending text level, number of weeks, and free/reduced lunch status was explained by LD status. Table 4.4 indicates that about 65.8% of the originally grouped cases defined as LD/Non-LD were classified correctly.

The discriminant function is mostly defined by ending text level (.783), whether students participate in the free/reduced lunch program (-.404), and to a lesser

Table 4.3
Discriminant Function Results

	Wilks' Lambda	Standardized Discriminant Function Coefficients ¹	Structure Coefficients ¹
Analysis 1— School District Definition of LD RD (N=35) and Non-RD group (N=120) (Most likely non-LD)	.828 (p < .001)	ETL ² .783 ⁶ F/RL ³ -.404 Weeks ⁴ -.239	ETL .890 F/RL -.547 Weeks -.394
Analysis 2—Reading Composite < 30 RD (N=50) and Non-RD group (N=105)	.854 (p < .001)	BTL ⁵ -.079 ETL 1.017 F/RL .380 BTL -.152	BTL .146 ETL .921 Weeks -.262 BTL .049
Analysis 3—Reading Composite <23 RD (N=35) and Non-RD Group (N=120)	.907 (p < .005)	ETL 1.054 F/RL .163 BTL -.144	ETL .967 Weeks -.102 F/RL -.078
Analysis 4—Reading Composite <15 RD (N=21) and Non-RD Group (N=134)	.930 (p < .028)	Weeks .092 ETL .957 Weeks .531 F/RL .186 BTL .033	BTL -.024 ETL .855 F/RL -.346 Weeks .255 BTL -.053

¹Values for each analysis are listed in descending order

²Ending Text Level in the Reading Recovery Program

³Free/Reduced Lunch Status during First Grade

⁴Number of Weeks in the Reading Recovery Program

⁵Beginning Text Level in the Reading Recovery Program

⁶The higher the ending text level, the less likely to be identified as having a RD

extent by the number of weeks (-.239) in RR (see Table 4.3). The negative coefficients mean that the function is defined by high ending text level, no status as free/reduced lunch, and fewer number of weeks in RR. Structure coefficient results mirrored the same order of the function coefficient results. The discriminate function is mostly represented by ending text level. Free/reduced lunch status was also well represented (-.547); this would indicate that no participation in the free/reduced lunch program (therefore, upper income family) and higher text level would render a student less likely to be identified as having a RD.

Table 4.4
Analysis 1 Classification Results: School District Definition

Original	Count	Non-LD	Predicted Group Membership		Total
			Non-LD	LD	
		Non-LD	78	42	120
		LD	11	24	35
	%	Non-LD	65.0	35.0	100.0
		LD	31.4	68.6	100.0

65.8% of original grouped cases correctly classified.

As expected, student's identified as having an RD have a different beginning and ending text level from that of non-RD students (see Table 4.5). The mean reading composite scores for the two groups would appear to be the opposite of those expected for each of the two groups. However, the non-RD group could include students with characteristics of mental retardation (although not formally identified), for example, which would result in lowering the mean score for the non-RD group as a whole. An independent samples t-test (see Table 4.6) was conducted to evaluate for

significant differences between the RD and non-RD groups based on beginning text level, ending text level, number of weeks, reading composite, and IQ scores.

Significant differences were found for text level end, number of weeks, and reading composite.

Table 4.5
*Analysis 1—School District Definition of LD
Means and Standard Deviations of Age, IQ, Reading Composite, Number of Weeks in RR, Beginning Text Level, and Ending Text Level of the RD (N=35) and Non-RD group (N=120)*

Variable	RD Group	Non-RD Group
	Mean	Mean
Age	10.23 (0.73) ¹ (69% Male, 31% Female)	9.90 (0.77) (61% Male, 39% Female)
Grade Level	4.51 (0.742)	4.26 (0.667)
IQ ²	91.34 (13.95)	92.64 (12.78)
Reading Composite ³	54.40 (28.891) ⁶	42.71 (22.767) ⁶
Number of Weeks in RR	17.97 (3.97)	16.12 (4.44)
Beginning Text Level ⁴	0.89 (1.83)	1.28 (2.67)
Ending Text Level ⁵	8.40 (4.97)	14.57 (6.74)
Percentage of Students on Free/Reduced Lunch Programs	32%	68%

¹ All scores in parentheses represent standard deviations (SD).

² InView IQ Test (Cognitive Skills Index).

³ Terra Nova Academic Achievement Test (National Percentiles).

⁴ Reading Recovery instruction and assessment book series.

⁵ Reading Recovery instruction and assessment book series.

⁶ Independent Samples T-Test indicated a significant difference between the RD/non-RD Groups ($p < .010$)

Table 4.6
Independent Samples t Tests of Assessment and Descriptive Scores

Variable	<i>t</i>	df	Sig. (2-tailed)	Mean Difference
<u>Analysis 1 (School District Definition)</u>				
Beginning Text Level	.825	153	.410	.398
Ending Text Level	5.024	153	.001	6.167
Number of Weeks	-2.226	153	.028	-1.855
Reading Composite	-2.508	153	.013	-11.692
IQ	.518	153	.605	1.299
<u>Analysis 2 (Reading Composite <30)</u>				
Beginning Text Level	.251	153	.802	.109
Ending Text Level	4.711	153	.001	5.217
Number of Weeks	-1.342	153	.182	-1.010
Reading Composite	17.290	153	.001	42.792
IQ	6.790	153	.001	13.357
<u>Analysis 3 (Reading Composite <23)</u>				
Beginning Text Level	-.094	153	.925	-.045
Ending Text Level	3.822	153	.001	4.838
Number of Weeks	-.404	153	.687	-.342
Reading Composite	13.105	153	.001	42.780
IQ	5.168	153	.001	11.964
<u>Analysis 4 (Reading Composite <15)</u>				
Beginning Text Level	-.181	153	.857	-.107
Ending Text Level	2.889	153	.004	4.553
Number of Weeks	.760	153	.448	.785
Reading Composite	9.066	153	.001	42.485
IQ	4.328	153	.001	12.521

Analysis 2. The result of Analysis 2 (see Tables 4.3) was significant (Wilks' Lambda = .854, $p < .001$). Approximately 14.6% of the variance in the discriminant

function using beginning text level, ending text level, number of weeks, and free/reduced lunch status was explained by RD status. Table 4.7 indicates that about 69.0% of the originally grouped cases defined as RD/Non-RD were classified correctly. In comparison with the classification of RD/non-RD status with Analysis 1 (See Table 4.8), of the 120 cases defined as non-RD by Analysis 1 (School District

Table 4.7
Analysis 2 Classification Results: Reading Composite <30

Original	Count	Non-LD	Predicted Group Membership		Total
			Non-LD	LD	
		Non-LD	70	35	105
		LD	13	37	50
	%	Non-LD	66.7	33.3	100.0
		LD	26.0	74.0	100.0

69.0% of original grouped cases correctly classified.

Defintion), 40 of these cases were categorized as RD by Analysis 2 (Reading Composite <30). Of the 35 cases categorized as RD by Analysis 1, 25 of these cases were defined as non-RD by Analysis 2.

Table 4.8
Crosstabulation of Analysis 1 (School District Definition) with Analysis 2

School District Defintion of LD		Reading Composite <30		Total
		Non-LD	LD	
	Non-LD	80	40	120
	LD	25	10	35
	Total	105	50	155

The discriminant function is mostly defined by *ending text level* (1.017) in RR (see Table 4.3). The coefficient means that the function is defined by higher *ending text level*. Structure coefficient results indicate that the discriminant function is mostly related to ending text level.

As expected beginning and ending text level differ between students identified as having a RD and students who are non-RD (see Table 4.9). The mean reading composite scores for the two groups is as expected for each of the two groups. This

Table 4.9
Analysis 2—Reading Composite <30
Means and Standard Deviations of Age, IQ, Reading Composite, Number of Weeks in RR, Beginning Text Level, and Ending Text Level of the RD (N = 50) and Non-RD group (N = 105)

Variable	<u>RD Group</u>	<u>Non-RD Group</u>
	<u>Mean</u>	<u>Mean</u>
Age	9.96 (0.699) ¹ (62% Male, 38% Female)	9.98 (0.796) (63% Male, 37% Female)
Grade Level	4.18 (0.720)	4.38 (0.671)
IQ ²	83.30 (10.238)	96.66 (11.98)
Reading Composite ³	16.36 (8.086) ⁶	59.15 (16.566) ⁶
Number of Weeks in RR	17.22 (4.097)	16.21 (4.510)
Beginning Text Level ⁴	1.12 (2.076)	1.23 (2.694)
Ending Text level ⁵	9.64 (6.009)	14.86 (6.640)
Percentage of Students on Free/Reduced Lunch Programs	31%	69%

¹ All scores in parentheses represent standard deviations (SD).

² InView IQ Test (Cognitive Skills Index).

