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AN EXPLORATORY STUDY OF AN APPLIED PREVENTION MODEL FOR ACADEMIC DIFFICULTIES AMONG STUDENTS IN A SCHOOL IN MUMBAI, INDIA

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Abstract

In India, several prevalent problems hinder the process of early identification and subsequent provision of early intervention. The rationale for this exploratory study is to provide schools in India with a preventive service delivery model that aids early identification, provides evidence-based early interventions, and can also be used in identification of Specific Learning Disability. The present study aims to provide an insight into the process of instituting a Response to Intervention model in a school in Mumbai, India. Twenty-four at-risk participants were selected from 104 students screened for reading problems. Participants were assigned to one of three groups (A, B, or C) for Tier 2 reading intervention sessions. To assess participants' academic progress, the Beginning Phonics Assessment (BPA) and Primary Phonics Assessment (PPA) were administered pre- and post-intervention. To evaluate the internal consistency of the overall test scores, Cronbach's coefficient alpha and split-half method were applied. The impact of Direct Instruction intervention on reading skills and the duration and length of intervention on reading skills were assessed via *t* tests. Graphic display of each participant's progress monitoring scores was used to permit visual analysis and descriptive explanation. The Reliable Change Index (RCI; Zahra & Hedge, 2010) was also applied individually with participants in Group A and combined Group B/C to assess whether or not the individual's score change from pre- to post-intervention was statistically significant. The results of the study provide initial evidence for the utility of BPA and PPA with the Indian population. The study also provides evidence for the efficacy of DI reading interventions within the Indian educational setting. The study also identified the potential areas of challenges that one might face in implementing this model in Indian schools. The results of the study provide initial evidence for employing RTI with schools in India.

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GLOSSARY OF ABBREVIATIONS

BPA – Beginning Phonics Assessment

DI – Direct Instruction

ELL – English Language Learners

IDEIA - Individuals with Disabilities Education Improvement Act

IQ – Intelligence Quotient

NJCLD – National Joint Committee on Learning Disabilities

OLST – Oral Language Screening Test

PPA – Primary Phonics Assessment

RCI – Reliable Change Index

RTI – Response to Intervention

SLD – Specific Learning Disability

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CHAPTER 1: INTRODUCTION

In the United States, the Individuals with Disabilities Education Improvement Act (IDEIA) 2004 has brought Response to Intervention (RTI) into the limelight (Elliot, 2008; National Joint Committee on Learning Disabilities [NJCLD], 2005). In theory as well as in practice, RTI is a model that provides learning support to students before they are referred for special education services (Elliot, 2008). As an approach to remedial intervention, the RTI process generates data to inform instruction and identify students who might need special education and related services (NJCLD, 2005). Whereas practitioners were previously mandated to use an ability-achievement discrepancy to identify students with a Specific Learning Disability (SLD), they now have the option of using the RTI method to do so (Fuchs & Fuchs, 2006).

RTI is a preventative approach that aims at providing early interventions as soon as children experience academic difficulties and to improve achievement of all students, even those who may have learning disabilities (NJCLD, 2005). RTI aims to bridge the gap between what a student knows and what she or he should know through evidence-based early interventions (Riccomini & Witzel, 2010). RTI is a process in which students are provided quality instructions, their progress is monitored, those who do not respond appropriately are provided additional instruction and their progress is continued to be monitored, and those who continue to not respond appropriately are considered for special education services (Fuchs, Mock, Morgan, & Young, 2003).

Riccomini and Witzel (2010) highlight the six key components of an RTI model. First, a belief system evidenced among all school personnel that if provided with adequate instructions, all children are capable of learning. Second, services are provided to students in an incremental sequence through a multi-tiered approach. Third, at all levels of service delivery teachers

provide their students with evidence based instructions and interventions with fidelity. Fourth, universal screenings are regularly conducted to identify students who might be struggling and to provide them with early interventions. Fifth, progress of the students is regularly monitored. Lastly, schools must regularly evaluate the program and make modifications to improve its effectiveness (Riccomini & Witzel, 2010). Thus, the process of RTI is geared towards early identification and intervention of academic difficulties.

In India, several prevalent problems hinder the process of early identification and subsequent provision of early intervention. One of them is the lack of standardized measures for assessment. Most tests of achievement or cognitive abilities have been developed and standardized on samples in Western countries and their applicability and effectiveness with Indian population is only an assumption (Rozario, 2007). Furthermore, multiple languages are spoken in India and a dearth of standardized tools in all Indian languages at different schooling stages makes identifying and diagnosing special needs difficult (Kulkarni, cited by Shrinivasan, 2005; Ramaa, 2000). Another very important issue is the lack of awareness among teachers, parents, and administrators related to learning difficulties and disabilities (Pandit, 2007).

Furthermore, many experts in India believe that Indians are immune to specific learning disabilities (SLD). Given the transparency of Indian languages (i.e., a consistent sound-letter association between spoken languages and the written scripts), many hold that Indian students are unlikely to experience SLD (Karanth, 2003). However, research conducted over the past two decades provides evidence for the existence of this condition among the Indian population of school-aged children (Ramaa, 2000). Although extensive research has discussed the importance of understanding the structure of Indian languages and inclusion of specific language-based tests in assessment batteries for SLD (e.g., Prema & Karanth, 2003), little information is available

about the practices that are actually adopted by professionals involved in the identification of this condition among children (Karanth, 2003).

In terms of accommodating children with academic difficulties in India, many improvements are needed to be on par with the developed nations of the world. For example, in 1996 the state of Maharashtra formally granted students with SLD the benefit of availing the necessary 'accommodations' to enable them to complete education in regular mainstream schools -- the first municipality to do so (Karande, Sholapurwala, & Kulkarni, 2011). These accommodations include (a) extra time for all written tests with spelling mistakes being overlooked, (b) employing a writer for children with learning disabilities in writing, (c) exemption of second language and substituting for it with a work experience subject, and (d) exemption of algebra and geometry and substituting for it with a lower grade mathematics or another work experience subject. In the 2003, the federal government of India extended these provisions to the college courses and college seats were even reserved for these students who qualified for the handicapped category (Karande et al., 2011). However, no law in any of the Indian states obligates schools to provide remedial education or special education services to these students, nor are these students entitled to any publically funded services (Karande et al., 2011).

Given the lack of organized services for students who face academic difficulties in India, laying a foundation for service provision becomes imperative. The present study aims to provide insight into the process of application of a prevention model for academic difficulties that focuses on universal screening and providing early intervention services for children who might be at risk for learning difficulties in a school in Mumbai, India. The purpose of this study was to explore the application of a RTI model in a school in Mumbai and to examine the efficacy of the

model in promoting reading skills among students who are identified as struggling in this academic area. Universal screening is an inherent feature of an RTI model and thus necessitates availability of psychometrically sound measures for screening of academic difficulties. The items on these measures must also function appropriately for the India population (Allen & Yen, 1979; Camilli & Shepard, 1994). Thus, this study also examines the reliability and utility of a screening measure in reading with an urban sample in India.

CHAPTER 2: LITERATURE REVIEW

Importance of Early Intervention and Identification

Not all children are born healthy, have access to decent nutrition, have adequate health care and housing, are raised by parents who can nurture and challenge them appropriately, or are born without any disabilities or genetic susceptibilities (Meisels & Shonkoff, 2000). These environmental and genetic factors can make children susceptible to learning problems. Problems in learning tend to escalate rather than alleviate over the years and can lead to long-term effects on the students' school success as well as later life (Janus & Offord, 2007). However, these difficulties due to the different biological and environmental factors can be prevented entirely or their severity can be minimized if adequate interventions are provided in the early years (Guralnick, 2005). Evidence for the short- and long-term efficacy of early intervention has been demonstrated with effect sizes ranging between 0.50 and 0.75 (Guralnick, 2005).

Further evidence for the efficacy of early intervention comes from the Consortium for Longitudinal Studies for the economically disadvantaged children between 1962 and 1973 (Lazar, Darlington, Murray, Royce, & Snipper, 1982). When evaluating the long-term benefits, children who received early intervention services had significantly fewer placements into special education and fewer grade retentions as compared to the children who did not receive early interventions (Lazar et al., 1982). In their follow-up study of the Carolina Abecedarian Project, four to seven years after the cognitive, language, perceptual-motor, and social development intervention had ended, Campbell and Ramey (1994) found that early interventions had positive and long-lasting effects on both intellectual development and academic achievement. Thus, early academic and behavioral interventions that aim to help young, at-risk children and their families succeed are essential (Meisels & Shonkoff, 2000).

Along with early intervention, early identification of difficulties has also been advocated as an economical and humanitarian approach to increase children's life chances and decrease secondary problems (Palfrey, Singer, Walker, & Butler, 1987). Advocacy for such early identification is logical -- to provide early interventions to children, one must identify children who are in need before their difficulties increase in scope and severity (Shaughnessy, Lane, Gresham, & Beebe-Frankenberger, 2003; Pandit, 2007). Bordignon and Lam (2004) identified four major reasons for assessing preschool children: (a) to identify children in need of further evaluation, (b) to make diagnostic assessments available, (c) to help in curriculum planning, and (d) to monitor the development of identified pupils.

In a study by Palfrey et al. (1987) of special education programs in five urban American school systems, parent interview data for 1,726 children documented the timing of the children's problem identification and the medical system's involvement in the diagnosis. These problems encompassed speech impairment, learning disabilities, emotional disturbance, mental retardation, sensory disorders, and physical and health disabilities. Overall, 4.5% of the children's problems were identified at birth and only 28.7% before the age of 5 years. About 48% of the children were diagnosed between the ages of 5 and 7, and special needs of the remaining 23.3% were detected at the age of 8 years and older. Low-prevalence disabilities were more likely to be diagnosed by a physician; high-prevalence disabilities were more likely to be identified by teachers and school professionals. O'Shaughnessy et al. (2003) recommended a school-wide system of early identification and intervention that requires the educators to have an understanding of empirically supported identification and intervention approaches and the appropriate knowledge to apply this knowledge in a systematic way. Such screenings and assessments with preschool children are common in many American schools (Gredler, 1997).

Identification of Specific Learning Disabilities

The Specific Learning Disability classification is defined by IDEIA (2004) as impairment in one or more basic psychological processes related to preprocessing written or spoken language that manifests itself in difficulties to read, write, understand, speak, and do mathematical calculations. These difficulties are so severe that the educational performance of these students is impaired. One can have a specific learning disability identified in the areas of listening comprehension, written expression, oral expression, basic reading, reading comprehension, reading fluency, mathematical computation, and math problem solving. Further, one cannot be diagnosed with a SLD if difficulties are mainly due to limited English language proficiency, lack of adequate instruction, family and cultural background, or low socio-economic status (Hale, Naglieri, Kaufman, & Kavale, 2004).

Both technical and conceptual problems exist regarding the criteria for identification of SLD. A lack of professional agreement on what constitutes SLD is a critical problem (Wedl, 2005) leading to significant inconsistencies for SLD eligibility across U.S. (MacMillan, Gresham, & Bocian, 1998; Ysseldyke, Algozzine, & Epps, 1983). A large difference in prevalence rates across the nation is evidences (Colker, 2011). This difference is more likely related to the variations in the state-by-state practices regarding how children and youth are identified than to real differences in student populations (Wedl, 2005).

The latest reauthorization of the IDEIA presents two paths to identifying SLD: the traditional discrepancy model and the RTI model. The traditional discrepancy model is based on the medical model, whereas the Response to Intervention model takes a preventative approach.

The Discrepancy Model Approach. The discrepancy model looks at the difference between ability and achievement and is the most widely used method for identification of SLD in

the U.S. However, several fundamental problems are inherent in the discrepancy method (Vaughn & Fuchs, 2003). The discrepancy approach has been frequently criticized as atheoretical (e.g., Lyon, 1987; Willson & Reynolds, 1984)). Some of the underlying assumptions of the discrepancy model are not empirically supported. These assumptions include: (a) degree of the discrepancy relates to the severity of SLD (Stanovich & Siegel. 1994), (b) differences prevail in the academic performance of a student with severe discrepancy and without discrepancy (Gresham, 2002), (c) discrepancy model produces reliable information (Willson & Reynolds, 1984), (d) results of the discrepancy model inform intervention and instruction (Elliot & Fuchs, 1997), and (e) IQ tests are a necessary element in the identification of SLD (Donovan & Cross, 2002).

Moreover, the number of students identified as SLD in the U.S. has risen considerably (U.S. Department of Education, 2000). As special education services are more expensive than regular education services (Chambers, Parrish, & Harr, 2002), accurate special education determination is crucial (Vaughn & Fuchs, 2003). The discrepancy model is often viewed as the reason for the increase in special education enrollments and costs (Fuchs & Fuchs, 2006).

The identification criterion regarding how ability-achievement discrepancy should be applied is ambiguous, and state laws and regulations must define and specify the terms for the application of the discrepancy between the child's ability and achievement. The federal regulations only provide vague guidelines for identification criterion. Across the U.S., discrepancy varies in terms of (a) how it is computed (e.g., standard IQ score minus standard achievement score versus the regression of IQ on achievement), (b) its size (e.g., 1.0 *SD* versus 2.0 *SD*s, etc.), and (c) which IQ and achievement tests are appropriate for use. The lack of theory supporting the discrepancy model has paved the way for different states and districts to

operationalize this discrepancy differently. As a result of these differences in the operational definition and criteria large inconsistencies in SLD prevalence rates between states and sometimes between districts within states are evidenced (e.g., Hosp & Reschly, 2004; Scruggs & Mastropieri, 2002).

Mercer, Jordan, Allsopp, and Mercer (1996) listed four main methods in which discrepancy has been operationalized by different states. These methods for determining ability-achievement discrepancy include a constant and graduated deviation from the grade level, expectancy formulas, regression analysis, and standard score comparisons. Most states use standard score comparisons to determine inter-individual discrepancy, whereas intra-individual method (i.e., a difference between "student's highest and lowest areas of achievement") was reported to be used only by one state (Kidder-Ashley, Deni, & Anderton., 2000, p. 68). Such inconsistency in the definition of IQ–achievement discrepancy and varying prevalence rates—as well as the outright noncompliance by some school-level personnel with state and district guidelines (Gottlieb, Alter, Gottlieb, & Wishner, 1994)—have contributed to a widespread view that the SLD diagnosis is more or less arbitrary (Coles, 1987).

Furthermore, the 50 American states also differ on the basis of their implementation of the different criteria for identification. Mercer et al. (1996) reported that 37 states do not factor intelligence in their definitions; however, 13 use intelligence test scores in their identification criterion (exclusion component). A language component is included by 42 of the states in their identification criteria. Also, low academic achievement is observed as central to the concept of SLD with 47 of the states including reading factors, 45 specifying writing, and 46 with math in their criteria. All 50 of the states permit application of the discrepancy method for identification (Mercer et al., 1996). Notably absent from some of these criteria is any mention that a child with

SLD must have a psychological processing disorder, even though this is a mandatory requirement according to the current and previous IDEIA definitions (Hale et al., 2004; Mercer et al., 1996).

Some of these inconsistencies for SLD eligibility may also stem from the technical issues related to the ability-achievement discrepancy score. Reschly and Ysseldyke (2002) note that discrepancy scores may contain considerable measurement error and that the exact size of ability-achievement discrepancy is significantly less reliable than either of the test scores used to determine the discrepancy. A number of other factors may also contribute to the varied identification practices: the decision of the regular education teacher to refer (Ysseldyke & Algozzine, 1983), the assessment procedures utilized, and considerations of the placement committee (MacMillan & Siperstein, 2002). Teachers are guided by their own judgments about the child's level of deficient performance when making referrals for special education evaluation, which is not always weighed against the local norms of achievement (MacMillan & Siperstein). This leads to a great amount of subjectivity in referrals.

Furthermore, as the "ability" component of this equation is measured by IQ, a student who scores low on the IQ test will have difficulty demonstrating a significant discrepancy between ability and achievement, and thus not be found eligible for services for which they are in need (Ysseldyke & Marston, 1999). Vellutino, Scanlon, and Lyon (2000) addressed the problems of using a discrepancy formula to differentiate the needs of students who need help in reading. Studies suggest that young, poor readers with and without an IQ–achievement discrepancy perform similarly on many reading-related cognitive tasks (e.g., Fletcher et al., 1994; Foorman, Francis, & Fletcher, 1995; Stanovich & Siegel, 1994), as well as demonstrate phonological processing deficits that are correctable with appropriate instruction (e.g., Fletcher,

1995; Morris et al., 1998; Stanovich, 1999; Torgesen, Morgan, & Davis, 1992; Vellutino et al., 2000). A study by Algozzine, Ysseldyke, and McGue (1995) also revealed few differences between low achieving and learning disabled students. Thus, due to the IQ–achievement discrepancy approach, the SLD label is not just arbitrarily assigned, it may be unfairly withheld from children who are as needy and deserving as those given the label.

The use of IQ scores in the discrepancy method has also been a source of further controversy. In identification of learning disabilities, IQ scores may be used in two main ways: as the inclusion criteria to establish the discrepancy between ability and achievement, and as the exclusion criteria to rule out mental retardation. Many professionals have questioned the use of IQ scores in eligibility determination of SLD (e.g., Siegel, 1999; Stanovich, 2005; Vellutino et al.,, 2000). Siegel (1999) argued that IQ scores do not represent a single construct, and different tests measure different skill sets. Siegel (1999) also points out the potential bias in the IQ tests for some populations and the question as to whether or not they can be used in the eligibility process. Moreover, inappropriate predictions made by IQ scores tend to put limits on the extent that a child can achieve. If made early in one's academic life, such a prediction can prove detrimental to a child's educational experience. Further, linguistic coding ability and short-term verbal memory assessed by intelligence tests are adversely affected by the presence of SLD, thus intelligence scores may underestimate the true ability (Vellutino et al., 2000) and thereby leading to misdiagnosis.

Another critique of the discrepancy model stems from the fact that implementation of the model hampers early identification of learning difficulties. Identification of SLD using the discrepancy model depends on a large enough discrepancy (often 15-22 points) between aptitude and achievement, which may not be obtainable until third or fourth grade (Stuebing et al. 2002).

Unfortunately, evidence indicates that children identified with a Reading Disability after second grade rarely catch up to their peers (Lyon et al., 2001). Such evidence is likely to raise ethical dilemmas for educators and school administrators, who are more concerned about providing help to these students and has led to ignoring the identification criteria and classifying the low achieving students with SLD even in absence of the prescribed discrepancies (MacMillan et al., 1997).

Furthermore, the use of the discrepancy model alone provides limited information (i.e., difference between two scores) that does not explicitly inform decisions related to interventions and remediation (Semrud-Clikeman, 2005). Gresham (2001) noted that the most serious drawback of the discrepancy model is the absence of the direct link between assessment procedures for identification and the resulting interventions. An approach that defines SLD based on how students respond to instructional interventions rather than on some arbitrarily defined discrepancy between ability and achievement is needed.

The Response to Intervention (RTI) Approach. As discussed in the earlier section, IDEIA has paved way for schools in the U.S. to use RTI as a method for diagnosing students with SLD. The emerging RTI models rely on multi-tiered system of evidence-based interventions, becoming progressively more intense based on students responses to those interventions (Hoover & Patton, 2008). While RTI as a replacement for the discrepancy model has been a source of controversy, RTI is being seriously considered by many state education departments in the U.S. as the predominant method of choice for meeting the needs of students at-risk and those struggling with learning (Hoover, Baca, Wexler-Love, & Saenz, 2008).

A study by Hoover et al. (2008) sought to understand the perception of RTI and its utility by investigating the level of emphasis of current and projected statewide efforts for

implementing RTI from the perspectives of special education state departments directors in all the states as well as the District of Columbia. Survey results indicated that statewide training efforts are implemented in 90% of the states with primary emphasis on overview of RTI, progress monitoring, and the use of data-driven decision-making. Over one-third of the states indicated that they plan to use RTI as a replacement for, or supplement to, the learning disability discrepancy model.

Gresham (2005) has identified four main advantages of the RTI model over the discrepancy model: (a) early identification of learning problems, (b) use of a risk model rather than a deficit model, (c) reduction of identification bias, and (d) focus on student outcomes. Also, RTI provides a way to support English language learners (ELL) when they first show signs of struggling with reading. Many recommend using RTI over the discrepancy model for identifying ELL students with SLD (Bradley, Danielson, & Hallahan, 2002; Donovan & Cross, 2002). Proponents of RTI believe that a successful model for making special education decisions should be based on structured, data-based problem solving, flexible service delivery, regular progress monitoring, and focus on the natural classroom contexts (Bradley, Danielson, & Doolittle, 2005).

Johnson and Smith (2008) discuss the challenges and the potential benefits of the implementing a RTI model at a middle school. At the end of the first year of RTI implementation at the middle school level, significant improvements in many areas were reported. A concerted effort on implementing evidence-based instructional practices was evidenced across the entire school. The review and analysis of interventions to target common academic concerns allowed the school to use resources more efficiently and see greater progress and a reduction in the referrals to special education services. Further, the implementation of screening and progress-

monitoring tools provided an objective means to early identification of needs. Finally, the information that was collected on individual students provided the implementation team with a more substantial and organized method of communicating concerns with parents and working in conjunction with them to address concerns (Johnson & Smith, 2008).

Despite the potential benefits of RTI, criticisms regarding its effectiveness in identification of SLD remain. One of the concerns is that RTI fails to make a distinction between SLD and slow learners. It also does not consider academic failure due to unexplained causes, and a student who learns slowly may be diagnosed with SLD (Kavale, 2005). RTI is also unable to differentiate SLD from other disabilities such as mental retardation, emotional or behavioral disorders, and attention-deficit/hyperactivity disorder (ADHD; Mastoripieri, & Scruggs, 2005). RTI models seek to identify nonresponsiveness to empirically validated intervention rather than the presence or absence of underachievement.

Furthermore, implementation of RTI is not standardized and vast differences in what RTI looks like are evidenced. Berkeley, Bender, Peaster, and Saunders (2009) provided an overview of how the 50 American states progressed with the development and implementation of RTI models a year after the final regulations for IDEIA were passed. They presented information related to RTI model type, implementation status, professional development, criteria for eligibility, and specific features of individual state's RTI models. Results indicated that a wide variety of approaches were adopted throughout the country.

Also, a number of questions about and logistical aspects of RTI are necessary to address in order to successfully implement RTI (Bradley et al., 2005). For example, how should screening for secondary interventions occur? How should secondary interventions be formulated? What are the feasibility and consequences of RTI? How should unresponsiveness to

secondary intervention be defined in an RTI approach to SLD identification? How many tiers are needed and effective in achieving acceptable patterns of SLD identification?

The RTI Process

At the core of an RTI approach are the systematic applications of research-based interventions in general education, measurement of a student's response to these interventions, and use of RTI progress monitoring data to make decisions about instructions (NJCLD, 2005). Using the RTI method, a subgroup of at-risk students is identified before data are gathered to determine whether or not students are responsive to intervention. From this at-risk subgroup, nonresponders are likely to emerge (Fuchs & Fuchs, 2006). Several ways can be utilized in the identification of this subgroup. Practitioners may choose to look at all students' performance on the prior year's high-stakes test and choose a criterion such as scores below the 25th percentile to designate risk. Alternatively, practitioners may test all students in a given grade and identify those scoring below the same percentile (for a norm-referenced measure) or below a performance benchmark (for a criterion-referenced measure) as at risk. Fuchs and Fuchs (2006) recommend that the best strategy is to assess every student in the grade on a screening tool with a benchmark that demonstrates utility for predicting end-of-year performance on high-stakes tests (elementary grades) or on local graduation requirements (secondary level).

The next step in the RTI framework is monitoring the progress of these at-risk students as to their responsiveness to general instruction is monitored (Fuchs & Fuchs, 2006). Responsiveness may be defined as "a score above the 16th percentile" (p. 94). However, Fuchs and Fuchs recommend a method that requires practitioners to compare the at-risk students' performance to either local or national normative estimates for weekly improvement, or criterion-referenced figures for weekly improvement. If neither are available, then

responsiveness may be operationalized as “some improvement” (i.e., increased achievement greater than the standard error of estimate). At-risk children who are unresponsive to classroom instruction are given more intensive instruction at a second tier, or level, either in or outside the classroom and their performance during this more intensive, second-tier instruction may be assessed in a manner similar to how performance was assessed during first-tier instruction provided to all students (Fuchs & Fuchs, 2006).

Wedl (2005) published a report that provides 10 essential points for implementation of RTI model:

1. Problem Definition. The teacher gathers information related to achievement, state scores, attendance, and relevant academic data to provide a specific description of the problem.
2. Strengths and Weaknesses. The aim is to create an environment for success. The teacher is able to give valuable information about the child’s learning style and skill sets that can be used to inform interventions.
3. Health and Other Relevant Issues. Is there a hearing, visual, physical, or health conditions that would hamper learning?
4. Generating Hypothesis about Student Needs. The teacher formulates ideas regarding why the student isn’t learning and possible interventions to address the concerns.
5. Intervention Selection. The teacher selects the appropriate intervention to address the student’s needs based on the hypothesis
6. Duration of Intervention. The duration of intervention is determined by several factors, including, expert recommendations, research data, student schedules, availability of resources, and student attendance.

7. Goals. Setting a goal for the student requires identification of the student's current skill level and determining what target skills the child could attain with the intervention.
8. Instruments for Progress Monitoring and Decision Rules. Curriculum-Based Measurements (CBM) are recommended for measuring student growth and universal screening tools for the efficacy of RTI.
9. Evidence of Response or Non-Response to Intervention. A teacher or a team is usually involved in making this determination. The data collected regarding the students' progress is usually used to determine whether ongoing intervention, modification, or discontinuation is appropriate.
10. Decisions. Evaluation of general education interventions with increased intensity in type and length of interventions provide the basis to determine whether interventions at present levels should be continued, modified, or discontinued. Also, referral for special education services is recommended when general education interventions show lack of progress (Wedl, 2005).

Common RTI Models. Educators have spent a considerable amount of time and effort in developing and polishing specific procedures used to implement RTI. Schools vary in the specific approaches adopted to implement RTI, however, two basic approached emerge: (1) standardized protocol method and (2) problem-solving model. A third hybrid model that combines components of both the standardized protocol model and problem-solving model is also emerging (Riccomini & Witzel, 2010).

Within a standardized protocol model, the procedures for implementation are the same and apply to all students. Thus, a school using this model will provide the same interventions to all students failing to make adequate progress in the core education program (Riccomini &

Witzel, 2010). All the tiers of instructional support look very similar for all students. A problem-solving model on the other hand attempts to address struggling students on an individual basis. Within this model interventions are matched to individual student's strengths and weaknesses and are generally accomplished through a team approach wherein the team examines student's performance data, identifies the weakest areas, and designs an intervention plan (Riccomini & Witzel, 2010). The hybrid RTI model maximizes the advantages of both the standardized protocol and the problem-solving approach to improving instructions (Riccomin & Witzel, 2010).

The most important aspect of each model is the plan to provide additional instruction and supports for students identified as struggling. Berkley et al. (2009) reported that majority of the states adopted the hybrid model or the problem-solving model despite the fact that the standardized protocol approach has been favored by researchers (Fuchs et al., 2003) and the problem-solving model has faced criticism due to the lack of rigorous research supporting its effectiveness (Fuchs et al., 2003; Mastropieri & Scruggs, 2005). Arguably, there may be no "best" way to implement RTI and student progress should be the determinant of whether or not a specific approach is effective. Also the specific model does not necessarily dictate success, but rather the quality and intensity of the instruction and assessment procedures will have the most impact on the effectiveness (Riccomini &Witzel, 2010).

RTI Tiers. Regardless of the model applied, a common element to RTI is its multitiered approach (Fuchs & Fuchs, 2006). Different schools employ different structures for the RTI prevention model. Some employ a 3-tiered model while other have a 4-tiered model in their schools based on the resources that are available to the schools (Fuchs & Fuchs, 2006; NJCLD, 2005).

Generally, a three-tiered model has been implemented in schools (Berkley et al., 2009; NJCLD, 2005). The nature of the academic intervention changes at each tier, becoming more intensive as a student moves across the tiers. Increasing intensity is attained by (a) using more teacher-centered, systematic, and direct instruction; (b) conducting intervention sessions more frequently; (c) adding to the duration of the sessions; (d) creating smaller and more homogenous student groupings; or (e) utilizing instructors with greater expertise (Fuchs & Fuchs, 2006).

Tier 1 involves provision of high quality of instructional and behavioral supports to all students in general education (NJCLD, 2005), and is the core instructional program for all general education students (Riccomini & Witzel, 2009). Berkley et al. (2009) reported that for all U.S. states following the 3-tier model, the first tier consists of general education interventions, including differentiated instruction, administered classwide and to struggling students who are identified through universal screening and/or benchmark assessments. Tier 1 instructional programming should be effective for the majority of the student population (80%). Riccomini and Witzel (2010) recommend Tier 1 instruction be for a minimum of 50-60 minutes per day.

Tier 2 instruction is more intensive and explicit in comparison to Tier 1 instruction (Riccomin & Witzel, 2010). In this tier, specialized instruction and remediation is provided to those students whose performance and rate of progress lags behind their peers, and involves more intensive small-group interventions with frequent progress monitoring (Berkley et al., 2009). Riccomini and Witzel suggest that the 20-30 minutes of Tier 2 instructional time should be in addition to the instructional time in Tier 1 for students who are struggling, and that 15 percent of the students will need Tier 2 interventions.

Tier 3 involves highly intensive, specifically targeted individualized instruction with even more frequent progress monitoring and may or may not include placement in special

education. In some models, Tier 3 is where a comprehensive psychoeducational evaluation is conducted to determine eligibility for special education and related services for those students who did not respond to the specialized interventions in the Tier 2 (NJCLD, 2005). Riccomini and Witzel (2010) state that if effectiveness of Tier 1 and Tier 2 instruction is maximized, no more than 5% of the student population should require Tier 3 services.

All three-tier models may share many commonalities but are not necessarily identical, such that differences in models occur at every tier. Berkley et al. (2009) reported that a major difference among states at Tier 2 is the way in which interventions are developed. Some states determine interventions at Tier 2 through a problem-solving approach and develop specific interventions based on individual student needs. Some other states follow a standard protocol method and use a predetermined list of empirically validated interventions targeting specific deficits to maximize efficiency and resource utilization by grouping students who have similar academic needs. States also differ in regards to who is involved. In some states, the Tier 2 instruction is the responsibility of the classroom teacher, speech language pathologist, or other specialists whereas in other states Tier 2 interventions are provided by any trained staff member under adequate supervision (Berkley et al., 2009).

Across states, differences are also reported in the implementation of Tier 3 interventions (Berkley et al., 2009). Inconsistencies regarding when the special education referral process can be initiated are present. Most states consider special education placement once students have progressed through Tier 3; however, some states conduct special education evaluation after Tier 2, while other state permit referral for special education eligibility evaluations to be made at any point in the RTI process (Berkley et al., 2009).

Some practitioners (e.g., Grimes, 2002) regard these tiers as substitutions for the comprehensive evaluation now afforded to all children suspected of having SLD. Others see the RTI tiers as a component of a more comprehensive and traditional evaluation (e.g., Division of Learning Disabilities of the Council for Exceptional Children, n.d.; Telzrow, McNamara, & Hollinger, 2000). According to Fuchs and Fuchs (2006), the former group views RTI mostly in terms of providing prevention and advocates for more tiers, whereas the latter group regards RTI mostly as an identification and classification procedure and argues for fewer tiers.

Assessment in RTI. An essential component of any RTI model is assessment. Assessments in RTI serve two purposes: first to provide struggling students with early, effective instruction, and second to provide a valid means of assessing learner needs (Fuchs & Fuchs, 2006). Additionally, Riccomini and Witzel (2010) also state that assessments provide evidence of student progress and program effectiveness. In an RTI model, two forms of formative assessments are inherent: (a) universal screenings and (b) progress monitoring and diagnostic assessments for struggling students (Riccomini & Witzel, 2010).

Universal Screenings. Universal screening is usually the first step in RTI and involves all students being assessed three to four times per year. The results of the universal screenings are then used to identify students who are struggling with or are at risk for developing SLD. The intended purpose of screening is to identify children who might be at risk so that interventions can be provided early and hence severe problems can be avoided (Pyle, 2002). The screening measures are relatively short and simple to administer and are demonstrated to be reliable and valid measures of student learning (Riccomini & Witzel, 2010).

Progress Monitoring. The main purpose of progress monitoring is to assess program effectiveness as measured by student growth (Riccomin & Witzel, 2010). Provided that the large

majority of students progress at an appropriate rate, one can reasonably conclude that the instructional program is effective. Diagnostic assessments identify specific deficit areas for each struggling student. Once the specific areas are identified, teachers can better individualize instruction for their struggling students. This type of informed instructional decision making help in reducing the number of students referred for comprehensive evaluations and the once that are referred are more likely to need special education services.