³ Terra Nova Academic Achievement Test (National Percentiles).

⁴ Reading Recovery instruction and assessment book series.

⁵ Reading Recovery instruction and assessment book series.

⁶ Independent Samples T-Test indicated a significant difference between the RD/non-RD Groups (p <.000)

analysis reveals that students without RD have a higher reading composite score than students with RD. An independent samples t-test (see Table 4.6) was conducted to evaluate for significant differences between the RD and non-RD groups based on beginning text level, ending text level, number of weeks, reading composite, and IQ scores. Significant differences were found for text level end, reading composite, and IQ.

Analysis 3. The result of Analysis 3 (see Tables 4.3) was significant (Wilks' Lambda = .907, $p < .005$). Approximately 9.3% of the variance in the discriminant function using beginning text level, ending text level, number of weeks, and free/reduced lunch status was explained by LD status. Table 4.10 indicates that about 64.5% of the originally grouped cases defined as LD/Non-LD were classified correctly.

The discriminant function is mostly defined by ending text level (1.054) in RR (see Table 4.3). The standardized coefficient means that the function is defined by high ending text level. Structure coefficients results indicate that the discriminant function is most related to ending text level.

Table 4.10
Analysis 3 Classification Results: Reading Composite <23

		Predicted Group Membership		Total	
		Non-LD	LD		
Original	Count	Non-LD	75	45	120
		LD	10	25	35
	%	Non-LD	62.5	37.5	100.0
		LD	28.6	71.4	100.0

64.5% of original grouped cases correctly classified.

As expected beginning and ending text level differ between students identified as having a RD and students who are non-RD (see Table 4.11). An independent samples t-test (see Table 4.6) was conducted to evaluate for significant differences between the RD and non-RD groups based on beginning text level, ending text level, number of weeks, reading composite, and IQ scores. Significant differences were found for text level end, reading composite, and IQ.

Table 4.11
 Analysis 3—Reading Composite <23
Means and Standard Deviations of Age, IQ, Reading Composite, Number of Weeks in RR, Beginning Text Level, and Ending Text Level of the RD (N =35) and Non-RD Group (N = 120)

Variable	RD Group	Non-RD Group
	<u>Mean</u>	<u>Mean</u>
Age	9.94 (.765) ¹ (69% male, 31% Female)	9.98 (0.767) (61% Male, 39% Female)
Grade Level	4.14 (0.692)	4.37 (0.685)
IQ ²	83.09 (9.895)	95.05 (12.598)
Reading Composite ³	12.23 (5.806) ⁶	55.01 (19.016) ⁶
Number of Weeks in RR	16.80 (4.276)	16.46 (4.442)
Beginning Text Level ⁴	1.23 (2.211)	1.18 (2.593)
Ending Text level ⁵	9.43 (5.700)	14.27 (6.822)
Percentage of Students on Free/Reduced Lunch Programs	24%	76%

¹ All scores in parentheses represent standard deviations (SD).

² INVIEW IQ Test (Cognitive Skills Index).

³ Terra Nova Academic Achievement Test (National Percentiles).

⁴ Reading Recovery instruction and assessment book series.

⁵ Reading Recovery instruction and assessment book series.

⁶ Independent Samples T-Test indicated a significant difference between the RD/non-RD Groups (p <.000)

In comparison with the classification of RD/non-RD status with Analysis 1 (See Table 4.12), of the 120 cases defined as non-RD by Analysis 1 (School District Definition), 27 of these cases were categorized as RD by Analysis 3 (Reading Composite <23). Of the 35 cases categorized as RD by Analysis 1, 27 of these cases were defined as non-RD by Analysis 2.

Table 4.12
Crosstabulation of Analysis 1 (School District Definition) with Analysis 3

		Reading Composite <23		Total
		Non-LD	LD	
School District Definition of LD	Non-LD	93	27	120
	LD	27	8	35
Total		120	35	155

Analysis 4. The result of Analysis 1 (see Tables 4.3) was significant (Wilks' Lambda = .930, $p < .028$). Approximately seven percent of the variance in the discriminant function using beginning text level, ending text level, number of weeks, and free/reduced lunch status was explained by LD status. Table 4.13 indicates that about 67.1% of the originally grouped cases defined as LD/Non-LD were classified correctly.

In comparison with the classification of LD/non-LD status with Analysis 1 (See Table 4.14), of the 120 cases defined as non-LD by Analysis 1 (School District Definition), 16 of these cases were categorized as LD by Analysis 4 (Reading Composite <15). Of the 35 cases categorized as LD by Analysis 1, 30 of these cases were defined as non-LD by Analysis 4.

Table 4.13
Analysis 4 Classification Results: Reading Composite <15

Original	Count	Non-LD	Predicted Group Membership		Total
			Non-LD	LD	
		Non-LD	88	46	134
		LD	5	16	21
	%	Non-LD	65.7	34.3	100.0
		LD	23.8	76.2	100.0

67.1% of original grouped cases correctly classified.

The discriminant function is mostly defined by ending text level (.957) and number of weeks (.531) in RR (see Table 4.3). The standardized coefficients mean that the function is defined by high ending text level and higher number of weeks in RR. This positive number of weeks coefficient with ending text level contradicts the correlation between the two variables (see Table 4.2). This would indicate that in a more refined definition of LD, the more a student participates in RR, the higher the

Table 4.14
Crosstabulation of School District Definition with Analysis 4

School District Definition of LD		Reading Composite <15		Total
		Non-LD	LD	
School District Definition of LD	Non-LD	104	16	120
	LD	30	5	35
Total		134	21	155

probability of improving with literacy tasks. Structure coefficient results indicate a different order of the coefficient results. However, ending text level still resulted in being the most representative of the discriminant function.

As for descriptive statistics (see Table 4.15), it is expected that ending text level is different for students identified as having a RD from students who are non-RD. The mean reading composite scores for the two groups are indicative of

Table 4.15
 Analysis 4—Reading Composite <15
Means and Standard Deviations of Age, IQ, Reading Composite, Number of Weeks in RR, Beginning Text Level, and Ending Text Level of the RD (N =21) and Non-RD Group (N = 134)

Variable	RD Group	Non-RD Group
	<u>Mean</u>	<u>Mean</u>
Age	9.95 (.669) ¹ (71% Male, 29% Female)	9.98 (0.780) (61% Male, 39% Female)
Grade Level	4.10 (0.625)	4.35 (0.696)
IQ ²	81.52 (9.796)	94.04 (12.664)
Reading Composite ³	8.62 (4.341) ⁶	51.10 (21.349) ⁶
Number of Weeks in RR	15.86 (4.127)	16.64 (4.439)
Beginning Text Level ⁴	1.29 (2.194)	1.18 (2.557)
Ending Text level ⁵	9.24 (6.625)	13.79 (6.729)
Percentage of Students on Free/Reduced Lunch Programs	16%	84%

¹ All scores in parentheses represent standard deviations (SD).

² InView IQ Test (Cognitive Skills Index).

³ Terra Nova Academic Achievement Test (National Percentiles).

⁴ Reading Recovery instruction and assessment book series.

⁵ Reading Recovery instruction and assessment book series.

⁶ Independent Samples T-Test indicated a significant difference between the RD/non-RD Groups (p <.000)

characteristics for each of the two groups. An independent samples t-test (see Table 4.6) was conducted to evaluate for significant differences between the RD and non-RD groups based on beginning text level, ending text level, number of weeks, reading composite, and IQ scores. Significant differences were found for text level end, reading composite, and IQ.

Summary of results. Ending text was consistently the largest PV in the four functions and was most representative of the functions as defined by the structure matrix. In Analysis 1, free/reduced lunch status was also well represented in the function; however, this did not remain true in Analyses 2-4. Number of weeks became a significant PV only in Analysis 4 (reading composite <15). The more the amount of time a student spends in the program based on a cut-off score of reading composite <15, the less likely to be identified as having a RD. This would indicate that the more instruction a student receives, the more progress the student could make in literacy skills. The research of Sylva and Evans (1999) would seem to parallel this finding in that the students who benefit most from the RR Program are those who start as nonreaders when they began the program; they start at a lower level but make more progress during time spent in RR and are therefore less likely identified as having a RD.

Each successive Analysis (1—4) resulted in explaining less and less of the variance in the function of the four variables. As the definition of RD became more restrictive (reading composite <30 to <15), other factors in determining RD status became more implied. The reducing of sample size in the RD group for each successive analysis also impairs the significance of these results; using a sample size

of 21 student cases defined as having a RD (Analysis 4; reading composite <15) versus a sample size of 55 student cases defined as having a RD (Analysis 2; reading composite <30) statistically compromises the results of Analysis 4. It could be argued that using a reading composite score of <30 as a cut-off may be less theoretically substantive than a score of <15 given that this lower score would better define the most needy students in need of special education assistance. However, the reduced sample size of the reading composite <15 analysis compromises the power of the results (Tabachnick & Fidell, 2001).

Independent Samples *t* Tests indicated that there were differences between of the two groups in this study (RD and non-RD). Ending text level and reading composite scores were consistently different between the two groups in all four analyses. Number of weeks was significantly different in Analysis 1 (School districts' definition of LD); IQ was significantly different in Analyses 2—4. This would indicate that there are distinct differences between the two groups based on the definitions created.

Chapter 5

Discussion

This study research by means of discriminant function analysis whether beginning text level, ending text level, number of weeks in the RR Program, and free/reduced lunch status (as a covariate) would be good predictors of students identified as having a RD by third through fifth grade. The results indicated that higher ending text level was the largest PV of each of the four analyses.

Nonparticipation in the free/reduced lunch program was well represented in Analysis 1 (school districts' definition of RD). Number of weeks was also a good PV in Analysis 4 (reading composite <15). The amount of variance explained by the function decreased as the definition of RD became more restrictive. Independent Sample *t* Tests indicated significant differences amongst the four analyses on values of ending text level, number of weeks, reading composite, and IQ; ending text level and reading composite were significantly different in all four analyses. The significance of the results is impaired due to the sample size of the RD group being successively smaller in Analyses 2—4.

Findings relative to other RTI Research

This study evaluated elements of the RR Program for its predictiveness of students later classified as having an LD. As discussed previously (Fuchs et al., 2003), there were two categories of RTI. The behavioral consultation's problem-solving approach of RTI focuses on gathering student data within general education classrooms and providing a strategy or plan for student improvement; these data

inform remediation methods as opposed to remediation's being based on initial student characteristics. The standard protocol approach of RTI uses a standard set of procedures for students with similar characteristics. For example, one teacher and one student work together on a set of activities for a portion of the school day over a set time period (that is, 20 weeks) with the aim of improving the student's academic performance. The RR Program (Clay, 2002) closely parallels this format of RTI. With its consistent implementation and instructional methods for students, the RR Program offers the educational community a practical, in-use method for RTI. The RR Program meets the criteria used in RTI research (Fuchs & Fuchs, 1998). The program incorporates the dually discrepant method of assessment (progress through leveled texts during the 20 weeks of remediation) as well as the pass/fail component of reaching book 15 (representative of first-grade level of ability) after 20 weeks of participation in the intervention.

Researchers (Cohen et al, 2003; Fuchs et al., 2005; McNamara & Hollinger, 2002; O'Connor & Harty, 2005; Vaughn et al., 2005) have investigated experimental RTI methods or programs using the principles of RTI that only in certain cases aim to actually identify students. This study adds to the body of RTI research in that no other retrospective studies are known to have been completed. The predictiveness of assessment elements of the RR intervention were analyzed using existing data of students who participated in RR—some of whom were later identified as having a LD. The results of this study provide a means to see how characteristics of RR's book levels and students' number of weeks participation in the program are related to students later being identified as LD.

The factor of including a measure of intelligence in the identification of LD has its supporters (Kavale, Holdnack, & Mostert, 2005) and critics (Fletcher, Francis, Rourke, Shaywitz, & Shaywitz, 1992; Fletcher et al., 1994; Jiménez-Glez & Rodrigo-Lopez, 1994; Stanovich & Siegel, 1994; Tal & Siegel, 1996). Advocates (Kavale et al., 2005) of continuing to include the IQ argue that it is impossible to determine an expected achievement level without a measure of intelligence, which is an integral part of the discrepancy criterion. Furthermore, cognitive ability tests have been improved over time to measure not just one primary cognitive ability but a multitude of complex processes or abilities (Kaufman & Kaufman, 2001). However, Kavale et al. (2005) do not discount RTI as being part of the identification process. They argue that it just cannot replace the aspect of intelligence documenting underachievement. Critics of the inclusion of intelligence measures in LD identification state that elements of IQ tests: (a) include questions that accentuate the deficits of students who have an LD, (b) reflect what students have already learned instead of what they can learn in the future, (c) include assessment questions that are socially and economically biased in that students from minority and low-income backgrounds have not been exposed to materials and events that are implied within the assessment, (d) are not a good predictor of students who would benefit from remediation (e) can result in classifying students as having an LD or not depending on the components (verbal, performance, or full-scale score) of the test used for measuring the IQ/achievement discrepancy. These reasons provoked the need for alternative methods to be sought through RTI.

Although Kavale et al. (2005) are critics of RTI, they admit that it can document low achievement in reading—which is the subject of this study. They suggest that RTI would appear to be an appropriate first step in the identification process. The results of this study indicate that ending text level is a significant indicator of students who would later be identified as having an LD—80 percent of which have an RD. The fact that RR occurs during first grade would facilitate ending text level being that first appropriate step in the identification process. In terms of predictive validity (defined as how well an assessment measures one's potential for success) discussed earlier in this study, ending text level is a significant predictor but is not the only conceptual factor in determining RD/non-RD status given only 7 to 15 percent of the variance being explained in the function. The rationale for choosing the variables (beginning text level, ending text level, and number of weeks in the RR Program) used in this study is that they pertain to the characteristics of having a RD. An RD is defined as weaknesses in phonemic awareness, speech perception, vocabulary skills, phonetic working memory, and syntax and semantics (Mann, 2003). RR (Clay, 2002) would need to offer an assessment in each of these areas that is predictive of a student's later success in using these concepts in literacy experiences in and outside of the classroom. The program is not designed to specifically assess phonemic awareness, speech perception, vocabulary skills, phonetic working memory, and syntax and semantics on a daily basis. However, they are all incorporated aspects of RR. The predictive accuracy of RR assessments are based on the daily running record. Theoretically, the distribution of scores on the criteria measured in running records should be accurate given the high fidelity of the

RR Program. For a student to achieve mastery of a given book level, a score of 90% is to be attained. In terms of overall predictive accuracy of running record assessments, Clay's (1966) research found that they are significantly predictive of reading ability ($r = .98$ for errors; $r = .68$ for self-correction rate). Given this context, it is important to reflect on RR possibly meeting the criteria of RTI in practice.

Vaughn (2002) comments on five potential issues regarding the effective use of RTI as a means for identifying students with a LD, which I would like to address in terms of this RTI study on RR. First, is measurement in place to effectively implement a RTI model? Vaughn (2002) states that the educational system is more prepared to implement a RTI model in early reading than in any other area. The results of this study support this opinion. With RR's widespread implementation in 20% of American school districts (Vital Statistics, 2002) as well as other countries, use of this remedial program as a RTI method in practice fulfills the dual discrepancy method of assessment and cut-off score used in RTI research. A student is considered to have succeeded with RR by having attained book 15 during a round (normally 20 weeks) in the program.

Second, are treatment validity practices (or sensitivity to the effects of interventions targeting a particular developmental outcome) readily identified and verified for implementing a RTI model? Vaughn (2002) commented that the education system is further along in the area of early reading than in any other area. The results of this study support her opinion in that RR assessment elements have been found to significantly predict students who were later identified as LD. Ending text level in particular resulted in being the strongest predictor—even in the most

refined definition of LD that I created. However, it is not the only conceptual factor in the prediction of RD/non-RD status.

Third, do the personnel and physical resources exist to implement a RTI model? Vaughn (2002) states that we have only a small number of personnel with sufficient knowledge and skills to implement a RTI model. With sufficient planning and training, this could be achieved. This RR study demonstrates that we are actually much closer in meeting the aim of defining an effective RTI method in practice. With ending text level being a significant predictor of RD status, schools can use this measure as an indicator of students to receive special education services. In terms of implementation of the program in school districts, RR treatment methods are taught to certified teachers choosing to become RR teachers and teacher leaders. States and school districts have been expressing increased interest in the program. Since RR's implementation in Indiana, almost 1,200 teachers and 45 teacher leaders have been trained and 24 training sites were established (Reading Recovery in Indiana, 2005). Even as states face budget difficulties, there is a continued desire to fund RR (Contingency fund will cover federal monies lost for Reading Recovery, 2005; New Hampshire School Boards Association, 2005).

Fourth, can RTI be implemented on a large scale? The results of this study provide insight into the predictiveness of RR (ending text level) as an RTI method of assessment. Vaughn (2002) comments that large-scale implementation is yet to be tested. The results of this study indicate that such a large-scale study could render positive results. This study's diverse group of participants from rural and urban areas would support this.

Fifth, can a RTI model be implemented across the age span? Vaughn (2002) concedes that we do not have the knowledgebase to implement RTI across the age span at this point. However, with LD representing about 4% of the student population (Vital Health Statistics, 2002) and growing (Lyon et al., 2001; Viadero, 1991), RTI could and should be considered for this in the future. More work with fourth grade and older students is needed to develop a RTI model for these students. This study does not address this issue given RR's focus on first-grade students.