RTI Interventions in Reading. Ongoing debate regarding the efficacy of various teaching methods has ensued since the beginning of the twentieth century. Four different perspectives on improving reading performance have been posited (Carnine, Silbert, Kane'euni, & Traver, 2010). First is the pessimist's perspective that the schools can do little unless the student's environment or the biological make-up is changed. Second is the generalist's perspective that the schools can improve reading performance by developing a range of abilities underlying reading. Third, the constructivist's perspective that holds the individual reader's construction of meaning as central to reading. The fourth is the direct instruction perspective that requires the teachers to analyze the task to be learned, to sequence instructions carefully, to construct clear instructional presentations, and to provide systematic practice, review, and application so as to provide children with success in school (Carnine et al., 2010). The phonic method (Direct Instruction, DI) and the whole language method (generalist's perspective) constitute the two major teacher perspectives around which most the research is focused. Padakannya (2007) recommends using a bit of both the methods; however, the majority of research clearly points in favor of direct instruction (Adams & Engelmann, 1966; Forness, Kavale, Blum, & Lloyd, 1997; White, 1988).

Many meta-analytic studies have been conducted on the efficacy of Direct Instruction (DI) programs with regular and special education populations in preschool through high school, with children from all types of backgrounds. White (1998) studied 25 research investigations where DI was compared to some other treatments and the results indicated that 53% of the studies supported DI with an average effect size of .84. Not even a single study supported the comparison intervention. Forness et al. (1997) conducted an analysis of different intervention programs for student receiving special education services and found DI to be one of the only seven interventions with strong evidence of success. Adams and Engelmann (1996) also found similar results in their meta-analysis involving 37 research studies that also compared DI to other treatments. The mean effect size for DI involving special education students was .90.

Weisberg (1988) reported on a preschool/kindergarten project for low-income children that utilized components of DI language and reading, beginning in kindergarten and continuing into kindergarten. At the end of the second year, the students were given the end-of-first-grade component of the Metropolitan Achievement Test (Farr, Prescott, Balow, & Hogam, 1979) to evaluate their performance. The data showed that the children who had been through the DI program for two years on entering first grade tested at the 80th percentile, while their peers tested at the 20th percentile.

Results of a multiple-school project involving thousands of children that implemented DI reading and language programs in 10 low-income schools indicated that children involved in the program were performing at levels comparable to or far exceeding those of children within the district who were involved in other active reading programs. Children who began the program in kindergarten performed at the levels that were not only above their district peers but also above the national average. Another multiple-school study of implementation of DI showed that

children who remained in well-implemented DI program over a period of five years showed significantly higher gains in comprehension (Stockard, 2008).

The American Federation of Teachers (1999), American Institute of Research (1999), and the Center for Research on the Education of Students Placed at Risk (Borman, Hewes, Overman, & Brown, 2002) all conducted research review of models designed for at-risk students and found DI model to be one of the few models with substantial research to validate effectiveness.

Several different recommendations have been made about the implantation of effective DIs. The National Reading Panel (2000) identified five critical areas of content and provided guidance on how and what to teach. The five critical areas include phonemic awareness (oral language skills that involves the ability to identify and manipulate the individual sounds in words), phonics (teaches children the relationship between the letters and their sounds), fluency (ability to read text accurately and quickly), vocabulary (learning the meaning of words that are not in one's oral vocabulary), and text comprehension (complex set of skills and strategies that should be actively taught and developed).

The National Reading Panel (2000) also provided valuable information on how to teach. The panel recommends explicit and systematic instruction. Instruction is explicit when the teacher clearly models or demonstrates what he or she wants students to learn. The teacher clearly reveals the concepts and rules through modeling and running commentary to students. Systematic instruction is comprised of a planned logically progressive sequence of knowledge units, clearly defined objectives for each knowledge unit, planned distribution of practice to build fluency and retention, and planned work on new examples to enhance application or generalization of previously learnt materials.

Riccomini and Witzel (2010) discuss the six critical features of explicit teacher-directed instructions. First, each lesson begins with a daily review allowing teachers to review content from previous lessons as well as revisit important pre-skills for the upcoming lesson. Second, the daily review is followed by presentation of new content, which includes teacher-directed models and demonstrations with frequent questions and students actively involved in learning. Third, as students have started to acquire the new information, the teacher provides students with multiple opportunities for guided practice. During guided practice students receive explicit feedback and corrective instruction for any mistakes. Fourth, teachers can reteach content if students are struggling. Fifth, independent practice opportunities are provided to build proficiency and fluency. Finally, weekly and monthly reviews are provided to help students maintain important concepts and skills.

Special considerations need to be made when providing interventions to students whose primary language is not English in an RTI model. Suggestions for providing interventions to English language learners (ELL) were discussed by Carnine et al. (2010). They suggested that the first priority for ELL students who enter school is establishing an intensive language program to teach receptive and expressive English language. Reading instruction in reading can begin after a few months of English language instruction. The initial reading instructions should only include words that the children have already learned. Teachers should also be encouraged to use simple and clear presentations that involve minimal use of language when teaching beginning phonemic awareness and phonics and as the child begins reading text, the teacher would present the meaning of unknown words orally before the students encounter them in word-reading exercises. The English language instruction continues even after the student has started receiving reading instructions.

Brown, Sanford, and Lolich (2010) note the different factors that play a role in knowing the students that one works with. ELL students are a heterogeneous group. In the U.S., ELL students speak one or more of over 400 languages in their home (Brown et al., 2010). Also, the way second language develops is very diverse (Bialystok & Hakuta, 1994). ELL students who enter schools come with different educational experiences and their age alone may not be a reliable indicator of prior educational experiences. Students with interrupted instruction may need instructions in many foundational skills no matter their age (Brown et al., 2010).

Similarly, in India, for majority of students, English is a second language. Most children are exposed to a minimum of 3 three language, if not more and the way language develops for each of these children is diverse. Thus, special considerations should be made for a vast majority of the student population when providing reading instructions in India.

Duration and Intensity of Tier 2 Reading Interventions

Interventions must be provided to students with sufficient intensity so as to increase the pace of development of reading skills and to prevent reading problems for a vast majority of students (Al Otaiba & Torgensen, 2007). Denton & Mathes (2003) state that the intensity of an intervention is affected by factors like amount of time dedicated to intervention in the weekly schedule and the number of weeks for which it is provided. The amount of time dedicated to intervention in the Tier 2 varies greatly across different RTI models. For example, Marston, Lau, and Muyskens (2007) described an RTI service delivery model in which Tier 2 interventions are generally provided over an 8-week period and may consist of the use of published reading programs or more general types of academic support (e.g., small reading groups, peer tutoring). On the other hand Wanzek & Vaughn (2008) recommend interventions be provided for 20 weeks of more.

Research studies related to intervention dosage and scheduling in primary grades have mixed results. Hatcher et al. (2006) found that students with reading difficulties who received supplemental intervention for two consecutive 10-week periods (33 hours of instruction) performed comparably to a group who received the same intervention only during the second 10-week period (16.5 hr of instruction). Similarly, Wanzek and Vaughn (2008) found that providing 30 min of daily intervention in the fall of first grade followed by 60 min of daily intervention in the spring did not appear to increase the number of students with adequate instructional response relative to providing 30 min per day throughout the school year. Results of these studies suggest that increasing the duration of the intervention sessions did not appear to increase reading performance. Denton and Mathes (2003) also did not find any association between longer interventions and higher gains. However, conflicting results were reported by Al Otaiba, Schatschneider, and Silverman (2005) who found in a randomized study that kindergarten students who received year-long intervention four times per week had more robust outcomes than those who received the same intervention only two times per week.

Need for RTI in India Today

Several reasons are evident as to why RTI is needed in schools in India. First, a dearth of standardized tools of assessment for identification of a disability exists in India. In order to provide early interventions to children, one must identify children who are in need. Most tests for the purpose of assessment of SLD, achievement or cognitive abilities have been developed and standardized on samples in westerns countries. The applicability and effectiveness of these tests with Indian children is only an assumption (Rozario, 2007). Kapoor (2007) noted that about 17% of psychologists in India use standardized instruments that are not normed for the Indian population. Thirty-six percent of the psychologists used these tests to supplement those that have

been normed for Indian children. Instruments should be fair as well as valid for the population with which the tool will be used. The instruments used in the assessment process must provide reliable and valid scores because subsequent decisions and intervention techniques depend upon accurate assessment (Bordignon & Lam, 2004). The ongoing use of measures that have not been normed with Indian population raises both ethical and practical problems.

Furthermore, multilingual and multicultural backgrounds that children both bring to school and learn at school make study of learning disabilities a more complex task in India (Ramaa, 2000). With 18 main languages nationally -- each with its own orthographic system – and variation across Indian states, the typical school system uses the "three language formula" (Ramaa, 2000, p. 269). Students in Indian schools are expected to learn to read and write in Hindi (the national language), English, and the regional language. At the same time, depending upon the medium of instruction and the syllabus followed in the school, the students may be expected to speak in English and/or the regional language.

Children entering schools come from different linguistic backgrounds and may have little or no exposure to the language used as the main medium of instruction, especially in the urban English medium schools. The dearth of standardized tools in all Indian languages at different schooling stages makes identifying and diagnosing children's special needs difficult (Kulkarni, cited by Shrinivasan 2005; Ramaa, 2000). Failure to identify difficulties in reading early can result in the manifestation of a range of academic, behavioral and emotional problems (Hutchinson, Whiteley, Smith, & Connors, 2004).

As discussed in the earlier section, several problems are inherent to the IQ–achievement discrepancy method of SLD identification (Fuchs & Fuchs, 2006). The issues related to the discrepancy model that are prevalent in the Unites States are also true for India. Compounding

definitional inconsistencies are factors like parental illiteracy, lack of exposure to the pre-academic skills, and lack of awareness among teachers and a high student-teacher ratio (50:1) which makes identification of learning disabilities in India extremely difficult (Karanth, 2003).

Despite of being among the few developing countries that have systematic and advanced education system with special education and early intervention efforts, India still faces problems in delivering services that are effective for children with disabilities (Pang & Richey, 2005). The Indian government launched special programs for children with disabilities such as the 1994 District Primary Education Programme (DPEP), which focuses on making education accessible to children with disabilities, including female children, and children who dropped out of school to work. However, most early intervention programs initiated by the government only focus on medical prevention rather than education (Pang & Richey, 2005).

In the light of this information, moving away from the Discrepancy Model and exploring alternate models of identification of learning disabilities such as RTI that do not solely depend on standardized instruments are worth consideration. In the U.S., RTI models continue to be researched and implemented in elementary school settings. With the reauthorization of Individuals with Disabilities Education Act (2004), RTI as an alternative means of servicing struggling students as well as identifying those who qualify for special education services has become a reality in the U.S. RTI also helps in reducing the implications of the biases inherent in assessment due to SES and other social and economic disadvantages (Reschly, Tilly, & Grimes, 1999; Vellutino et al., 2000). The recent focus in the literature and related policy initiatives on RTI presents a welcome opportunity to structure a more comprehensive and integrated approach to instruction and intervention for all students. RTI is proposed as a valuable model for educators

because of its potential utility in the provision of appropriate learning experiences for all students as well as in the early identification of students as being at risk for academic failure.

Only a single published study of RTI implementation outside of the United States could be located. Jiménez, Rodriguez, Crespo, Gonzalez, Artiles, and Alfonso (2010) implemented an RTI model in Spain. They examined the effectiveness of second-tier intervention for at-risk readers within the context of a RTI approach. A sample of 1,123 Spanish children from fourteen school districts were given the Spanish adaptation of the Hong Kong Specific Learning Difficulties Behavior Checklist and children whose scores were in the last 25 percentile were classified as at-risk for early reading difficulties. The study was mainly focused on Tier 2 that involved small group interventions for children whose literacy difficulties were not resolved by appropriate adjustment to the classroom instructional program. Half of the students were randomly assigned to an intervention condition where they received small-group supplementary intervention for 30 minutes daily using Prevencion de las Dificulatades Especificas de Aprendizaje (PREDEA) curriculum. The other half received whatever typical remedial services were available at their schools. Results indicated that children who received the PREDEA curriculum had higher scores on the Early Grade Reading Assessment Test (EGRA) on initial sound identification, listening comprehension, letter sound knowledge and oral reading fluency compared to the control group (Jiménez et al., 2010).

Rationale and Hypotheses

The rationale for this study is to provide schools in India with a preventive service delivery model that aids early identification, provides evidence-based early interventions, and can also be used in identification of SLD. Given the dearth of standardized and normed measures with the Indian population, RTI may be an alternative method for providing services and identifying students with academic difficulties.

The current study is comprised of two components considered essential in the implementation of RTI. First, reliable scores are needed. The study aims to assess the reliability and utility of the Beginning Phonics Assessment and Primary Phonics Assessment (BPA & PPA, respectively; Carnine et al., 2010a; Carnine et al., 2010b) scores with Indian population. Two operational hypotheses have been formulated for the purpose of the study: (a) scores from the BPA and PPA will be sufficiently reliable at or above .80, and (b) BPA and PPA items will be appropriate for use with the Indian population based on item difficulty and discrimination indices.

Second, the study aims to assess the effectiveness of Tier 2 direct instruction-based program on reading among first-grade students in a school in Mumbai, India. The study hypothesizes that the program based on direct instruction will have a statistically significant effect on the students' reading performance as measured via pre- and post-intervention assessments. The study also hypothesizes that the duration and length of intervention will have a positive effect on the students reading performance.

CHAPTER 3: METHOD

Setting

This study was conducted in the South Asian city of Mumbai, India. India is the seventh largest country by area at approximately 3.288 million square kilometers in size (Dikshit, 2014). Currently comprised of 28 states and seven union territories, India was formerly a British colony until the attainment of Independence in 1947. India is the second-most populated country in the world with a population of 1.2 billion people. According to the 2011 census (Government of India, 2011), 80.5% of the Indian population practice Hinduism, followed by Islam (13.4%), Christianity (2.3%) Sikhism (1.9%), Buddhism (0.8%), and Jainism (0.4%). Zoroastrianism and Judaism also have an ancient history in India and each have several thousand followers. Mumbai is the fifth-most populated city in the world, with an estimated population of 20.7 million people (Government of India, 2011). The city is comprised of seven islands and was gifted as a part of dowry of Catherine of Braganza to Charles II of England in 1661. Mumbai is the capital of the Indian state of Maharashtra and the financial capital of India (Raghavan, 2013).

Throughout the 1840s and 1850s, primary, middle, and high schools were opened in India with most schools offering English language instruction. In 1857, universities modeled on the University of London and using English as the primary language of instruction were established in Bombay (Mumbai), Calcutta (Kolkata), and Madras (Chennai; Basu, n.d.). Today, four educational boards oversee education in Mumbai: the Central Board of Secondary Education (CBSE), the Indian Certificate of Secondary Education (ICSE), the International Baccalaureate (IB), and the Secondary School Certificate (SSC; Karande, 2008).

English is the primary medium of education at the school where the study was conducted. This private school (student's pay a fee to attend this school) follows the ISCE curriculum, and is located in an upper-middle class neighborhood of Mumbai. Consequently, the general population of students attending this school belongs to the upper-middle socioeconomic status. This school is a good representative of a large number of ISCE board school all over India.

Participants

A total of 105 first-standard (i.e., first-grade) students (56 males, 49 females) between the ages of 5 and 6 from a private school in Mumbai, India participated in the study. Most students in the sample also attended 2 years of kindergarten at the same school prior to entering first standard. English was the primary language of instruction in the school; however, for most of the students English was not their first language. Gujarati, Hindi, Marathi, and Tamil are few of the languages commonly spoken by students at the school. Students' oral fluency in English was assessed using the Oral Language Screening Test (OLST; Carnine et al., 2010c). Frequencies of the students' scores on the OLST are presented in Figure 1. Seventy-six of 105 (72%) students scored 7 or more points out of a total of 10 points (*M = 7.26*, *SD = 1.57),* indicating that majority of students in the sample were sufficiently proficient in oral English language and that administering a screening test in English was appropriate.

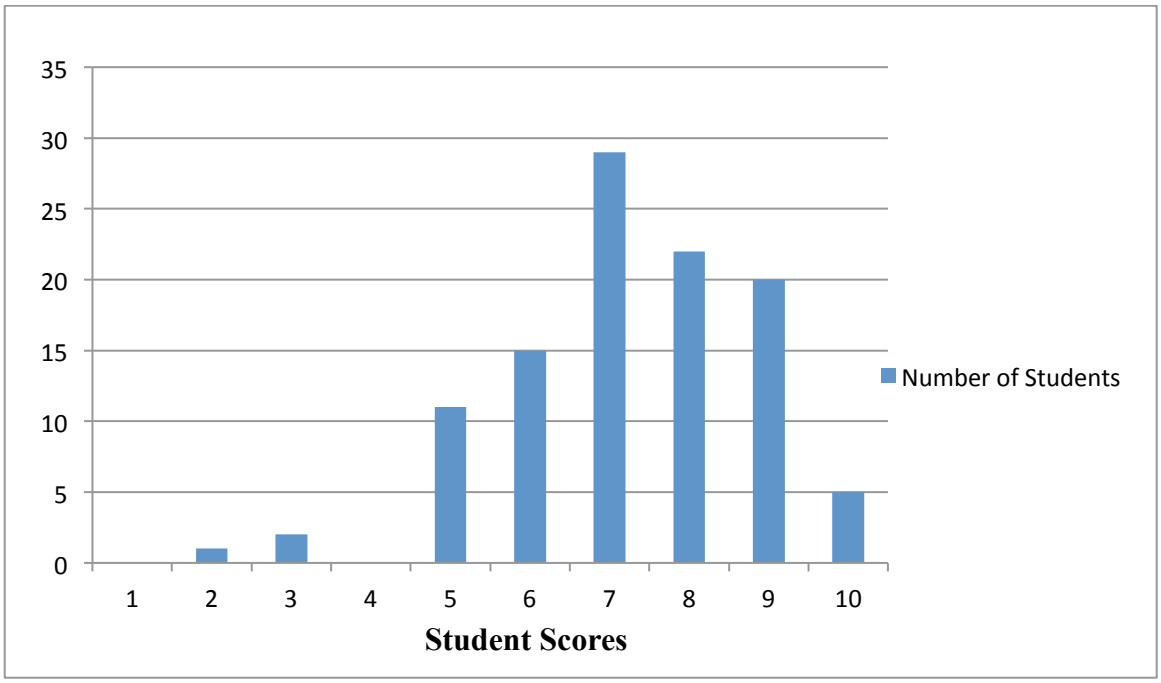


Figure 1. Frequency Distribution of Students' Scores on the Oral Language Screening Test.

Out of the 105 students screened, 25 potentially at-risk students (below the 25th quartile) identified based on their scores on the Beginning Phonics Assessment (BPA) were provided with Tier 2 intervention in reading in English. These students were randomly divided in three different groups (Groups A, B, & C). Initially, Group A had 9 students, however, two of these students dropped out due to unwillingness to participate. One student (who did not score below the 25th percentile) was added to this group based on teachers' recommendation. Thus, each group had eight students with the total number of students receiving interventions being 24. The ranges of scores for each of the 4 quartiles are presented in Table 3.1.

Table 3.1

Ranges of Scores on BPA and PPA for each Quartile

	Quartile 1 (n = 25)	Quartile 2 (n = 32)	Quartile 3 (n = 23)	Quartile 4 (n = 25)
BPA [50 items]	15-35	36-42	43-45	46-50
PPA [68 items]	0-7	0-62	0-55	2-57
Total [118 items]	22-37	36-98	44-98	48-105

Note. Subsample sizes are in parentheses.

The ranges of scores of students in Group A, B, and C on the BPA and Primary Phonics Assessment (PPA) are presented in Table 3.2. A one-way ANOVA was conducted between the three groups to test for group differences. However, no statistically significant differences were noted between the scores of, $M_{\text{Group A}} = 31$, $SD_{\text{Group A}} = 4.04$; $M_{\text{Group B}} = 30.25$, $SD_{\text{Group B}} = 4.43$; or $M_{\text{Group C}} = 33.75$, $SD_{\text{Group C}} = 2.71$; $t(2) = 1.883$, $p = .177$, thereby indicating that the three groups were equivalent in performance.

Group A had eight students that met with the researcher 5 days a week for 40 minutes prior to the beginning of the school in the morning. The other two groups with eight students each (Groups B & C) met for 25 minutes twice per week after lunch break. In total, Group A received 28 forty-minute sessions of reading interventions, while the Group B and Group C received nine 25- minute sessions. Due to unforeseen scheduling difficulties, a number of intervention sessions had to be cancelled. For the purpose of data analyses, Group B and Group C were combined into one group as they received equivalent duration and intensity of intervention.

For the purposes of pre- and post- intervention analysis, only 102 students were included because 3 of the 105 initially screened students were absent on the days of post-intervention screening and could not be tested.

Table 3.2

Ranges of Scores on BPA and PPA for Group A, B, and C

	Group A	Group B	Group C
BPA [50 items]	15-35	23-34	30-35
PPA [68 items]	0-7	0-2	0-3

Measures

Beginning Phonics Assessment (BPA; Carnine et al., 2010a). The BPA includes 50 items: 26 items ask students to name the sounds of the lower case letters, and nine items ask students to sound out the upper case letters. The remaining 15 items require students to read 'regular words'. The BPA is a quick screener that can be used by teachers as an initial indicator

of student's mastery of letter-sound correspondences, uppercase letters, and reading regular word types.

Primary Phonics Assessment (PPA; Carnine et al., 2010b). The PPA is also a quick screener that teachers can use as an initial indicator of what phonic and structural elements the student does or does not know. The screener includes 68 items that require students to read a list of words.

Information related to the reliability and validity of the scores for both the BPA and PPA was not reported by the authors, nor was information about the development of the instruments available.

Progress Monitoring Probes. Students were given a list of letters and were asked to sound them out loud as fast as they could. Number of correct and incorrect letter-sounds they read in 30 seconds was recorded.

Procedure

The screening and reading intervention were conducted during the 2012-13 academic year. Universal screening in reading in English using the BPA and PPA was conducted with the students in the first standard in June of 2012. Students in the lowest quartile were selected for Tier 2 intervention in reading. DI interventions in reading based on the guidelines of Carnine et al., (2010) were implemented for a 6-week period during the months of July and August of 2012. Instructions during these 6 weeks were focused on the Beginning Reading Stage (Carnine et al., 2010) that involves phonemic awareness (blending & segmenting) and phonics (letter sound correspondence, reading regular words, & reading irregular words). All the interventions were provided by one instructor. Detailed lesson plans that were followed are listed in the Appendix. At the end of the sixth week, a post-intervention assessment using the BPA and PPA was

conducted. Written permission was obtained from the school to use these data for the purpose of this study.

Data Analysis

A single-subject design with eight replications was used to assess the effect of small group interventions on the academic progress for Group A, Group B, and Group C. To assess participants' academic progress, the BPA and PPA were administered pre- and post-intervention. To evaluate the internal consistency of the overall test scores, Cronbach's coefficient alpha and split-half method were used. Murphy and Davidshofer (2005) have provided descriptors for reliability coefficients as follows: very low (.00 to.59), low (.60 to .69), moderate (.70 to.80), moderately high (.80 to.89), and high (90 to .99).

To identify problematic, inconsistent, and potentially problematic items, item analyses using indices of difficulty and discrimination were applied. The item difficulty index is useful in evaluating the difficulty level of an individual item and whether or not the item is suitable for the examinees taking the test. Item difficulties between .3 and .7 maximize the information the test provides about the variances among examinees (Allen & Yen, 1979).

Allen and Yen (1979) define item discrimination (r_x) as the difference between the proportion of high-scoring examinees that get the item correct and the proportion of low-scoring examinees that get the item correct. Point-biserial correlations provide a measure of an item's discriminating power (Allen & Yen, 1979). On any item, r_x should be positive (i.e., more high scoring examines than low-scoring examinees should have answered the item correctly; Allen & Yen, 1979). A negative r_x suggests that errors in the scoring may be present or that the item has problematic wording (Allen & Yen, 1979). Verma (2012) recommends a point-biserial value of at least .15 to be "acceptable" and at least .25 to be considered "good."

A *t* test was conducted between the pre- and post-test composite scores (sum of scores on PPA and BPA) across all participants to assess the impact of intervention on reading skills. In order to assess social validity and importance of the interventions, a one-way ANOVA was conducted between the post-intervention PPA score and BPA scores of participants in Group A, combined Group B/C, and those in regular classrooms.

Graphic display of each participant's progress monitoring scores was used to permit visual analysis and descriptive explanation. The Reliable Change Index (RCI; Zahra & Hedge, 2010) was also applied individually with participants in Group A and combined Group B/C to assess whether or not the individual's score change from pre- to post-intervention was statistically significant. In order to assess the effect of the interventions in reducing or closing up the gap between students in the lowest quartile (those receiving interventions) with the others in the classrooms, average RCI's for each of the quartiles were calculated and a one-way ANOVA was conducted to compare the means for each of the quartile. RCI demonstrates change in standardized units, the direction of the occurred change, and whether the change is reliable and clinically significant. An RCI of 1.00 is half as large a change as an RCI of 2.00, positive RCIs indicate score increases whereas negative RCIs indicate decreases, and an RCI with a magnitude of 1.96 or greater in either direction is statistically significant at the $p < .05$ level (Jacobson & Truax, 1991). To adjust for regression to the mean, the Edwards-Nunnally correction was also applied (Speer, 1992).

A *t* test evaluated post-intervention composite scores for Group A and combined Group B/C to assess the potential impact of duration and length of intervention on reading skills. To further assess the impact of duration and length of intervention, a simple regression equation was applied to the post-intervention composite scores of all the participants.

CHAPTER 4: RESULTS

Descriptive statistics for Beginning Phonics Assessment (BPA) and Primary Phonics Assessment (PPA) sores across males and females are presented in Table 4.1. Overall, males performed better them females on both BPA and PPA. Given the mean and standard deviations below, the PPA scores reflect greater variability and items were more difficult for the students as compared to the BPA for both males and females.. Skewness and kurtosis for both tests' scores indicate fairly normally distributed scores.

Table 4.1

Descriptive Statistics Beginning Phonics Assessment (BPA) and Primary Phonics Assessment (PPA) Scores

	Male (n = 56)		Female (n = 49)		Total (N = 105)	
	BPA	PPA	BPA	PPA	BPA	PPA
M	41.80	11.93	38.94	10.08	40.47	11.07
SD	5.60	15.80	7.57	15.39	6.71	15.56
Skewness	-.66	1.65	-.96	1.71	-1.00	1.65
Kurtosis	-2.96	2.12	.70	1.97	1.03	1.90

Note. Subsample sizes are in parentheses.

Evidence of Internal Consistency

Cronbach's coefficient alpha and split-half reliability coefficients for the BPA and the PPA scores by sex are presented in Table 4.2. The coefficient alphas and the split-half reliability

coefficients for the BPA scores indicate moderate to high reliability for both males and females. The coefficient alpha and the split-half reliability coefficient for the total score on the BPA is .89 and .82 respectively, thereby indicating that overall the test score demonstrates good reliability for the sample. The coefficient alphas and the split-half reliability coefficients for the PPA total score falls in the high reliability category and indicate excellent reliability for the sample.

Table 4.2

Beginning Phonics Assessment (BPA) and Primary Phonics Assessment (PPA) Scores' Coefficient Alpha and Split-Half Reliability Coefficients (N = 105) by Sex

	Male (n = 56)		Female (n = 49)		Total Sample (N = 105)	
	α	Split-Half	α	Split-Half	α	Split-Half
BPA [50 items]	.86	.73	.91	.89	.89	.82
PPA [63 items]	.98	.91	.98	.96	.98	.98

Note. Subsample sizes are in parentheses.

Item Analysis Using Item Difficulty and Item Discrimination Indices

The point-biserial correlation coefficients (r_x) and the item difficulty (p_i) indices for BPA and PPA scores are presented in Table 4.3.

Beginning Phonics Assessment. The p_i values for BPA ranges between .3 and 1. Twenty of the 50 items on this test had a p_i value of 1, indicating that nearly all of the students answered the items correctly and that these items were not difficult for the students in the sample. However, all these items except for item 36 and 39 had point-biserial correlation coefficients

Table 4.3

Beginning Phonics Assessment (BPA) and Primary Phonics Assessment (PPA) Scores' Item Difficulty (p) and Point Biserial Correlation Coefficients (r_x) for the Sample (N = 105)

Beginning Phonics Assessment						Primary Phonics Assessment								
Item	p_i	r_x	**Item**	p_i	r_x	**Item**	p_i	r_x	**Item**	p_i	r_x	**Item**	p_i	r_x
1	.7	.42	**26**	.9	.34	**1**	.5	.48	**22**	.1	.75	**45**	.1	.80
2	1	.32	**27**	1	.32	**2**	.5	.57	**23**	.1	.62	**46**	.1	.68
3	1	.43	**28**	.7	.38	**3**	.3	.54	**24**	.1	.65	**47**	.1	.75
4	1	.36	**29**	1	.36	**4**	.6	.50	**25a**	.1	.66	**48**	.1	.63
5	.7	.44	**30**	1	.39	**5a**	.3	.68	**25b**	.1	.59	**49**	.0	.47
6	1	.36	**31**	.9	.40	**5b**	.3	.52	**25c**	.2	.80	**50**	.1	.75
7	.9	.20	**32**	1	.26	**5c**	.2	.54	**26**	.1	.79	**51**	.1	.66
8	1	.23	**33**	.6	.61	**6**	.5	.62	**27**	.2	.81	**52**	.1	.76
9	.8	.46	**34**	1	.36	**7**	.3	.62	**28**	.2	.80	**53**	.1	.84
10	.9	.39	**35**	1	.31	**8**	.3	.60	**29**	.1	.78	**54**	.0	.50
11	1	.21	**36**	1	.10	**9**	.3	.73	**30**	.0	.51	**55**	.1	.72
12	1	.44	**37**	.9	.18	**10**	.2	.77	**31**	.1	.71	**56**	.0	.49
13	.6	.61	**38**	.8	.17	**11**	.1	.70	**32**	.1	.54	**57**	.0	.51
14	.9	.48	**39**	1	.0	**12**	.2	.80	**33**	.0	.64	**58**	.0	.30
15	.9	.33	**40**	.9	.37	**13a**	.2	.83	**34**	.1	.68	**59**	.0	.37
16	1	.36	**41**	.9	.31	**13b**	.1	.69	**35**	.1	.79	**60**	.1	.64
17	1	.24	**42**	.6	.55	**13c**	.1	.74	**36**	.0	.54	**61**	.0	.53
18	.5	.56	**43**	.8	.32	**14**	.2	.76	**37**	.1	.82	**62**	.0	.43
19	1	.34	**44**	.8	.26	**15**	.2	.81	**38**	.1	.84			
20	1	.27	**45**	.7	.55	**16**	.2	.81	**39**	.1	.69			
21	.7	.55	**46**	.6	.44	**17**	.2	.83	**40**	.1	.75			
22	1	.38	**47**	.6	.49	**18**	.2	.84	**41**	.1	.73			
23	.3	.33	**48**	.4	.38	**19**	.3	.87	**42**	.1	.68			
24	.8	.27	**49**	.4	.44	**20**	.3	.69	**43**	.1	.80			
25	.5	.39	**50**	.3	.47	**21**	.3	.86	**44**	.0	.47			

above .25, thereby indicating that these items are fairly good items with appropriate functioning. Item 36 and 39 also had a very low point-biserial correlation (.10 and .0 respectively) which signifies that these items may be problematic.

Primary Phonics Assessment. A number of items in the Primary Phonics Assessment subtest were quite difficult for the children in the current sample. Items 5c and 10 through 18, and items 24 through 62 were markedly difficult with a p_i value of .2 or below; however, the point-biserial correlations for these items suggest that these are reasonably good items functioning as expected. Overall, point-biserial correlations for all the items in this test fall in the 'good' range, thereby indicating that the items are functioning appropriately with the current sample.

Efficacy of Intervention

A paired-samples *t* test was conducted to compare the pre-and post-intervention screening scores for all 24 participants in the intervention. A significant difference in the scores emerged between pre-intervention screening scores, $M = 31.67$, $SD = 3.942$, and post-intervention screening scores, $M = 45.96$, $SD = 8.917$; $t(23) = -7.040$, $p < .001$. These results suggest that the intervention had a positive effect on the students' reading performance.