Implications of the Specific Findings: RTI

Findings from these discriminant function analyses support the concept that ending text level is a significant predictor for students who would later be identified as having a RD—in the context of 7 to 15% of the variance being explained. Ending text level was consistently the largest discriminating coefficient and structure coefficient indicating that it is the largest discriminating variable and most representative within the function. This should not be surprising that the ending text level factor resulted in being the largest predictor of RD/non-RD group membership. The tasks involved in progressing through the book levels of the RR Program reflect the components related to having a RD mentioned earlier in this study: phonemic awareness, speech perception, vocabulary skills, phonetic working memory, as well as syntax and semantics. Students need to be able to use the alphabetic principle, hear and distinguish sounds within words, use terminology correctly, retain and extract from long-term memory the letter/sound relationships, have an understanding of the grammar of language, and have a sense of the social context of language in order to

decode text and make sense of it to solve unknown words within sentences and paragraphs. When students demonstrate difficulty with these aspects of reading, they will have difficulty progressing through the text levels of the RR Program. This indicates the presence of having a RD.

Analysis 4 (reading composite <15) explained 7% of the variance within the function—less than the other analyses. In this function, ending text level and number of weeks were discriminating coefficients. For students who do not progress during the 20 weeks in RR, the existence of some underlying characteristics of RD is implied. They should continue to receive assistance thorough special education services.

Although the increasingly refined definitions of RD created in this study rendered significant functions and consistently rated ending text level as the largest discriminating variable, the declining amount of variance explained would suggest the presence of other factors in determining LD status. RR would not be sufficient as a RTI model. Kavale et al. (2005) also comment that an RTI model cannot stand alone as the primary means of identifying for LD. The results of this study would support this given that ending text level only explains 7 to 15 percent of the variance in the construct of LD identification.

Earlier in this study, I discussed the aspect of classroom pedagogy provoking students to having RD characteristics. Related to this concept are three methods of teaching literacy skills in the general education classroom—subskills, skills, and holistic approach (Carnine, 2004; Goodman, 1967; Howard, 2005). Teachers who use a skills-based approach would address the mechanics of language in a highly

systematic manner offering students who have difficulties with these tasks more practice. Teachers who employ a sub-skills approach to literacy instruction would offer a more eclectic set of tasks and materials. This is certainly a prevalent method in many classrooms with the federal government's desire for scientifically based instructional methods as emphasized in its Reading First Program (Morrow, 2003). A holistic classroom would be more student centered with a focus on the comprehension of text. In reference to Cohen's (1971) concept of "dyspedagogia" (poor teaching or curricular inadequacies at a pseudo scientific level relating to causation of learning difficulties) discussed earlier in this study, perhaps there is a mismatch between the students' learning needs and the curriculum methods employed. If teachers could address the individual student's literacy needs at an earlier point in elementary school through pedagogical means that fit the student's learning style, RD might be less prevalent.

Components of literacy instruction have been defined by Smith, Baker, & Oudeans (2001) as: daily, highly focused literacy instruction; teaching the big ideas of literacy (phonemic awareness, alphabetic principle, fluency with text, vocabulary, and comprehension [DIBELS, 2004]) through consistent routines; explicitly teach new letter names and sounds, daily assisted ("scaffolded") practice with auditory phoneme detection, segmenting, and blending; immediate corrective feedback; apply the new knowledge of phoneme and letter sounds across varied literacy contexts on a daily basis; and daily reviews. Classrooms that do not include these elements could evade offering students the curriculum experiences that they need for effective learning.

Research (Jitendra, Edwards, Starosta, Sacks, Jacobson, & Choutka, 2004; Pullen, P., Lane, H., Lloyd, J., Nowak, R., & Ryals, J., 2005; Schatschneider & Torgensen, 2004; Shaywitz, Shaywitz, Fulbright, Skudlarski, Einar, Todd, Pugh, Holahan, Marchione, Fletcher, Lyon, Gore, Silver, 2003; Tomlinson, 2001) into what classroom practices help address the needs of students having a LD offer insight as to how classroom practices can be adapted for students who have a LD. For children who experience early reading failure, explicit instruction is imperative to facilitate efficient growth (Mercer, Lane, Jordan, Allsopp, & Eisele, 1996). Research (Chard, Simmons, & Kameenui, 1998; Foorman, Francis, Beeler, Winikates, & Fletcher, 1997; Jackson, Paratore, Chard, & Gamick, 1999) has documented the benefits of including classroom practices which develop phonological awareness and decoding skills. A student must be able to apply the alphabetic principle to develop automatic fluency of a skilled reader (Signorini, 1997). Fluent knowledge and automaticity is a prerequisite to comprehension. Repeated reading of text has been found to one of the most effective methods to improve fluency (Mercer, Campbell, Miller, Mercer, & Lane, 2000; National Reading Panel, 2000). As students learn to develop these skills, it is important for them to have access to texts which represent an appropriate level of difficulty. This facilitates progress from emergent to fluent reading (Allington, 2001; Fountas & Pinnell, 1999).

Small group instruction is an effective component of classroom instruction in assisting students to improve their reading skills (Taylor, Pearson, Clark, & Walpole, 2000). Differentiated instruction (Tomlinson, 2001), an instructional philosophy that aims to be more inclusive of all students given the mixed abilities represented in the

nation's classrooms, includes this concept as a key component of effective classroom-based instruction. Flexible grouping (individual, small, and large [whole class] group) based on readiness, interest, and manner in which students learn best provides the type of variety for students to improve their academic skills in varied formats.

If learning opportunities are to be effective, they need to be engaging, relevant, and interesting. Opportunities must be provided to students at a level of difficulty appropriate for them to succeed. Employing this concept within classroom instruction helps elicit students' interest. This is imperative for students with learning disabilities given their difficulties with motivation. Tomlinson (2001) advocates that students will feel more successful when they are offered learning opportunities one "chunk" above their level of academic independence—similar to Vygotsky's (1987) zone of proximal development.

A related pedagogical concept that is being encouraged for students generally and for students with learning disabilities is Gardner's (1999) multiple intelligences. Tomlinson (2001) has advocated that teachers should plan their teaching and student learning through many modalities. Instead of only listening to an idea, a student should be offered the opportunity to sing about it, build it, act it out, see it, etc., so that all aspects of the body's senses have participated in the learning. With students having some modalities favored over others, varying curriculum content delivery will help provide students with a format that suits them best.

Learning strategies for students with a mild disability like LD at the small group or individual level can be effectively presented in a format which offers students the opportunity to see the task modeled, do the task with assistance, try it out

with feedback, generalize to other learning contexts, and maintain the strategy over time. Bender (2002) affirms the effectiveness of the Kansas Center for Research on Learning's steps for strategy instruction. First, in order to know where a student is functioning academically, the student needs to be tested to determine if a particular strategy is required. The RR Program mirrors this concept with the "roaming around the known" (Clay, 2002) activities during the first few days of the intervention. Once the student is informed about the results of the assessment and the degree to which the student can achieve mastery, the student needs to "buy into" learning and applying it (Day & Elskin, 1994). Success cannot be achieved without the student's sense of commitment.

The second step is to explain the components of the strategy to the student. The key elements of the strategy, how they are used, where and under what conditions the strategy is applied are all part of this process. At the next instructional session, the teacher models the use of the strategy. An important element is for the teacher to do so by explaining the process "out loud". The student is encouraged to ask questions and may be asked to try to do some elements. A key aim of this step is that the student learns the strategy by rote. The student should be able to state the steps quickly before trying to apply the strategy. The student should be able to identify each step of the strategy and why it is important for the strategy overall. This facilitates independence for students who have a LD (Bender, 2002). RR is similar in that it aims to teach reading strategies; however, it is not done in such a hierarchical fashion. Rather, strategies are taught incidentally. Yet, the aim is for students to become independent in their employment of reading strategies (Clay, 2002).

For strategy instruction's next step, the student should practice using controlled materials (Bender, 2002). If the student is in sixth grade but operating at a fourth-grade level in reading, fourth-grade level materials should be used. The difficulty of the material is not to impair the student's ability to learn the strategy. Daily assessment of the student's success with the task and the use of the strategy would be recorded. The teacher would offer periodic corrective feedback. Repeating this aspect of the strategy process over a series of instructional periods is to continue until independent student mastery has been achieved. Student practice would then begin with fifth-grade level materials.

As the student attains grade-level ability, prompts and cues from the teacher are faded out. At this point, the student is encouraged to see the benefit of using the strategy and commit to using it for other similar classroom tasks. With this being confirmed by the student, the final phase of strategy instruction can begin: generalization and maintenance. The student is oriented to situations where the new strategy can be applied and adapted as needed. Strategy generalization is then activated with the student completing specific assignments with grade-appropriate materials. General education classroom teachers are encouraged to have the student use the strategy as well as check the student's output. Maintenance should occur periodically by reminding the student to use it and the special education teacher's review of work output.