A one-way ANOVA was conducted to compare the post-intervention scores on the BPA and the PPA of the participants in Group A (8 students; $M_{BPA} = 44.00$, $SD_{BPA} = 1.70$; $M_{PPA} = 6.00$, $SD_{PPA} = 6.740$), Group B/C (18 students; $M_{BPA} = 40.59$, $SD_{BPA} = 4.14$; $M_{PPA} = 4.29$, $SD_{PPA} = 8.22$), and the students in regular classroom (78 students; $M_{BPA} = 43.39$, $SD_{BPA} = 4.06$; $M_{PPA} = 21.39$, $SD_{PPA} = 19.52$). An analysis of variance of the scores on the BPA showed a significant difference, $F(2, 99) = 3.79$, $p = .026$. Post hoc analyses using the Bonferroni post hoc criterion for significance indicated that the scores of the students in Group B/C was significantly lower

than the scores of the students in regular classroom. No significant difference was found between Group A and the regular classroom group. Similarly, analysis of variance of the PPA score also revealed a significant difference, $F(2, 99) = 8.452$, $p < .001$. As per the Bonferroni post hoc analyses, no significant difference emerged between Group A and the regular classroom group. However, the scores of the students in Group B/C were significantly lower than those in the regular group. These results suggest that the interventions were only successful in diminishing the gap between the scores of the students in Group A and those of the students in regular classroom but not for students in Group B/C.

RCIs were calculated on 102 students' pre- and post- test score of BPA (see Appendix B). RCIs reported in Appendix B were calculated based on the equation published by Jacobson and Truax (1991). Edwards-Nunnally corrected RCIs (E-N RCI; Speer, 1992) were also calculated and are reported in Appendix B. Only three out of the 102 students achieved an RCI of 1.96 or above; however, a one-way ANOVA for the RCI, $F(3, 98) = 44.19$, $p < .001$, as well as the Edwards-Nunnally corrected RCIs, $F(3, 98) = 13.46$, $p < .001$, revealed significant differences at the .05 level between the average progress made by each of the quartile groups. As expected, a post hoc analyses using the Bonferroni criterion for significance indicated that the lowest quartile ($M_{RCI} = 1.56$, $SD_{RCI} = .77$; $M_{E\text{-}N\ RCI} = .86$, $SD_{E\text{-}N\ RCI} = .58$) made the most progress and was significantly higher than the second quartile ($M_{RCI} = .21$, $SD_{RCI} = .64$; $M_{E\text{-}N\ RCI} = .13$, $SD_{E\text{-}N\ RCI} = .54$), third quartile ($M_{RCI} = -.10$, $SD_{RCI} = .44$; $M_{E\text{-}N\ RCI} = .06$, $SD_{E\text{-}N\ RCI} = .45$), and fourth quartile ($M_{RCI} = -.08$, $SD_{RCI} = .40$; $M_{E\text{-}N\ RCI} = .43$, $SD_{E\text{-}N\ RCI} = .40$). No other significant differences were found between the other quartile groups. These results suggest that students in first quartile made accelerated progress and are catching up with the other quartiles.

Group A. To assess the effects of the treatment on individual students in Group A, RCIs were calculated on individuals' composite pre- and post-test scores of BPA and PPA as presented in Table 4.4. RCIs as well as Edwards-Nunnally corrected RCIs (Speer, 1992) are reported in Table 4.4. Except for Student 8, the students in Group A achieved a RCI of 1.96 or greater. Thus, the results indicate that all the students but one benefitted significantly from the reading intervention sessions. Student 1 and Student 7 showed the most apparent gains on post-intervention scores.

Table 4.4

Group A Participants' Reading Composite Scores and Reliable Change Indices (RCIs)

Participant	# of Sessions Attended	Pre-test Score	Post-test Score	Change	RCI	Edwards-Nunnally Corrected RCI
Student 1	24/28	22	70	48	6.84	4.89*
Student 2	16/28	29	51	22	3.13	2.70*
Student 3	22/28	32	47	15	2.14	2.35*
Student 4	18/28	32	47	15	2.14	2.35*
Student 5	17/28	32	48	16	2.28	2.49*
Student 6	23/28	32	47	15	2.14	2.35*
Student 7	21/28	34	71	37	5.27	5.92*
Student 8	6/28	35	42	7	.10	1.86
M	*18.38*	*31.00*	*52.87*			
SD	*5.78*	*4.04*	*11.15*			

*Corrected RCI > 1.96 is considered significant.

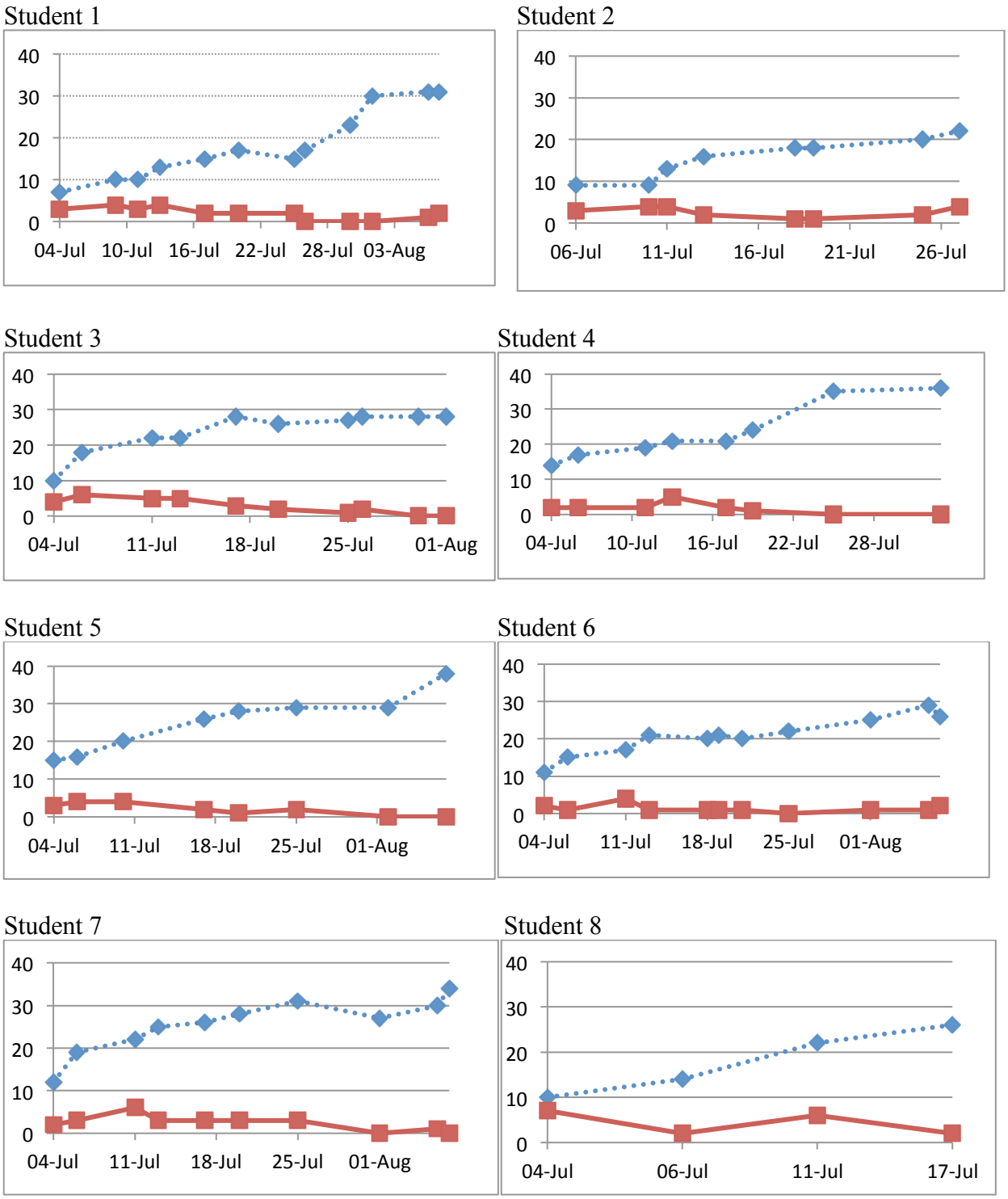


Figure 2. Group A participants' scores for progress monitoring on letter-sounds. Correct sounds per 30-second probe are graphed with diamonds and a dashed line; incorrect sounds are graphed with squares and a solid line.

Graphic display of Group A participants' scores collected for progress monitoring on letter-sounds are presented in Figure 2. Students were given a list of letters and were asked to sound them out loud as fast as they could. Number of correct and incorrect letter-sounds they read in 30

Table 4.5

Combined Group B (Students 9 to 16) and C (Students 17 to 24) Participants' Performance on Reading Composite Scores and Reliable Change Indices (RCIs)

Participant	# of Sessions Attended	Pre-test	Post-test	Change	RCI	Edwards-Nunnally Corrected RCI
Student 9	9/9	23	33	10	2.71	1.67
Student 10	9/9	26	38	12	3.13	2.70*
Student 11	6/9	27	41	14	3.80	3.22*
Student 12	9/9	31	34	3	.81	.70
Student 13	8/9	33	42	9	2.44	2.56*
Student 14	8/9	32	40	8	2.17	2.17*
Student 15	8/9	35	48	13	3.52	3.86*
Student 16	8/9	35	41	6	1.63	1.98*
Student 17	5/9	30	40	10	2.71	2.48*
Student 18	9/9	30	53	23	6.23	6.01*
Student 19	5/9	32	45	13	3.53	3.53*
Student 20	7/9	37	47	10	2.71	3.29*
Student 21	9/9	35	44	9	2.44	2.79*
Student 22	8/9	35	44	9	2.44	2.79*
Student 23	9/9	35	45	10	2.71	3.06*
Student 24	9/9	36	45	9	2.44	2.91*
M	*7.88*	*32*	*42.50*			
SD	*1.41*	*3.98*	*5.06*			

*Corrected RCI > 1.96 is considered significant.

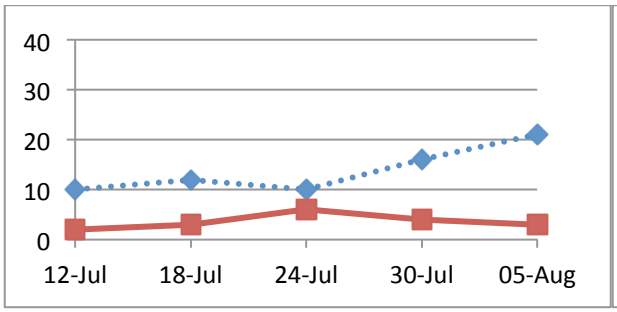
seconds was recorded. The graphs in Figure 2 present the data collected on each student's accuracy of sounding out the letters. All the students in Group A showed an increase in the number of letters each could sound out correctly and a decreasing trend in the number of incorrect sounds. Of all the students in Group A, Student 8 showed the least progress in comparison to other students in this group. This observation aligns with the results of the RCI calculations. Notably, Student 8 also had the lowest attendance in the group (6 out of 28 sessions) and the attendance of other students in the group ranged between 16 and 24 sessions.

Group B and Group C. As completed for Group A, RCI was also calculated on the individuals' pre- and post-test BPA and PPA composite scores to assess the effects of the treatment on individual students in Groups B and C combined. RCIs and Edwards-Nunnally corrected RCIs are presented in Table 4.5. Groups B and C were combined because both received the equivalent duration and length of intervention (i.e., fewer and shorter intervention sessions compared to Group A). The same progress monitoring tool used with Group A was used with Groups B and C.

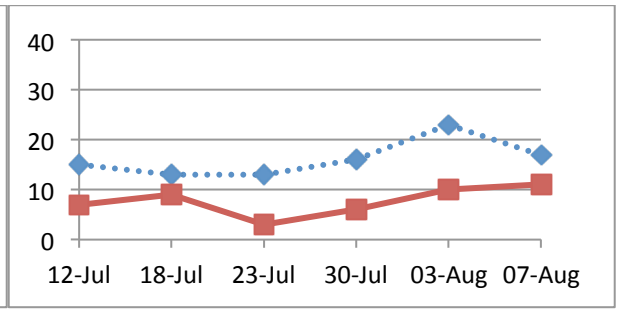
Of the 16 students in Group B/C, all the students except Student 12 and Student 16 achieved acceptable levels for RCI; with the Edwards-Nunnally corrected RCI, Student 16 also achieved significantly. Student 18 evidenced the largest pre- and post-test change results followed by Student 11. Overall, 14 out of the 16 students evidenced reliable change and improvement in their performance.

Graphs displaying scores of participants in Group B on letter-sounds recorded for progress monitoring are presented in Figure 3. Group B and Group C received relatively fewer sessions and shorter length of interventions as compared to Group A. Most of the students in Group B also showed a steady increase in sounding out letters correctly. However, this increase

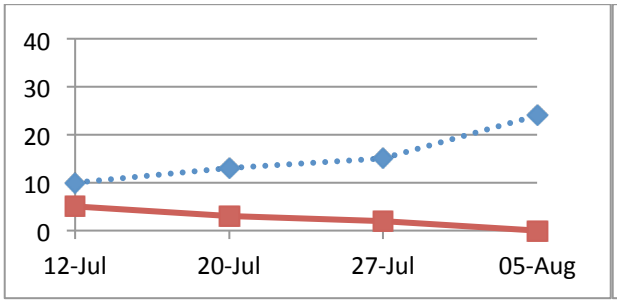
Student 9



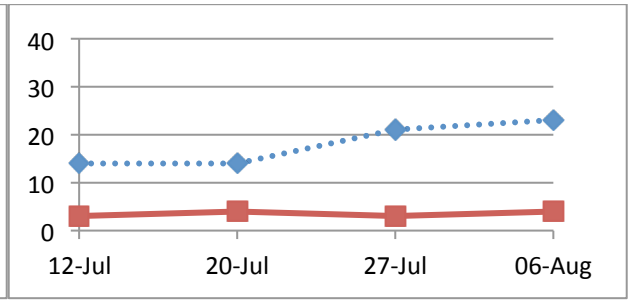
Student 10



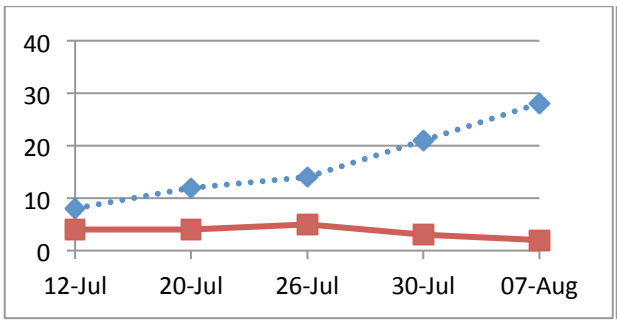
Student 11



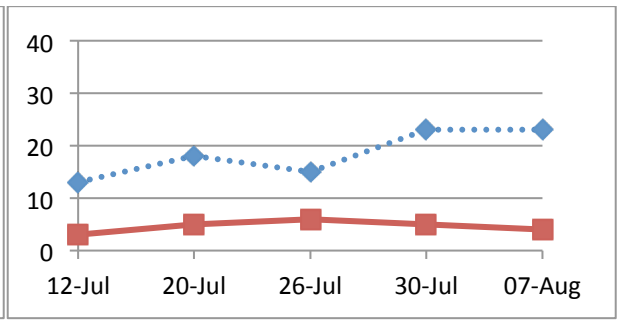
Student 12



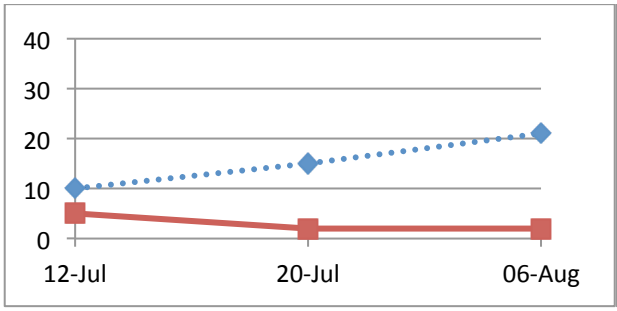
Student 13



Student 14



Student 15



Student 16

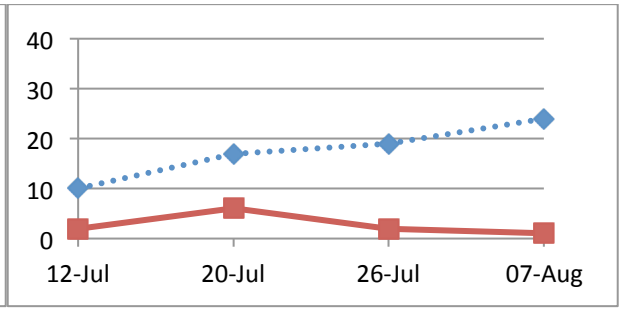


Figure 3. Group B participants' scores for progress monitoring on letter-sounds. Correct sounds per 30-second probe are graphed with diamonds and a dashed line; incorrect sounds are graphed with squares and a solid line.

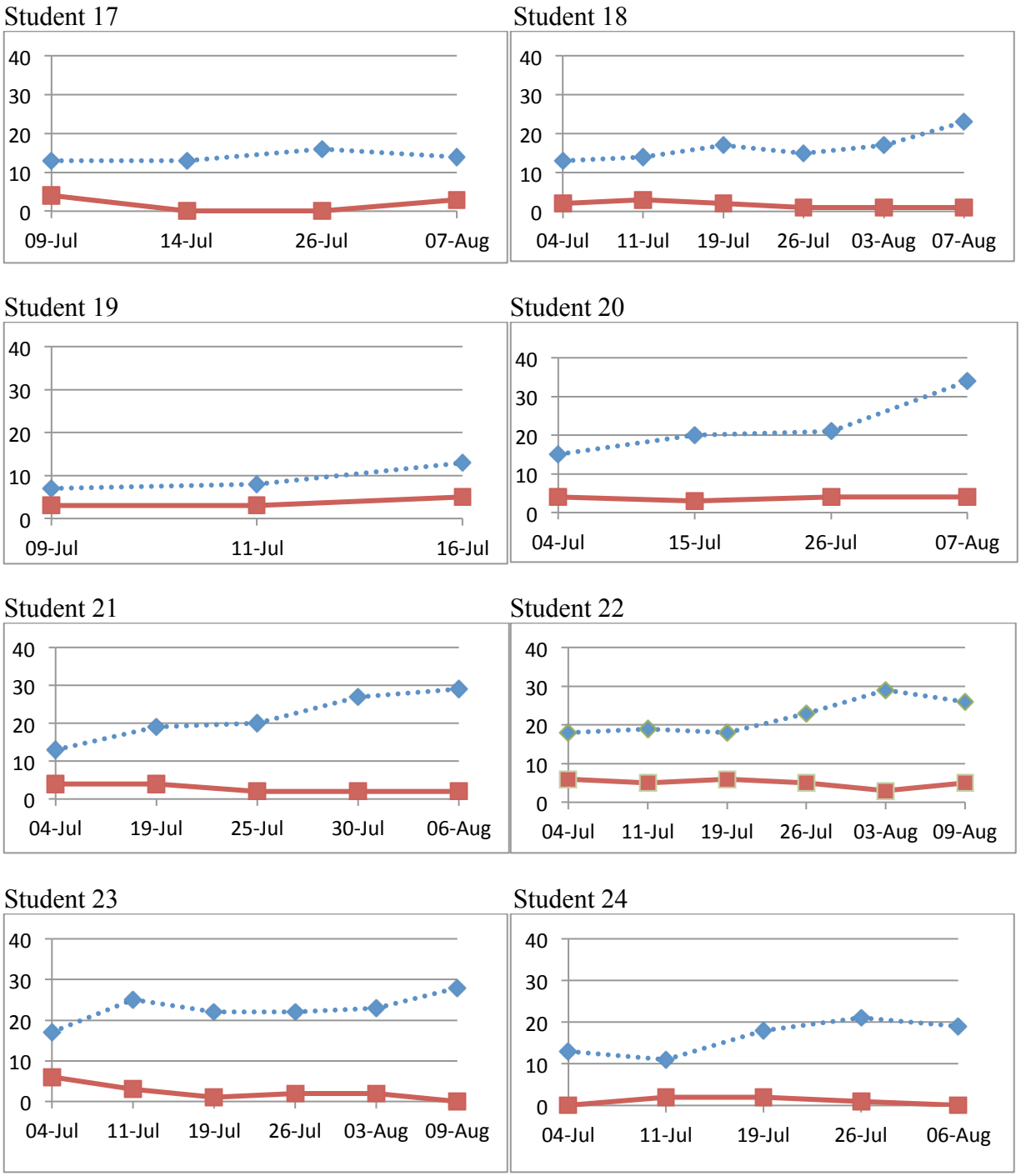


Figure 4. Group C participants' scores for progress monitoring on letter-sounds. Correct sounds per 30-second probe are graphed with diamonds and a dashed line; incorrect sounds are graphed with squares and a solid line.

was at a slower pace as compared to students in Group A. Also, four out of the eight students in Group B did not show a decrease in reading incorrect letter-sounds. Attendance of students in this group ranged between 6 and 9 sessions out of a total of 9 sessions.

Graphs depicting the performance of students in Group C on reading letter-sounds are presented in Figure 4. Except for Student 17 all the other students showed an increase in their performance. Improvement shown by Student 19 was also relatively less compared to the other students in the Group. Again, the attendance for both Student 17 (5 sessions) and Student 19 (5 sessions) was relatively less compared to the other students in the group (range = 7-9 sessions).

Effect of Duration and Frequency on Efficacy of Intervention

An independent samples *t* test was conducted on the post-intervention scores of Group A and combined Group B/C. Significant difference at .05 level was evidenced between the Group A, $M = 52.88$, $SD = 11.15$, and combined Group B/C, $M = 42.50$, SD = 5.06; $t(22) = 3.172$, $p = .013$. These results indicate that duration and frequency of intervention also had an effect on students' reading scores. The greater the number of sessions and the longer the duration of the intervention exposure, the better the reading performance of the students was at post-testing.

Further, a simple linear regression analysis was conducted to determine whether duration and frequency of intervention (independent variable) could predict the student's progress in reading (dependent variable). As Group A received 60 minute sessions everyday of the week and Group B and C received only 30 minute sessions, to maintain equivalence, each of the Group A sessions were broken down into 2 sessions. For example, if a student in Group A attended 10 one-hour sessions, for the purpose of this analysis, it will be considered 20 half-hour sessions. The null hypothesis tested was that the regression coefficient (i.e., the slope) was equal to 0.

The data was screened for violations of assumptions prior to analysis. The scatterplot of the independent variable (duration and frequency of interventions) indicates that the assumption of linearity is reasonable. As duration and frequency of interventions increases, post-intervention composite scores generally increases as well. With a random display of points falling within a absolute value of 2, a scatterplot of unstandardized residuals against values of the independent variable provide further evidence of linearity. The assumption of normality was tested via examination of the unstandardized residuals. Review of the S-W test for normality (SW = .843, *df* = 24, p = .002) indicates that the scores are significantly non-normal. However, the Q-Q plot as well as the skewness (1.712) and kurtosis (6.299) suggest relatively normal distribution. The Durbin-Watson statistic was computed to evaluate independence of errors and was 2.359, which is considered acceptable (Field, 2013). This means that the assumption of independence has been met. A relatively random display of points, where the spread of residuals appear fairly constant over the range of values of the independent variable) in the scatterplot of studentized residuals against values of the independent variable) provided evidence of homogeneity of variance.

The results of the simple linear regression suggest that a significant proportion of the total variation in post-intervention composite scores was predicted by time and duration of intervention. In other words, the duration and frequency of intervention is a good predictor of the impact that interventions will have a student's reading performance, $F(1, 22) = 13.367$, $p = .001$. Additionally, the unstandardized slope (.258) and the standardized slope (.615) are significantly difference from 0, $t(22) = -3.656$, $p = .001$. *R* squared indicates that approximately 37% of the variation in the post-intervention test scores was predicted by the duration and frequency of intervention. According to Cohen (1988), this suggests a medium effect.

CHAPTER 5: DISCUSSION

This exploratory study investigates the RTI service delivery model -- one that is preventive and facilitates early identification, provides evidence-based early interventions, and can lead to identification of SLD – in a Mumbai, India school setting by implementing two components that are critical to RTI implementation: (a) universal screening measures, and (b) empirically validated interventions.

Measures for Universal Screening

The first part of the study assessed the psychometrics of the Beginning Phonics Assessment (BPA; Carnine et al., 2010a) and Primary Phonics Assessment (PPA; Carnine et al., 2010b) scores with an Indian sample, which had not previously been done. Reliability of BPA and PPA scores and their item functioning (e.g., coefficient alpha, split-half reliability, item difficulty & item discrimination) were assessed to evaluate the utility of these test scores in the Indian setting. Overall, the results of the current study indicate that both the BPA and PPA scores for the current sample are sufficiently reliable at .80 and above.

The reliability of BPA was in the moderate to high range for males and females, with only the split-half reliability for the scores of male students falling in the moderate category. In large part, items on the BPA functioned appropriately with the current sample. Item discrimination values were considered good with two exceptions: items 36 (“it”) and 39 (“cat”). Both these items were too easy for the current sample based on their item difficulty values. All the items on the test that had appropriate item difficulty levels also had adequate point-biserial values, thereby suggesting appropriate utility with the Indian sample.

Overall, reliability of the PPA scores for the current sample was in the high range. While items on PPA were relatively difficult for the current sample, based on their point-biserial values

all the items were good items and were functioning appropriately. As all the items have acceptable levels of point-biserial correlations, this preliminary evidence points to the utility of this measure to provide useful scores for the current sample, thereby, making these tests potentially useful in screening students for Tier 2 interventions.

Consequently, both BPA and PPA show preliminary evidence for the integrity of resultant scores for children in India, and such scores may prove to be effective in identifying children who are at risk for academic failure. However, for a test to be suitable for use with a particular population, the test scores necessarily must be both reliable and valid with that population (Sattler, 2008). Validity of test scores refers to the extent to which a test measures what it is purports to measure, and therefore the suitability with which we can make conclusions based on the test results (Sattler, 2008). Thus, further investigation is warranted to assess aspects of validity (e.g., convergent/discriminant validity, predictive validity) of the two test scores with the Indian population before the tests' scores are used to make placement or diagnostic decisions. Convergent/divergent validity would provide evidence for the extent to which a test measures the construct that it claims to measure and predictive validity provides evidence for the accuracy in predicting future performance on the criterion (Sattler, 2008).

This study provides initial evidence of the BPA's and PPA's utility. Information related to the reliability and validity of the scores of both BPA and PPA was not previously reported by the authors, nor was the information about the development of the instruments available. Consequently, prior data with which to compare the results of the current study are lacking. Notably, the current study includes a sample from a single metropolitan city in India that is not representative of the entire Indian population, therefore results should not be overgeneralized. Furthermore, the present sample was drawn from a predominantly middle- to upper-middle class

school in Mumbai. In order to make these tests available to other practitioners who are interested in implementing an RTI model in schools in India, future research investigating the reliability and validity of BPA and PPA scores with samples that more accurately represent the diverse population of India is needed.

Empirically Validated Interventions

The second component of the study assessed the effectiveness of a Tier 2, direct instruction-based program in reading with first-grade students. Results indicate that interventions based on direct instruction were effective in increasing students' performance in reading in an Indian sample for which English is not their first language. Results align with earlier evidence that direct instruction programs are effective in increasing reading performance in other countries (Adams & Engelmann, 1966; Forness, Kavale, Blum, & Lloyd, 1997; White, 1988). The debate between advocates of interventions based on the direct instruction approach and those who support the whole language approach has been on-going (Carnine et al., 2010). Given that the vast majority of research related to direct instruction has been conducted with students in schools in the US (Adams & Engelmann, 1966; Forness, Kavale, Blum, & Lloyd, 1997; Weisberg, 1988; White, 1988), the current study extends support to the efficacy of direct instruction with a sample of students in Mumbai, India.

The results of the study also highlight an important factor that affects students' responsiveness to intervention -- the length and frequency of the intervention. Group A received longer and more frequent intervention sessions as compared to Groups B and C and the *t*-test results comparing the performance of Group A and combined Group B/C indicate that the group that received longer and more frequent sessions (Group A) outperformed the groups that received fewer and shorter sessions (Group B/C). Furthermore, the recorded change in the

performance of students in Group A was higher as compared to the recorded change of the performance of students in Group B and Group C. Regression analysis also identified duration and frequency of intervention as good predictors of a student's reading progress. Thus, the results indicate that the length and the duration of intervention had an impact on the performance of the students. These results are consistent with the findings of meta-analysis conducted by Suggate (2010). However, they contrast with those of Denton and Mathes (2003), Wanzek and Vaughn (2008), and Hatcher et al. (2006), who found no effect of intervention duration on students' responsiveness to intervention. Differences in results may be due to a variety of reasons such as the type of intervention (direct instruction, whole language-based instructions, etc; Carnine et al, 2010), the number of teacher–student interactions during each session (Warren, Fey, & Yoder, 2007), the pacing both within and across lessons (i.e., program coverage rate; What Works Clearinghouse, 2009), and the level of active student engagement in instructional activities (Vaughn, Denton, & Fletcher, 2010).

Attendance contributed to Tier 2 intervention exposure and impacted students' reading performance. Students who were not regular in attending the intervention sessions evidenced less improvement in reading as compared to students whose attendance was more regular. Student 8 in Group A attended only 6 sessions out of a total of 28 sessions and did not evidence a reliable change. Student 8's performance on progress monitoring was also lower than peers' in Group A. Similarly, Students 17 and 19 in Group C attended only 5 sessions and their performance on progress monitoring was relatively lower than the others in their group. These findings are consistent with earlier findings by Roby (2003) at schools in Ohio, where he found a statistically significant relationship between attendance and student achievement.

Challenges in Implementation of RTI

Implementing RTI in a school calls for a system-wide change that requires vision, persistence, and good communication skills (Cavendish, McLeod, Espinosa, Mahotiere, & Menda-Marshall, 2010). The challenges that schools and districts can anticipate in implementing RTI were presented at the 2008 Response to Intervention Conference. Common RTI implementation challenges highlighted regarding setting up and running an RTI program included: time/scheduling, classroom management, resistance, instructional changes, leadership changes, and funding. Several of these problems were evident when implementing RTI in the Mumbai, India school.

The school invited the author to implement Response to Intervention with their first standard students and the resulting data used for the current study were a part of this project. The main intention of this project was to explore the possibility of implementing an RTI model in schools in India and to understand the challenges involved in the process of implementation. Trying to schedule sessions while making certain that the students did not miss any of the core curriculum lead to problems in attendance in the Tier 2 intervention sessions. Students in Group A met every morning, 40 minutes before school started; students in Group B and C met every alternate afternoon for 25 minutes. Establishing routines also took time as many students would forget to come to the sessions, or their teachers would forget to send them for the sessions, which led to spending time in gathering the participants for each session.

The project was initially intended to train the school's teachers and special educators in providing interventions as well as in progress monitoring and universal screening. Unfortunately, despite the headmaster's endorsement and approval, many teachers were reluctant to participate in the project. An initial session was held for teachers to introduce them to the model and to ask

them to participate in and contribute to the study. However, the teachers viewed this effort as an additional task that they were asked to do and did not show much interest in the project. The teacher-student ratio in the classrooms was about 1:35 and many of the teachers were requesting additional support in the classrooms. The teachers as well as the special educators were less inclined to take on the additional task of screening, progress monitoring, and providing intervention. Teachers were asked to attend the intervention sessions at their convenience; consequently, the teacher attendance to these sessions was quite low. A scheduled time allotment for teachers to attend these sessions might have helped to increase teacher attendance; however, this was not accomplished due to teachers' resistance. Very few teachers showed interest in participating and many complained about how overworked they already were. Thus, the training aspect of the intended program was discontinued. Taking the teachers' comments into consideration, availability of additional support staff may be crucial in implementing interventions in similar settings.

Lack of personnel and support staff to implement RTI in the school as well as lack of resources were additional challenges faced during implementation. Effective leadership plays a crucial role in obtaining and maintaining teacher buy-in. Results of the study by Turnbull (2002) indicate that support from program developers, support from staff members, administrator buy-in, and control over classroom implementation were stronger and constant predictors of teacher buy-in regarding a school reform program. In the Indian school, a lack of administrator buy-in and support was evidenced. The school was also reluctant to allocate funds to implement the project as it was an experimental pilot. Despite the challenges faced during implementation, the results of this study provide solid preliminary evidence to support implementation RTI as a service delivery model for students at-risk for reading difficulties in schools in India.

Limitations

The current study has several limitations that must be considered. An RTI model has a number of aspects involved in its implementation, and not all could be included in this study. The scope of the current study only includes assessments for universal screening and Tier 2 interventions in some aspects of reading. Also, the current study was conducted at an English medium school; replications are needed in schools wherein instruction is delivered in Indian vernacular languages. Furthermore, the current sample is drawn from a school that is located in an upper-middle class neighborhood of Mumbai. It is likely that a large proportion of the participants in the present study came from middle to upper socioeconomic status families, which is not an accurate representation of the Indian society. It is important to note that the current study includes a sample from one school in a large metropolitan city within a very diverse country; thus, replication is needed in multiple schools in different parts of the country to examine generalizability to the broader population of students.

The National Reading Panel (2000) identified five critical areas of content to teach reading in English: phonemic awareness, phonics, fluency, vocabulary, and text comprehension. Instructions provided in the current study only focused on phonemic awareness (blending & segmenting) and phonics (letter sound correspondence, reading regular words, & reading irregular words). Consequently, the study is limited in the range of interventions provided and further research involving interventions targeting all five areas is important before the efficacy of direct instruction is generalized to other aspects of reading instruction.