These strategy methods and classroom practices can facilitate the learning of students who have a LD. Classroom teachers who do not actually implement these procedures could contribute to students who exhibit characteristics of having a LD.

Therefore, strategy methods and classroom practices could be a component in describing the variance in the function of predicting RD/non-RD status.

A second possible element in the variance of defining RD or non-RD status could relate to comorbidity—that a disability may coexist with one or more other disabilities. Research (Willcutt & Pennington, 2000) has found that there is a high level of RD and Attention Deficit Hyperactivity Disorder (ADHD) co-occurrence ranging from 25 to 40%. Whether a student exhibits hyperactivity, inattentiveness, or a combination of the two, difficulty with attending to the learning tasks presented in the classroom will impair a student's ability to learn. Given these characteristics of ADHD, difficulties with learning to read could be attributed to this aspect of the learning process. Unless these needs are addressed through medication or a behavior modification program, prolonged impaired learning has a doubly negative effect of not only impairing reading skills but also having the student miss out on the academic content presented in the classroom through textbooks and other materials. (McGee, Prior, Williams, Smart, and Sanson, 2002; Voeller, 2004).

Ghelani, Sidhu, Jain, & Tannock (2004) investigated students with RD, ADHD, and comorbid RD-ADHD. Some differences were found in the areas of text reading rate, accuracy, and silent reading comprehension. Similarly to the RD group, the comorbid group experienced difficulties with word reading accuracy and reading rate; only silent reading comprehension presented more noticeable problems. For students in the RR Program, the daily lesson format involves daily assessments such as Running Records, which determine reading accuracy and comprehension. If a student has difficulty attending to the task of reading a passage, he or she will find it

more difficult to attain a passing score with the book level. Therefore, inattention could be another aspect in explaining the variance of predicting RD or non-RD group membership.

Earlier in this study, I discussed the five components of the federal definition of LD: the ability (IQ/achievement discrepancy), disorder of psychological process (that students with a LD do not process information in the same manner as other children do), the language component (difficulties with expressive/receptive language), the inclusion clause (students identified with LD previous to the 1977 definition would continue to be eligible for services), and the exclusion clause (students not considered to have a LD due to having another disability—vision impairment, Autism, etc) (Raymond, 2004). The inclusion clause is basically a historical issue as of 2005 given that current first-grade students have only been in school during the current definition.

Using RR as a RTI method of assessment would directly address some of these components but not all. Ending text level would be directly related to the language component and academic achievement. With this study explaining a relatively small amount of variance within the function (7 to 15%), it would be inadequate to diagnose a student with a RD solely on the largest predictor found in the results: ending text level. The ability/achievement discrepancy and exclusion clause components of the LD definition would pose difficulties for RR as a RTI method of RD identification. Without an assessment element of intelligence, RR alone could not specifically assess for this. The exclusion clause includes other disabilities (e.g., mental retardation) which require IQ as a means of diagnosis. Given

this context, the results of this study help inform a component of a larger process to identify specifically for RD.

Based on Kavale and Forness' (2000) operational LD definition (See Figure 5.1), Flanagan, Ortiz, Alfonso, and Mascolo (2002) identified a comprehensive framework for LD determination (see Table 5.1) where students are assessed through intelligence and achievement tests. Flanagan et al. (2002) viewed Kavale and Forness' (2000) model (Figure 5.1) as an important addition to current practice;

Figure 5.1
Example of an operational definition of learning disability by Kavale and Forness (2000).

Level	Operational Definitions					
I	Underachievement Ability-Achievement Discrepancy					Necessary
II	Language	Reading	Writing	Math		
III	<div style="text-align: center;"> Learning Efficiency ↙ ↘ Strategy Rate </div>					
IV	Attention	Memory	Linguistic Processing	Social Cognition	Perception	Metacognition
V	Not Sensory Impairment	Not MMR	Not EBD	Not Cultural Differences	Not Insufficient Instruction	
						Sufficient

however, it did not include a well-documented theoretical paradigm and there were no suggested methods to attain effective measurement of LD. Flanagan et al. (2002)

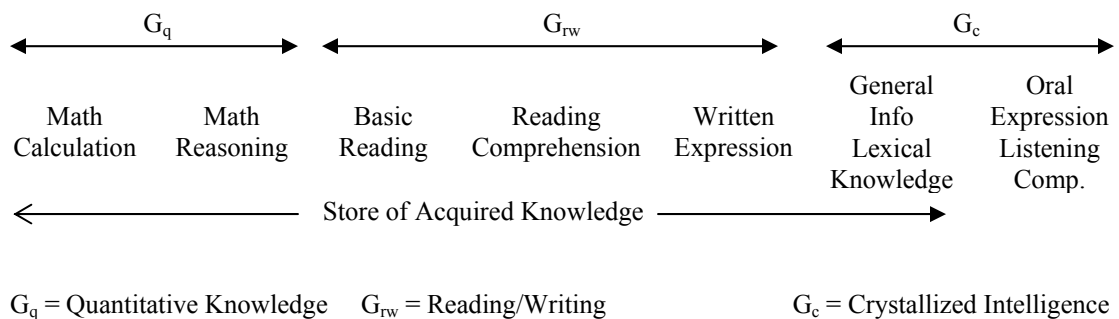
chose to incorporate the Cattell-Horn-Carroll (CHC) theory of cognitive and academic abilities. Flanagan and Ortiz (2001) created a definition that included CHC cross-battery assessment—a guide to the selection and interpretation of academic and intelligence tests. This operational definition is defined in the components of Table 5.2 (Kavale et al., 2005).

Table 5.2
Comprehensive Framework for LD Determination
 Flanagan & Ortiz (2001)

Level	Component	Outcome
I-A	Inter-Individual Academic Ability Analysis	Document specific academic skill or knowledge deficits
I-B	Evaluation of Exclusionary Factors	Identify alternative explanation for learning difficulties
II-A	Inter-Individual Cognitive Ability Analysis	Document specific cognitive deficits
II-B	Reevaluation of Exclusionary Factors	Identify alternative explanation for cognitive difficulties
III	Integrated Ability Analysis—Evaluation of Underachievement	Document that identified academic deficits are empirically or logically related
IV	Evaluation of Interference with Functioning	Document the degree to which identified deficits interfere with functioning
	Related Considerations	Identify other limitations in areas of social skills, motor abilities, vision and hearing abilities
	Eligibility Recommendation	Determine eligibility for SLD classification

The first stage involves documentation of LD through informal methods and prereferral methods that have been unsuccessful. This concept is incorporated into the RR Program by the process of RR referral; classroom teachers nominate the bottom fifth of student in the class who are not succeeding with reading skills. Using CHC theory, Flanagan and Ortiz (2001) then suggest that a comprehensive assessment be initiated. For example, assessment of academic skills would include the elements depicted in Figure 5.2. Each academic skill would then need to be assessed. The final

Figure 5.2
 Level I-A: Measurement of specific academic skills and acquired knowledge – inter-academic ability analysis (Flanagan & Ortiz, 2001)