The minimum recommendation for how long Tier 2 interventions should be provided is 8 weeks (Marston, Lau, & Muyskens, 2007), and some researchers have recommended interventions be provided for 20 weeks or more (Wanzek & Vaughn, 2007). Due to scheduling

problems in the current project, Tier 2 interventions were provided to the participants for only 6 weeks. Despite the intentions and effort of author to include the teacher training aspect of the program and to expand the time period of intervention session offerings, the teachers did not participate and the Tier 2 program was necessarily discontinued after the end of the 6 weeks.

Directions for Future Research

Given the limitations of the current study and the lack of prior studies in India, additional research is necessary to further understand the process for implementing RTI in Indian schools. Of importance is to identify Tier 2 and Tier 3 intervention programs, screening measure, and progress monitoring tools that are culturally valid with the Indian population. Also, another crucial area that future research should target is to develop Indian norms and goals for benchmark assessments.

Whereas the current study is the first to assess the psychometric properties of the BPA and PPA assessments and provides initial evidence for their utility, replication is needed with students in different parts of the country in order to examine generalizability to the broader population. For example, future research should investigate the reliability as well as validity of the BPA and PPA with a sample that represents the diverse Indian population.

Longer-term studies assessing the efficacy of the RTI model in schools in India should be conducted. The current study was also restricted in the range of interventions provided, thus, studies focusing on different types of interventions with the Indian populations is also warranted. Efficacy of interventions based on DI was focus of the current study, and DI has proven to be effective when compared with the whole language approach and other approaches with the U.S. population (Forness, et al., 1997; White, 1998); however, to this author's knowledge investigations comparing interventions based on different approaches within the Indian

population have yet to be conducted. An area for suggested further research would be comparing the different instructional approaches with Indian students.

The design of the current study did not lend itself to comparing the intervention groups with a non-intervention control group; consequently it is not truly an experimental design. Future research applying a true experimental design should be conducted to investigate the efficacy of DI within the Indian setting. Most RTI studies, including this one, have addressed Tier 2 reading interventions (e.g., Vaughn, Linan-Thompson, & Hickman, 2003; Jiménez et al., 2010; Vellutino et al., 2000). In mathematics, fewer studies have been conducted in the US (Fuchs, Fuchs, Craddock, Hollenbeck, & Hamlett, 2008) or in other countries. A direction for further RTI research should include the area of mathematics with Indian as well as international populations. Research should also be conducted in the area of Tier 3 interventions. RTI has been identified as an alternative method for identifying students with SLD in the US (Fuchs & Fuchs, 2006; IDEIA, 2004). Given the current use of the ability-achievement method in India and the problems related to this method, research should also explore effectiveness of using RTI for identification of SLD in India. Lastly, results of the study suggest that direct instruction were effective in increasing students' performance in reading in sample for which English is not their first language. Further replications with populations from different parts of India as well as other countries should also be conducted.

Conclusions

The results of the study provide initial evidence for the utility of BPA and PPA with the Indian population, thereby potentially making sound screening for reading difficulties available to educational professionals in India. Further, the study also provides evidence for the efficacy of DI reading interventions within the Indian educational setting. By exploring the possibility and

trying to understand the challenges in implementing RTI in a school in Mumbai, India, an attempt is made to make available a systematic service delivery model for identifying students at-risk for reading difficulties and providing them with early intervention. The results of the study provide initial evidence for employing RTI with schools in India. The study also identified the potential areas of challenges that one might face in implementing this model in Indian schools. These findings may thus help professionals subsequently plan a smoother implementation of RTI in Indian schools. In conclusion, implementation of the RTI model had evident effects on improving student's reading performance, and these results provide preliminary evidence suggesting the applicability of the RTI model within a school in Mumbai, India.

References

Adams, G. L., & Engelmann, S. (1996). *Research on direct instruction: 25 years beyond DISTAR.* Seattle, WA: Educational Achievement Systems.

Algozzine, B., Ysseldyke, J. E., & McGue, M. (1995). Differentiating low-achieving students: Thoughts on setting the record straight. *Learning Disabilities Research & Practice, 10,* 140-144.

Allen, M. J., & Yen, W. M. (1979). *Introduction to measurement theory.* Belmont, CA: Wadsworth.

Al Otaiba, S., Schatschneider, C., & Silverman, E., (2005). Tutor-assisted intensive learning strategies in kindergarten: How much is enough? *Exceptionality, 13,* 195–208.

Al Otaiba, S., & Torgesen, J. (2007) Effects from intensive standardized kindergarten and first-grade interventions for the prevention of reading difficulties. In S. R. Jimerson, M. K. Burns, A. M. Van Der Heyden, (Eds.). *Handbook of Response to Intervention*, (pp. 212–222) New York, NY: Springer.

American Federation of Teachers. (2004). *Six promising schoolwide reform programs.* Washington DC: Author.

American Institute of Research (1999). *Educators' guide to schoolwide reform,* Washington, DC.

Basu, B. D. (n.d.). *Histroy of education in India under the rule of the East India Company.* Retrieved from http://www.isec.ac.in/History%20of%20education%20in%20India...pdf

Berkeley, S., Bender, W. N., Peaster, L. G., Saunders, L. (2009) Implementation of response to intervention: A snapshot of progress. *Journal of Learning Disabilities, 42*, 85–95.

Bialystok, E., & Hakuta, K. (1994). *In other words: The science and psychology of second-language acquisition.* New York, NY: Basic Books.

Bordignon, C. M., & Lam, T. C. M. (2004). The early assessment conundrum: Lessons from the past, implication for the future. *Psychology in the Schools, 41,* 737-749. doi: 10.1002/pits.20019

Borman, G. D., Hewes, G. M., Overman, L. T., & Brown, S. (2002). *Comprehensive schoolreform and student achievement: A meta-analysis.* Baltimore, MD: Center for Research on the Education of Students Placed At Risk (CRESPAR) at Johns Hopkins University.

Bradley, R., Danielson, L., & Doolittle, J. (2005). Responsiveness to Intervention: 1997 to 2007, *Teaching Exceptional Children, 39,* 9-12.

Bradley, R., Danielson, L., & Hallahan, D. P. (2002). *Identification of Learning Disabilities: Research to Practice*. Mahwah, NJ: Lawrence Erlbaum.

Brown, J.E.; Sanford, A., and Lolich, E. (2010, April). *RTI For English Language Learners: Appropriate Screening, Progress Monitoring, and Instructional Planning*. Power point presentation at the meeting of National Center on Response to Intervention, Washington, DC, US

Camilli, G., & Shepard, L. A. (1994). *Methods for identifying biased test items* (Vol. 4). Thousand Oaks, CA: Sage.

Campbell, F. A., & Ramey, C. T. (1994). Effects of early intervention on intellectual and academic achievement: A follow-up study of children from low-income families. *Child Development, 65,* 684-698. doi: 10.1111/j.1467-8624.1994.tb00777.x

Carnine, D. W., Silbert, J., Kane'euni, E. J., & Traver, S. G. (2010). *Direct instruction reading.* Boston, MA: Merrill.

Carnine, D. W., Silbert, J., Kane'euni,E. J., & Traver, S. G. (2010a). *Beginning Phonics Assessment.* Boston, MA: Merrill.

Carnine, D. W., Silbert, J., Kane'euni,E. J., & Traver, S. G. (2010b). *Primary Phonics Assessment,* Boston, MA: Merrill.

Carnine, D. W., Silbert, J., Kane'euni,E. J., & Traver, S. G. (2010c). *Oral Language Screening Test.* Boston, MA: Merrill.

Cavendish, W., McLeod, T.A., Espinosa, A., Mahotiere, M., & Menda-Marshall, A. (2010, October). *Response to Intervention: Challenges and Successes in Large Scale Implementation Process.* Panel Presentation at the Great City Schools Conference, Tampa, FL.

Chambers, J., Parrish, T., & Harr, J. (2002). *What are we spending on special education services in the United States, 1999-2000?*. Palo Alto, CA: American Institutes for Research.

Coles. G. (1987). *The learning mystique: A critical look at "learning disabilities."* New York, NY: Pantheon.

Colker, R. (2011). The learning disability mess. *The American University Journal of Gender, Social Policy & the Law, 20,* 81-106.

Denton, C. A. & Mathes, P. G. (2003). Interventions for struggling readers: Possibilities and challenges. In B. R. Foorman (Ed.) *Preventing and remediating reading difficulties: Bringing science to scale* (229-252). Baltimore, MD: York.

Dikshit, K. R. (2014). India. In J. E. Schwartzberg (Ed.) *Encyclopedia Britannica.* Retrieved from http://britannica.com/EBchecked/topic/285248/India

Division of Learning Disabilities of the Council for Exceptional Children. *Response to OSEP's consensus statement. Unpublished paper.*

Elliot, K. (2008). Response to Intervention. *The Exceptional Parent, 38,* 72-73.

Elliot, S. N. & Fuchs, L. S. (1997). The utility of curriculum-based measurement and performance assessment as alternatives to traditional intelligence and achievement test. *School Psychology Review, 26,* 224-233.

Farr, R. C., Prescott, G. A., Balow, I. H., & Hogam. T. P. (1979). *Metropolitan Achievement Tests.* San Antonio, TX: Psychological Corporation.

Field, A. (2013), *Discovering Statistics Using IBM SPSS Statistics, Fourth Edition.* New Delhi, India: Sage.

Fletcher, J. M. (1995). *Diagnostic utility of intelligence testing and the discrepancy model for children with learning disabilities: Historical perspective and current research.* Paper presented at the IQ Testing and Educational Decision Making Workshop, National Research Council, National Academy of Sciences.

Fletcher, J. M., Shaywitz, S. E., Shankweilerm, D. P., Katz, L., Liberman, I. Y., Stuebing, K. K., Francis, D. J. et al. (1994). Cognitive profiles of reading disability: Comparisons of discrepancy and low achievement-definitions. *Journal of Educational Psychology, 86,* 6-23.

Foorman, B. R., Francis, D. J., & Fletcher, J. M. (1995). *Growth of phonological processing skill in beginning reading: The lag versus deficit model revisited.* Paper presented at the Society for Research on Child Development. Indianapolis, IN.

Forness, S. R., Kavale, K. A., Blum, I. M., & Lloyd, J. W. (1997). Mega-analysis of meta-analyses. *Teaching Exceptional Children, 29,* 4-9.

Fuchs, D., & Fuchs, L. S. (2006). Introduction to Response to Intervention: What, why, and how valid it is? *Reading Research Quarterly, 41,* 93-99. doi:10.1598/RRQ.41.1.4

Fuchs, L., Fuchs, D., Craddock, C., Hollenbeck, K. N., & Hamlett, C. L. (2008). Effects of small-group tutoring with and without validated classroom instruction on at-risk students' math problem solving: Are two tiers of prevention better than one? *Journal of Educational Psychology, 100,* 491-509. doi: 10.1037/0022-0663.100.3.491

Fuchs, D., Mock, D., Morgan, P., & Young, C. (2003). Responsiveness-to-Intervention: Definitions, evidence, and implication for the learning disabilities construct. *Learning Disabilities Research & Practice, 18,* 157-171.

Gottlieb, J., Alter, M., Gottlieb, B. W., & Wishner, J. (1994). Special education in urban America: It's not justifiable for many. *The Journal of Special Education*, *27*, 453-465.

Government of India, Ministry of Home Affairs (2011). Census of India. Retrieved from http://www.censusindia.gov.in

Gredler, G. R. (1997). Issues in early childhood screening and assessment. *Psychology in the Schools, 34*, 99-106. doi: 10.1002/(SICI)1520-6807(199704)34:2<99::AID-PITS3>3.0.CO;2-N

Gresham, F. (2001). *Responsiveness to intervention: An alternative to the identification of learning disabilities.* Paper presented at the 2001 Learning Disabilities Summit: Building a Foundation for the Future.

Gresham, F. M. (2002). Responsiveness to intervention: An alternative approach to the identification of learning disabilities. In R. Bradley, L. Donaldson, & D. Hallahan (Eds.), *Identification of learning disabilities: Research to practice* (pp. 467-519). Mahwah, NJ: Erlbaum.

Gresham, F. M. (2005). Response to intervention: An alternative means of identifying students as emotionally disturbed. *Education and Treatment of Children, 28*, 328-344.

Grimes, J. (2002). *Responsiveness to intervention: The next step in special education identification, service and exiting decision making.* Revision of paper written for the Office of Special Education Programs, U.S. Department of Education, and presented at the OSEP's LD summit conference. Washington, DC.

Guralnick, M. J. (2005). Early intervention for children with intellectual disabilities: Current knowledge and future prospects. *Journal of Applied Research in Intellectual Disabilities, 18,* 313-324.

Hale, J. B., Naglieri, J. A., Kaufman, A. S., & Kavale, K. A. (2004). Specific learning disabilities classification in the new Individuals with Disabilities Education Act: The danger of good ideas. *The School Psychologist, 58,* 6-13.

Hatcher, P. J., Hulme, C., Miles, J. N. V., Carroll, J. M., Hatcher, J., Gibbs, S., Smith, G., Bowyer-Crane, C. & Snowling M. J. (2006). Efficacy of small group reading intervention for beginning readers with reading-delay: A randomised controlled trial. *Journal of Child Psychology and Psychiatry, 47*, 820–827.

Hoover, J. J., Baca, L., Wexler-Love, E., & Saenz, L. (2008). *National Implementation of Response to Intervention, Research Summary.* NASDE.

Hoover, J. J., & Patton, J. R. (2008). The role of special educators in a multitiered instructional system. *Intervention in School and Clinic*, *43*, 195-202.

Hosp, J. L., & Reschly, D. J. (2004). Disproportionate representation of minority students in special education: Academic, economic, and demographic predictors. *Exceptional Children*, *70*, 185–200.

Hutchinson, J. M., Whiteley, H. E., Smith, C. D., & Connors, L. (2004). The early identification of dyslexia: Children with English as an additional language. *Dyslexia 10*, 179–195. doi: 10.1002/dys.275

Individuals with Disabilities Education Improvement Act of 2004, Pub. L. 108–466.

Jacobson, N. S., & Truax, P. (1991). Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology, 39.*12-19

Janus, M., & Offord, D. R. (2007). Development and psychometric properties of the Early Development Instrument (EDI): A measure of children's school readiness. *Canadian Journal of Behavioural Science, 39,* 1-22. doi: 10.1037/cjbs200700

Jiménez, J. E., Rodríguez, C., Crespo, P., González, D., Artiles, C., & Alfonso, M. (2010). Implementation of Response to Intervention (RtI) Model in Spain: An example of a collaboration between Canarian universities and the Department of Education of the Canary Islands. *Psicothema*, *22*, 935-942.

Johnson, E. S., & Smith, L. A., (2008). Implementing response to intervention in middle school: Challenges and potential benefits. *Teaching Exceptional Chindren, 40*, 46-52

Kapoor, G. (2007). Identification of learning disabilities in India. (Order No. 1446402, Emporia State University). *ProQuest Dissertations and Theses,* 67. Retrieved from http://search.proquest.com/docview/304720159?accountid=13158. (304720159)

Karande, S. (2008). Current challenges in managing specific learning disabilities in India. *Journal of Postgraduate Medicine, 54,* 75-77.

Karande, S., Sholapurwala, R., & Kulkarni, M. (2011). Managing specific learning disability in schools in India. *Indian Pediatrics, 47.*515-520

Karanth, P. (2003). Introduction. In P. Karant, & J. Rozario, (Eds.), *Learning disabilities in India: Willing the mind to learn,* (3rd ed., pp. 17-29). New Delhi, India: Sage.

Kavale, K. A. (2005). Identifying specific learning disability: Is responsiveness to intervention the answer? *Journal of Learning Disabilities*, *38*, 553-562.

Kidder-Ashley, P., Deni, J. R., & Anderton, J. B. (2000). Learning disabilities eligibility in the 1990s: An analysis of state practices. *Education*, *121*, 65-72.

Lazar, I., Darlington, R. B., Murray, H., W., Royce, J., & Snipper, A. (1982). Lasting effects of early education: A report from the consortium for longitudinal studies. *Monographs of the Society for Research in Child Development, 47,* (2-3, Serial No. 195).

Lyon, G. R. (1987). Severe discrepancy: Theoretical, psychometric, developmental, and educational issues. *Learning Disabilities Research & Practice, 3*, 10–11.