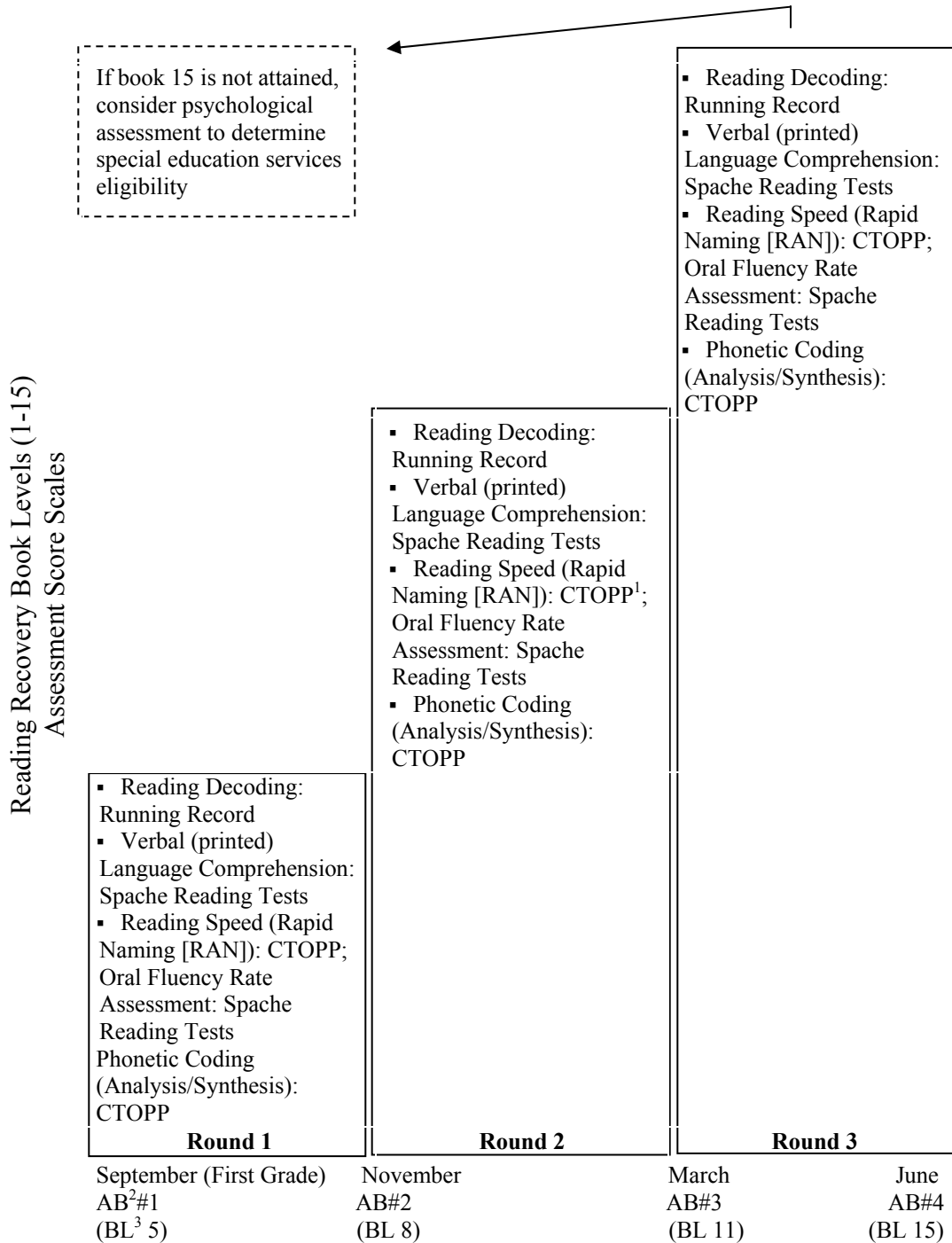
step would be to choose specific tests. The results of this study (ending text level) would be applicable to the reading/writing components. If a student has been referred and attained book level 15 by the end of the RR round, the student would have demonstrated success in reading skill ability. Relative to corresponding CHC abilities, the student would demonstrate good reading decoding, printed language comprehension, phonetic coding analysis, and phonetic coding synthesis. Reading speed is not included in the RR framework of assessments; rapid automatic naming (RAN) could be an additional assessment component address this aspect of CHC

(Kavale et al., 2005). Research (Savagea, 2005) has found that timing students as they name letters and numbers can indicate their ability to use their memory skills for skilled reading.

Whereas the Kavale and Forness (2000) model involves a hierarchical approach, the Falnagan et al. (2002) model is a more recursive process. Results from one level can inform decisions at other levels and possibly provoke a return to prior levels depending on the characteristics of the student's case. To build on this conceptual design, I propose components of a model of how this could work in practice in elementary schools.

As a means to refine Flanagan and Ortiz's (2001) model of LD identification, I propose the conceptual layout of Figure 5.3. This concept represents the practical tasks involved in Levels I-A and I-B of Flanagan and Ortiz's (2001) model. A more in-depth assessment of the components of RD would help to explain a student's profile. An assessment of the student's phonemic awareness, speech perception, vocabulary skills, phonetic working memory, as well as syntax and semantic knowledge would indicate how well the student could employ these skills (Mann, 2003). Measuring these skills over a period of time (e.g., during the first-grade year) would indicate the degree of improvement, if any (Kavale et al., 2005). This would complement the baseline data element of other RTI models in practice such as Ohio's IBAs (Telzrow et al., 2000), Pennsylvania's ISTs (Conway & Kovaleski, 1998), Iowa's Heartland Model (Ikeda & Gustafson, 2002), and Minneapolis Public Schools (2001).

Figure 5.3
RTI Framework with RR as Component for RD Identification



¹Comprehensive Test of Phonological Processing

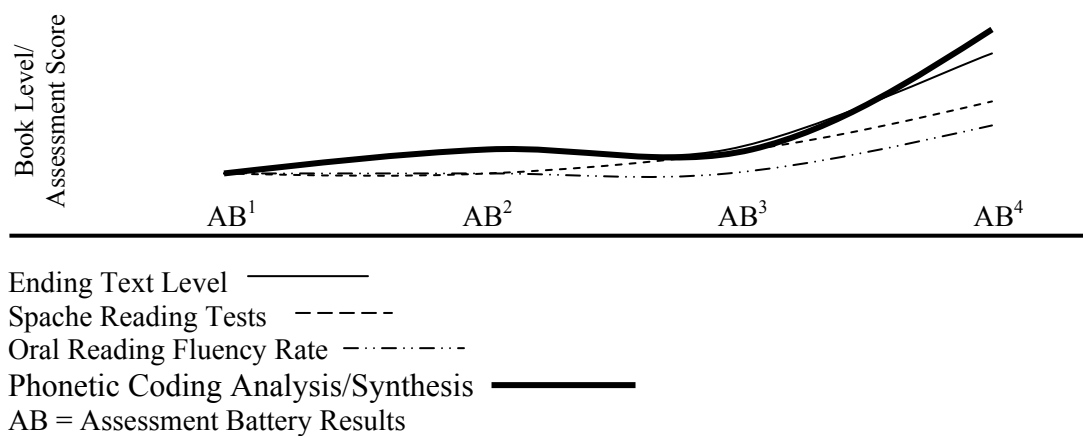
³Book Level (from RR Book Series)

²AB = Assessment Battery

In using RR as an RTI component of LD identification, students would enter first grade and have their reading skills assessed at four points during their first-grade year in school. Special Education staff would assist in having these assessments completed. To assess comprehension, a Running Record would be completed with each first grade student during the first two weeks of school. Comprehension would be demonstrated by the student being able to self-correct words within the text. Book Level 5 would represent the beginning level of a typical first-grade student. The Spache Diagnostic Reading Tests (1981) could also be administered. They include a series of grade-leveled story passage for students to read aloud and then respond to questions; this would indicate the student's ability to comprehend overall meaning within text. Reading speed could be measured with the Comprehensive Test of Phonological Processing (1999). This assessment has the student name random letters and numbers testing their ability to recall the symbols names from long-term memory—the concept of rapid naming (RAN). Research (Savagea, 2005) has found that timing students as they name letters and numbers can indicate their ability to use their memory skills for skilled reading. Components of the Comprehensive Test of Phonological Processing (CTOPP) (Wagner, Torgesen, & Rashotte, 1999) could also be used to measure phonetic coding (analysis/synthesis); this involves a student's ability to segment larger units of speech into smaller units and vice versa. Based on all of the results, the lowest 20% in the class would be nominated for the first round of the twenty-week, daily, one-to-one RR intervention period—with parental consent. The assessments would be repeated at the beginning of rounds two and three.

School special education staff would review the data from the three assessment periods and determine which students are not making progress over time. An example graph of what this might look like for a student appears in Table 5.4. This information would complement what the classroom teacher could provide relative to the student's reading progress in terms of curriculum assessments. If the student did not achieve RR book level 15, further psychological, attentional, and/or adaptive behavioral assessment could be completed. These assessments would complement that of ending text level from RR participation, graphs of reading skills assessments (CTOPP, Spache), and classroom teacher anecdotal notes to be considered together as a means to identify students for further special education services.

Table 5.4
Example Assessment Data Graph including RR Ending Text Level



SES as a non-predictor of RD. Although researchers (Blair & Scott, 2002; Bradley, 1993; Bradley, Caldwell, & Rock, 1988; Molfese, DiLalla, & Lovelace, 1995; Schaimberg & Lee, 1991) have discussed a link between SES and students who

become identified as having a LD, the results of this study did not consistently reflect their findings.

Free/reduced lunch status was well represented within Analysis 1 as demonstrated by the structure coefficient (-.547); students who did not participate in the free/reduced lunch program (those from higher income families) were less likely to be identified as having a LD. However, this did not remain true for Analyses 2—4 (RD defined as reading composite scores of <30, <23, <15). These results support RR as an RTI identification method which does not imply SES bias. The RR Program's focus on reading skills (as opposed to curriculum content knowledge and out-of-school educational experiences implied in intelligence tests) may help to discriminate students who can progress in literacy skills during the intervention from those who cannot.

Earlier this study, I have discussed the controversy related to current identification methods which have resulted in the interest in RTI. Intelligence tests do not identify well students who would benefit from remediation. The wait-to-fail model of identification exacerbates the problems of students who have a RD by leaving remediation to be done later rather than sooner. The characteristics of students with low SES are certainly intertwined with these issues. RTI is being considered as an alternative method of assessment to address these issues.

It is well accepted that the concept of RD is real. There are students who demonstrate real difficulty with literacy skills in schools. Students with low SES can become labeled as RD due to the income level of their family and the reduced educational experiences and modeling that result instead of whether they actually

have a disability. The question is how to factor out students' characteristics which lead to systemic identification based on characteristics such as SES?

There are significant benefits of RTI through the RR Program for students with low SES. Clay (2002) designed the program for students who needed extra assistance to demonstrate literacy skills. Because of the lack of modeling of literate practices in the home and few educational experiences outside of school, students with low SES are not offered the same types of opportunities that other students from middle or upper income families have. Therefore, students with low SES would benefit from this extensive 1:1 instruction to help compensate for what they have missed. If they are still not able to improve in literacy skills as demonstrated by ending text level (and number of weeks as indicated in Analysis 4), the existence of an underlying RD could be explored. The factor of their SES level has been removed with the discontinuation of identification be solely based on standardized test scores which imply SES bias.

RR and literacy definitions. Previously in this study, I discussed definitions of literacy (autonomous, critical literacy, and new literacy studies). The autonomous model focuses on individual and technical skills involved in the reading process (Street, 1996). Critical literacy refers not only to reading and writing but also the way we think about ourselves as working and thinking beings. New literacy studies advocate that literacy as a practice varies from one context to another; the academic and schooled literacy of western cultures only represents one form of literacy amongst many (Barton & Ivanic, 1991).

I think that RR and RTI would be closely aligned with the autonomous model due to concentrating on the technical skills of the reading process. The RR Program is structured in its format of day-to-day lessons; it is not so much a program of reflective thinking about social issues or contextual variation. While this study would feed into the current practices of educational policy makers of implementing the autonomous model, I would advocate that helping students to improve in their basic reading skills would help them become more reflective and varied in their thinking. Reading is a basic skill in our highly textual world. Use of computers is but one example. If a program such as RR can assist a student develop literacy skills which will provide a foundation for all of the literate skills taught and discussed in the general education classroom following the intervention, the students served will be much closer to participating in their literate, social, political, and working world. The RTI focus of this study would help define those students who need continued practice with literacy skills. For those students who do not succeed in RR, special education services could be provided.

Education of Students with RD

An existing issue for the educational community is that a growing number of students are being identified as RD. These students are not having their needs addressed in early elementary grades, although addressing those needs early would help alleviate their level of difficulty as they grow older (Lyon et al, 2001). This study indicates that assessment elements of the RR Program (ending text level in particular) are significant predictors of a student later being identified as RD or non-

RD. Students who participate in the RR Program benefit not only from the intensive individual instruction but also by being identified as RD based on their RR progress if they have not succeeded during the 20 weeks of intervention. Therefore, both RD and non-RD students would benefit from the intervention. Those who needed extra assistance to attain grade-level ability would receive it and be returned to the regular classroom. Those who need continued assistance would be eligible for special education services. These decisions would all be made by the end of first grade. Students would no longer have to “wait-to-fail” for the assistance that they need.

Based on the findings of this study, school districts should incorporate into their identification practices the component of ending text level in determining RD status. It would not explain the entire concept of having a RD, but it would be an indicator that should at least be considered as a reason for further assessment.

Limitations

There was no measure of the type and quality of general education classroom instruction that these students received before, during and after their participation in the RR Program. Students may or may not progress, in part, with RR based on the type or depth of literacy activities and instruction that occurs with the classroom.

Relative to classroom instruction is the issue of teacher judgment in the referral process for special education. Teachers can view students in a variety of ways for who in their classroom is succeeding academically or not (Caram, 2001; Bucci, 1992; Wotherspoon, 2001; Davis, 1990; Limbos, 2001). Disruptive behavior, unstable homes, or having a first language other than English can be reasons that

teacher refer students for special education services. There are reasons which are not so obvious: students who live in poverty, are quiet and withdrawn, or suffer from peer rejection and hence often seem alone (Tunstall, 1995). The influence that a classroom teacher has over the referral process (for RR or special education services generally) is very significant because once referred, it is highly probable that the student will later be officially identified (Yesseldyke, Vanderwood, & Shriner, 1997).

The consequences of teacher referral judgment can render a student who needs help for academic reasons are passed over because the classroom teacher considers another student with behavioral problems, for example, as more needy. Teachers may be new to the profession or not have experience in teaching students with special needs to guide their judgment in who the students are in their class to nominate for a program like RR or special education services. Increasing teacher workload (e.g. class sizes, standardized assessment pressures) diverts teachers' energy and attention from the academic needs of students. The issues surrounding the referral process impair consistent referrals of those students who actually need the help (Gresham & Witt, 1997; MacMillan & Speece, 1999; VanDerHeyden, Witt, & Naquin, 2003).

Although research (Roush, 1995) has found that about 80% of students with a LD have it in the area of reading, there was no definitive means to confirm this for the data set used in this study. There is reason to think that this statistic would continue to be true amongst the students in this sample. Furthermore, their mere participation in the RR Program due to difficulty with literacy tasks would suggest that perhaps more than 80 percent had difficulties in the area of reading.

Lack of running record data resulted in a less-informed description of students' reading skills and types of errors. Although book levels are determined by a score of 90% or more on a running record assessment, it would have been beneficial to have considered the visual, semantic, and meaning errors that students made.

Generalization to the larger national student population is hindered due to regional and demographic factors. The sample for this study was composed of students from three school districts in a midwestern state. The proportion of racial groups in the sample are not representative of students across the nation. This study was composed of 30 percent Black students whereas they represent 14.8 percent of the national student population. One percent of this sample was Hispanic as opposed to 14.2 percent of the American school population (Lawson et al., 2002).

Furthermore, RR has been funded through government programs and legislation (e.g. No Child Left behind Act, 2001) which aim to address the needs of students of low SES status. These students are therefore implied in the sample for this study.

Future Research

Investigating the predictability of error rate and self-correction rate would provide interesting insight into the degree of success students have with individual reading passages during the RR Program and their probability of later being identified as RD. It was unfortunate that these data could not be accessed for this study. A retrospective or longitudinal-type format may be required to attain these data.

Replicating this study on a larger scale would facilitate generalizability for the larger population. Including students and districts from a variety of states and districts would help make the findings more reflective of the national population.

Including variables related to comorbidity and pedagogical methods could help describe more of the variance within the function of predicting RD status. Students who have other health conditions or disabilities could contribute to their having characteristics of RD.

As a conceptual model of identification for students with LD generally, RTI needs to define not only the cut-off score to be used but also other elements of the assessment for identification process. For RD, this study highlighted the aspect of ending text level being a significant predictor in all four analyses; however, only 7 to 15% of the variance in RD/non-RD group membership was explained by ending text level, beginning text level, number of weeks in RR, and free/reduced lunch status. Therefore, there are other factors which are implied in the identification of RD. Future research needs to consider what those factors could be so as to get a more comprehensive explanation of the variance in the function.

For RD, I suggested what a more comprehensive model could be: analysing the elements of reading decoding with running records, verbal (printed) language comprehension using Spache Reading Tests, reading speed (Rapid Naming [RAN]) with CTOPP, oral fluency rate assessment using Spache Reading Tests, and phonetic coding (analysis/synthesis) with CTOPP. Some of these elements have been researched already as a predictor of RD (e.g. Rapid Naming [RAN] and phonemic awareness [Lovett, Steinbach, & Fritjers, 2000; McGuiness, McGuiness, &

McGuiness, 1996; Stanovich, 1988a; Torgensen & Wagner, 1998; Torgensen, Wagner, & Rashotte 1997]). Exploring these elements with ending text level, SES (free/reduced lunch in this study), and number of weeks in RR could a more comprehensive explanation of the variance in the function of RD/non-RD group membership.

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Yesseldyke, J., Vanderwood, M., & Shriner, J. (1997). Changes over the past decade in special education referral to placement probability: An incredibly reliable practice. *Diagnostique*, 23, 93-201.

Curriculum Vitae

Michael William Dunn
Ph.D. Candidate in Special Education/Literacy at Indiana University—
Bloomington

1. Academic Degrees

2005	Ph.D.	Indiana University, Bloomington, Indiana Special Education/Language Education
		Areas of interest: Learning Disabilities Teacher Education Assistive Technology in Special Education
		<u>Doctoral Dissertation:</u> Diagnosing Disability through Response-to- Intervention: An Analysis of Reading Recovery as a Valid Predictor of Reading Disabilities
2002	M.A.Ed.	Mt. St. Vincent University, Halifax, Nova Scotia (Distance-Education Site, Mississauga, Ontario) Literacy Education
1994–1997	Additional Qualifications	Ontario Institute for Studies in Education, Toronto, Ontario Special Education (Learning Disabilities) Certification Primary Classroom Certification English as a Second Language Certification
1991	B.A./B.Ed.	Dalhousie University, Halifax, Nova Scotia Second-Language Education Political Science
1989	Certificate	Centre universitaire de Moncton, Moncton, New Brunswick French Immersion

2. Publications

Dunn, M. W., & Butera, G. (2004). Using case studies in pre-service special education teacher preparation. *American Council on Rural Special Education, 1*, 144–150.

3. Manuscripts Submitted for Publication

Butera, G., & Dunn, M. (2004). *The case for cases in preparing special educators for rural schools*. Manuscript submitted for publication.

Dunn, M. W. (2004). *It was written all over him: Classroom teachers' criteria for special education referrals*. Manuscript submitted for publication.

Dunn, M. W., Cole, C.M. (2004). Key referral criteria of classroom teachers: Flagging students who are different. Manuscript submitted for publication.

4. Manuscripts in Preparation

Dunn, M. W. (2004). *Predicting reading disabilities: Reading recovery and running records as tools in a response-to-treatment method of assessment*. Indiana University, Bloomington, IN. Doctoral dissertation in preparation.

Dunn, M., Hinshaw, R., Williamson, G., & Nelson, J. (2004). *Scaffolding reading decoding and comprehension strategies for students with reading disabilities: A discourse analysis of tutor-student interactions*. Manuscript in preparation.

Hinshaw, R., Williamson, G., Dunn, M., Nelson, J. (2004). *Assistive technology and prompts: Impacting comprehension skills of students with reading disabilities*. Manuscript in preparation.

Williamson, G., Hinshaw, R., Dunn, M., Nelson, J. (2004). *Project CRISP: Comprehensive reading instruction and strategy practice*. Manuscript in preparation.

5. Grants

2004 Indiana University Travel Grant. Amount Awarded: \$800
Purpose: To present at the American Council on Rural Special Education, Orlando, Florida, March 18–21, 2004.

2004 Indiana University (Daisy Jones) Research Grant. Amount Awarded: \$2000 Principal Investigator: Michael W. Dunn.

6. Conference Presentations

Dunn, M. W. (2005) *The Construction of a learner as being at risk*. Round table discussion on literacy issues of learners who are at risk at the Jerome Harste/Carolyn Burke Retirement Conference, May 20–22, 2005, Bloomington, Indiana.

Dunn, M. W., Cole, C.M. (2005). *Key referral criteria of classroom teachers: Flagging students who are different*. Discussion Paper at the American Educational Research Conference, April 11–15, Montréal, Canada.

Hinshaw, R., Williamson, G., Dunn, M., Nelson, J. (2005). *Older Students with Reading Disabilities: Multimedia Inquiry Projects Using Reading Assistive Technology*. Discussion Paper at the American Educational Research Conference, April 11–15, Montréal, Canada.

Dunn, M. W. (2004). *The later literacy Program: Assisting Grades 4-8 readers who are at risk*. Workshop presented at the Indiana Council for Exceptional Children Conference, Bloomington, Indiana.

Hinshaw, R., Williamson, G., Dunn, M., Nelson, J. (2004). *Assistive technology and prompts: Impacting comprehension skills of students with reading disabilities*. Workshop presented at the Indiana Council for Exceptional Children Conference, Bloomington, Indiana.

Dunn, M. W. (2004). *Using case studies in pre-service special education teacher preparation*. Workshop presented at the American Council on Rural Special Education (ACRES) Conference, Orlando, Florida.

7. Reviewer for Conferences

2004 American Educational Research Association 2005 Conference—
Special Interest Group: Special Education.

8. Consulting Experience

2002 Dunn, M. W. *Participated in a panel discussion on Special Education to students seeking their degree in Elementary Education at Indiana University*. Elementary Certification Graduate Program, Bloomington, Indiana.

9. Relevant Professional Experience

2005–present Assistant Professor
Washington State University—Vancouver

2002–2005 Associate Instructor
Indiana University, Bloomington, Indiana

<u>Department</u>	<u>Level</u>	<u>Semester</u>	<u>Course Title</u>
Special Education	Undergraduate	Spring 2005	Introduction to Learning Disorders
Language Education	Undergraduate	Fall 2004	Methods of Teaching Reading II
Special Education	Undergraduate	Spring 2004	Introduction to Learning Disorders
Special Education	Graduate – Online	Fall 2003	Families, School, and Society
Special Education	Undergraduate	Spring 2003	Introduction to Learning Disorders

2002-2005 Field Experience Supervisor
Indiana University, Bloomington, Indiana

<u>Department</u>	<u>Level</u>	<u>Semester</u>	<u>Supervision Location</u>
Special Education	Undergraduate	Spring 2005	Indianapolis
Special Education	Undergraduate	Fall 2003	Bloomington
Special Education	Undergraduate	Spring 2003	Indianapolis
Special Education	Undergraduate	Fall 2002	Bloomington

2004 (Summer) Research Assistant
Brock Reading Clinic, Bloomington, Indiana

I assisted in the programming of this summer intervention clinic for students with reading disabilities. I also completed a qualitative research study (discourse analysis) about the process of the intervention's reading decoding and comprehension strategies.

2003 (Summer) Researcher
Indiana Institute on Disability and Community, Bloomington, Indiana

I designed a quantitative research study concerning referral criteria of classroom teachers for students with possible exceptionalities. I also participated in the institute's professional development Summer Camp for teachers.

1991–2002 Elementary Teacher
Dufferin-Peel Catholic District School Board
Mississauga, Ontario

I taught in elementary schools: Second-Language Education; Kindergarten; and for the last eight years, Special Education /English as a Second Language. As the lead Special Education Teacher, it was my responsibility to organize all the identification/case conference meetings and dialogue with educational personnel such as the school's social worker, child and youth worker, speech and language pathologist, and child psychologist about student cases in the school.

10. Associated Professional Experience

1998–1999 Program Facilitator
Dufferin-Peel Catholic District School Board
Mississauga, Ontario

I was selected for this part-time position in addition to my regular teaching duties to attend workshops concerning the curriculum initiative of Design-Down Planning. I would train teachers in the program during after-school workshops. I also collected data about teachers' curriculum needs.

11. Other Educator Experience

2002 (July) Group Leader, Grade 6 Reading
Education Quality and Accountability Office
Toronto, Ontario

I applied and was chosen to be a Group Leader for those teachers marking the provincial standardized assessments for Grade 6 Reading. I trained a group of 20 teachers in how to do the marking and assisted throughout the three-week marking session in maintaining the reliability of the process.

2001 (July) Marker, Grade 3 Math
1999 (July) Education Quality and Accountability Office
1998 (July) Toronto, Ontario

I was selected to be a teacher marker of the provincial standardized assessments for Grade 3 Math.

12. Scholarships and Awards

2004	Datatel Scholars Foundation Scholarship
2003	Datatel Scholars Foundation Returning-Student Scholarship
2003	Indiana University Foundation Scholarship
2002 & 2003	Ontario English Catholic Teachers' Association Scholarship
2002	Johnson Incorporated Academic Scholarship
2001	Jim Cranston Photography Award
1984	Nova Scotia Lieutenant Governor's Medallion – for combined academic achievement and school involvement

13. Professional and Community Service

2003–present	Graduate Student Representative on the Teaching-All-Learners (T.-A.-L.) Program Committee at Indiana University
2004	Member of the Organizing Committee for the 2004 Indiana Council for Exceptional Children Conference in Bloomington, Indiana
2004 (Fall)	Member of the Language Education Undergraduate Elementary Program Committee at Indiana University
2000–2002	Member of the Curriculum Management Team Committee
2000–2001	Vice-President of the Mississauga Camera Club
1996, 1999–2002	Co-Coach of the Junior Boys Volleyball
1998–2002	Organizing Committee for Junior/Intermediate Track and Field Day
1995–2002	Member of the Mississauga Camera Club
1991–2002	Played the guitar to accompany the school choir and students at gym assemblies
1999–2001	School OECTA Representative
1995, 1996, 1999, 2000	Co-Coach of the Junior Boys Basketball (we won 1 st place at our Family of Schools Tournament in 2000)
1996–1998	Organized School Spirit Activities
1997–1998	Organizing Committee for Winter Carnival and Summer Play Day Activities

1995–1997	School Athletic Association Representative
1994–1997	Primary Art Club
1994–1995	Yearbook Committee Member
1992-1993	Co-Coach of the Cross-Country Team

14. Licenses and Certifications

Licensed	Special Education Teacher
Licensed	English as a Second Language Teacher
Licensed	Primary Classroom Teacher (JK-Gr. 3)
Licensed	Second-Language Education Teacher
Certified	Later Literacy Program Teacher (Gr. 4-8)

15. Professional Associations

Council for Exceptional Children

Council for Exceptional Children (Division for Learning Disabilities)

Learning Disabilities Association of America

Council for Learning Disabilities

American Educational Research Association

National Council of the Teachers of English

International Reading Association