Lyon, G. R., Fletcher, J. M., Shaywitz, S. E., Shaywitz, B. A., Torgesen, J. K., Wood, F. B… Olson, R. (2001). Rethinking learning disabilities. In C. E. Finn, A. J. Rotherham & C. R. Hokanson, Jr. (Eds.), *Rethinking special education for a new century* (pp. 259-287). Washington, D.C.: Thomas B. Fordham Foundation and the Progressive Policy Institute.

MacMillan, D. L., Gresham, F. M., & Bocian, K. M. (1998). Discrepancy between definitions of learning disabilities and school practices: An empirical investigation. *Journal of Learning Disabilities*, *31*, 314-326.

MacMillan, D. L., Gresham, F. M., Bocian, K. M., & Siperstein, G. N. (1997). The role of assessment in qualifying students as eligible for special education: What is and what's supposed to be [Electronic version]. *Focus on Exceptional Children*, *30*, 1-18.

MacMillan, D. L., & Siperstein, G. N. (2002). Learning disabilities as operationally defined by schools. In R. Bradley, L. Danielson, & D. P. Hallahan (Eds.), *Identification of learning disabilities: Research to practice* (pp. 287-333). Mahwah, NJ: Lawrence Erlbaum.

Marston, D., Lau, M., Muyskens, P. (2007). Implementation of the problem-solving model in the Minneapolis public schools. In: S. R Jimerson, , M. K. Burns, A. M. Van Der Heyden, (Eds.). *Handbook of Response to Intervention*, (pp. 212–222) New York, NY: Springer.

Mastropieri, M. A., & Scruggs, T. E. (2005). Feasibility and Consequences of Response to Intervention Examination of the Issues and Scientific Evidence as a Model for the Identification of Individuals with Learning Disabilities. *Journal of Learning Disabilities*, *38*, 525-531.

Meisels, S. J. & Shonkoff, J. P. (2000). Early childhood intervention: A continuing evolution. In J. P. Shonkoff & S. J. Meisels, (Eds.), *Handbook of Early Childhood Intervention,* (2nd ed., pp. 3-34), New York, NY: Cambridge Press.

Mercer, C. D., Jordan, L., Allsopp, D.H., & Mercer, A. R. (1996). Learning disabilities definitions and criterion used by state education departments. *Learning Disability Quarterly*, 19, 217-232.

Morris, R. D.,Stuebing, K. K., Fletcher, J. M.,.Shywitz, S. E., Lyon, R. G., Shankweiler, D. P… Shaywitz, B. A. (1998). Subtypes of reading disabilities: Variability around a phonological core. *Journal of Educational Psychology, 90,* 347-373.

Murphy, K. R., & Davidshofer, C. O. (2005). *Psychological testing: Principles and applications* (6th ed.). Upper Saddle River, NJ: Pearson Education.

National Reading Panel. (2000). Report of the National Reading Panel. *Teaching children to read: An evidenced based assessment of the scientific research literature on reading and*

its implications for reading instruction: Reports of the subgroups (NIH Publication N0. 00-4754). Washington DC: U.S. Government Printing Office.

National Joint Committee on Learning Disabilities. (2005). Responsiveness to intervention and learning disabilities. Retrieved from www.ldonline.org/njcld.

O'Shaughnessy, T. E., Lane, K. L., Gresham, F. M., & Beebe-Frankenberger, M. E. (2003). Implementing a school-wide system of early identification and intervention. *Remedial and Special Education, 24,* 27-35

Padakannaya, P. (2007). Early reading acquisition. In P. Karanth, & J. Rozario (Eds.), *Learning disabilities in India: Willing the mind to learn* (pp. 62-76), New Delhi, India: Sage Publications.

Palfrey, J. S., Singer, J. D., Walker, D. K., & Butler, J. A. (1987). Early identification of children's special needs: A study in five metropolitan communities. *Journal of Pediatrics, 111,* 651-659

Pandit, V. (2007). Advocacy- Maharashtra, a case study. In P. Karant & J. Rozario, (Eds.), *Learning disabilities in India: Willing the mind to learn,* (3rd ed., pp. 166-170). New Delhi, India: Sage.

Pang, Y., & Richey, D. (2005). A comparative study of early intervention in Zimbabwe, Poland, China, India, and the United States of America. *The International Journal of Special Education, 20,*122-121

Prema, K. S., & Karanth, P. (2003). Assessment of learning disabilities: Language based tests. In P. Karanth & J. Rozario (Eds.), *Learning disabilities in India: Willing the mind to learn* (pp. 138-149). New Delhi, India: Sage.

Pyle, R. P. (2002). Best practices in assessing kindergarten readiness. *The California School Psychologist, 7,* 63-73.

Raghavan, C. (2013). Mumbai. *Encyclopedia Britannica.* Retrieved from http://britannica.com/EBchecked/topic/72526/Mumbai

Ramaa, S. (2000). Two decades of research on learning disabilities in India. *Dyslexia, 6,* 268–283.

Reschly, D. J., Tilly III, W. D., & Grimes, J. P. (1999). *Special education in transition: Functional assessment and noncategorical programming*. Longmont, CO: Sopris West.

Reschly, D. J., & Ysseldyke, J. E. (2002). Paradigm shift: The past is not the future. *Best practices in school psychology IV*. Washington, DC, US: National Association of School Psychologists.

Riccomini, P. J. & Witzel, B. S. (2010). *Response to intervention in math.* Thousand Oaks, CA: Corwin.

Roby, D. E. (2003). Research on school attendance and student achievement: A study of Ohio schools, *Educational Research Quarterly, 28*, 4-15.

Rozario, J. (2007). Assessment of learning disability. In P. Karant, & J. Rozario, (Eds), *Learning disabilities in India: Willing the mind to learn,* (3rd ed., pp. 101-110). New Delhi, India: Sage.

Sattler, J. M. (2008). *Assessment of children: Cognitive foundation* (5th ed.) San Diego, CA: Author.

Scruggs, T. E., & Mastropieri, M. A. (2002). On babies and bath-water: Addressing the problems of identification of learning disabilities. *Learning Disabilities Quarterly, 25,* 155-168.

Semrud-Clikeman, M. (2005). Neuropsychological aspects for evaluating learning disabilities. *Journal of Learning Disabilities*, *38*, 563-568.

Siegel, L. S. (1999). Issues in the definition and diagnosis of learning disabilities: A perspective on Guckenberger v. Boston University. *Journal of Learning Disabilities*, *32*, 304-319.

Shrinivasan, R. (March 30, 2005). Parents struggle to get information from Sion Hospital, *Times of India*, Retrieved on 10 November, 2010 from http://timesofindia.indiatimes.com/

Speer, D. C. (1992). Clinically significant change: Jacobson and Truax (1991) revisited. *Journal of Consulting and Clinical Psychology, 60,* 402– 408

Stanovich, K. E. (1999). The sociopsychometrics of learning disabilities. *Journal of Learning Disabilities, 32,* 350-361.

Stanovich, K. E. (2005). The future of a mistake: Will discrepancy measurement continue to make the learning disabilities field a pseudoscience? *Learning Disability Quarterly*, *28*, 103- 106.

Stanovich, K. E., & Seigel, L. S. (1994). Phenotypic performance profile of children with reading disabilities: A regression-based test of the phonological-core variable-difference model. *Journal of Educational Psychology, 86,* 24-53

Stockard, J. (September, 2008). *Improving first grade reading achievement in a large urban district: The effects of NIFDI-supported implementation of direct instruction in the Baltimore City public school system,* Technical Report #2008-1. Eugene, OR: National Institute of Direct Instruction.

Stuebing, K. K., Fletcher, J. M., LeDoux, J. M., Lyon, G. R., Shaywitz, S. E., & Shaywitz, B.A. (2002). Validity of IQ-discrepancy classifications of reading disabilities: A meta-analysis. *American Educational Research Journal*, *39*, 469-518.

Suggate, S/ P/ (2010). Why "what" we teach depends on "when": Grade and reading intervention modality moderate effect size. *Development Psychology, 46,* 1556-1579.

Telzrow, C. F., McNamara, K., & Hollinger, C. L. (2000). Fidelity of problem-solving implementation and relationship to student performance. *School Psychology Review, 29,* 443-461.

Torgesen, J. K., Morgan, S. T., & Davis, C. (1992). Effects of two types of phonological awareness training on work learning in kindergarten children. *Journal of Educational Psychology, 84,* 364-370.

Turnbull, B. (2002). Teacher participation and buy-in: Implications for school reform initiatives. *Learning Environments Research, 5,* 235-252.

U.S. Department of Education (2000) Twenty-second Annual Report to Congress on the Implementation of the Individuals with Disabilities Education Act .Washington, DC.

Vaughn, S., Denton, C. A., & Fletcher, J. F. (2010). Why intensive interventions are necessary for students with severe reading difficulties. *Psychology in the Schools, 47,* 432–444.

Vaughn, S. & Fuchs, L. S. (2003). Redefining learning disabilities as inadequate response to instruction: The promise and potential problems, *Learning Disabilities Research and Practice, 3,* 137-146.

Vaughn, S., Linan-Thompson, S., & Hickman, P. (2003). Response to instruction as a means of identifying students with reading/learning disabilities. *Exceptional Children, 69,* 391-409.

Verma, S. (2012). Preliminary item statistics using point-biserial correlation and *p*-values, *Educational Data Systems Inc.,* Retrieved on 3 March, 2012, from http://www.eddata.com/resources/publications/

Vellutino, F. R., Scanlon, D. M., & Lyon, G. R. (2000). Differentiating between difficult-to-remediate and readily remediated poor readers: More evidence against the IQ-achievement discrepancy definition of reading disability. *Journal of Learning Disabilities, 33*, 223–238.

Wanzek, J., & Vaughn, S. (2008). Response to varying amounts of time in reading intervention for students with low response to intervention. *Journal of Learning Disabilities, 41*, 126–142.

Warren, S. F., Fey, M. E., & Yoder, P. J. (2007). Differential treatment intensity research: A missing link to creating optimally effective communication interventions. *Mental Retardation and Developmental Disabilities Research Reviews, 13,* 70–77.

Wedl, R. J. (2005). Response to Intervention: An alternative to traditional eligibility criteria for students with disabilities. *Education Evolving,* Retrieved on 27 October, 2013, from http://www.educationevolving.org

Weisberg, P. (1988). Direct instruction in the preschool. *Education and Treatment of Children, 11,* 349-363.

What Works Clearinghouse (2009). Best practice for RTI: Small group instruction for students making minimal progress (Tier 3). Retrieved on 16 March, 2014, from http://www.colorincolorado.org/article/30676/

White, W. A. T. (1988). Meta-analysis of the effects of direct instruction in special education. *Education and Treatment of Children, 11*, 264-374.

Willson, V. L., & Reynolds, C. R. (1984). Another look at evaluating aptitude-achievement discrepancies in the diagnosis of learning disabilities. *The Journal of Special Education*, *18*, 477-487.

Ysseldyke, J., & Algozzine, B. (1983). LD or not LD: That's not the question! *Journal of Learning Disabilities*, *16*, 29-31.

Ysseldyke, J. E., Algozzine, B., & Epps, S. (1983). A logical and empirical analysis of current practices in classifying students as learning disabled. *Exceptional Children, 50,* 160-166.

Ysseldyke, J., & Marston, D. (1999). Origins of categorical special education services in schools and a rationale for changing them. In D. J. Reschly, W. D Tilly III, & J. P. Grimes (Eds.), *Special education in transition: Functional assessment and noncategorical programming* (pp. 1-18). Longmont, CO: Sopris West.

Zahra, D., & Hedge, C. (2010). The Reliability Change Index: Why isn't it more popular in academic psychology? *PsyPag Quarterly, 76,* 14-19

APPENDIX A

OUTLINE OF LESSONS

Lesson 1 Letter introduction – a, m Letter discrimination – a, m	**Lesson 6** Letter introduction – o Letter discrimination – a, e, i, o, u, s, t, f, m Letter introduction – z Sounding out – fat, mom, at, met, sum, dim Worksheets
Lesson 2 Letter discrimination – m, a Segmenting – am, Sam Letter introduction – i Letter discrimination – i, m, a Segmenting – it, sad, at Worksheets	**Lesson 7** Letter introduction – e Letter discrimination – a, e, i, o, u, s, t, f, m, x Letter introduction – y Sounding out – fat, mom, at, met, sum, dim Worksheets
Lesson 3 Letter discrimination – a, m, i, t, f, s Letter introduction – u Segmenting – at, it, Sam Letter introduction – a Segmenting – am, sit Worksheets	**Lesson 8** Letter introduction – x Letter discrimination – a, e, i, o, u, x, t, s, m, f Letter introduction – y Letter discrimination – a, e, i, o, u, x, t, s, m, f, y Worksheets
Lesson 4 Letter discrimination – a, m, i, t, f, s, u Letter introduction – o Letter discrimination – a, i, o, u Segmenting – am, sat, sit, mud, pot Letter introduction – i Letter discrimination – o, a, m, i, t, f, s, u, i Worksheets	**Lesson 9** Letter introduction – z Letter discrimination – a, e, i, o, u, x, y, z, s, m, f, t Blending – Sam, am, sit, fax, Sounding out – fat, mom, at, met, sum, dim Worksheets
Lesson 5 Letter introduction – s Letter discrimination – a, i, o, u, s Letter introduction – e Letter discrimination – a, e, i, o, u, s Segmenting – am, sit, sad, at sit, if Sounding out – am, fit Letter introduction – u Worksheets	**Lesson 10** Letter introduction – c Letter discrimination – a, e, i, o, u, c, f, m, s, t Segmenting – mad, mid, fit, rat Sounding out – if, fit, am, fat, Sam Sight reading – it, at, Sam, sit Worksheets

Lesson 11 Letter introduction – x, y, z, c Letter discrimination – a, e, i, o, u, c, x, y, z, s, t, f, m Letter introduction – d Sounding out – if, fit, can, fat, fax Sight reading – it, at, Sam, sit, cut Worksheets	**Lesson 16** Letter introduction – b, v, g Letter discrimination – a, e, i, o, u, x, y, z, w, v, c, d, g, s, t, f, m Sight reading – sock, sick, lick, mud Passage reading – red sock Worksheets
Lesson 12 Letter introduction – w, e Letter discrimination – a, e, i, o, u, s, t, f, m, e, d, x, y, z Segmenting – on, in, ran, rag Sounding out – mad, sad, sat, if, it, at Sight reading – sit, mad, fat, sad, sit, if Passage reading – am Sam Worksheets	**Lesson 17** Letter Introduction – p, e Letter Discrimination – a, e, i, o, u, s, t, f, m, m, p, b, d, x, y, z, w, v, c, g Sight reading – red, not, big, gap, can, up Passage reading – The dog is big Irregular word – was Worksheets
Lesson 13 Letter introduction – p, w Letter discrimination – x, y, z, w Segmenting – fax, lap, pin Sight reading – mud, fun, can, fin Irregular words – is	**Lesson 18** Letter introduction – h, i, d Letter discrimination – a, e, i, o, u, h, s, t, f, m, w, x, y, z, d, p, g, c, b, v Isolated sounds for letter combination – th Words with letter combination – thin, then, bath Worksheets
Lesson 14 Letter introduction – v, c Letter discrimination – d, e, c, f, m, s, t Segmenting – on, in, ran, rat Irregular words – is Passage reading – Sam is sad Sounding out – sad, sat, am, fit, mit Worksheets	**Lesson 19** Letter introduction – q, h, e Letter discrimination – a, e, i, o, u, b, c, d, f, g, h, m, o, p, s, t, v, w, x, y, z Words – better, faster Sight reading – fad, fan, fat, lad, lag lap Passage reading – It was fun Worksheets
Lesson 15 Letter introduction – z, g Letter discrimination – a, e, i, o, u, f, t, s, m, x, y, z, w, v, c, d Irregular word – was Segmenting – sick, sock, lot, on, in Passage reading – it is Sam Sight reading – at, it, am Worksheets	**Lesson 20** Letter introduction – l, q, h Letter discrimination – a, e, i, o, u, s, t, f, m, b, c, d, g, h, l, m, p, q, u, v, w, x, y, z Sight reading – mad, fin, fit, log, mud, fun Isolated sounds for letter combination – ing Words with letter combination – batting, cutting, betting, digging Passage reading – A thin girl was eating burger

Lesson 21 Letter introduction – n, l, q Sight reading – mad, Nat, mit, mop, nut, fed Isolated sounds for letter combination – th, er Passage reading – A little boy is a sad. Letter discrimination – a, e, i, o, u, s, t, f, m, w, x, y, z, v, l, m, n, p, q, g, h, c, d, b Worksheets	**Lesson 25** Letter discrimination – a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z Sight reading – rock, sock, hint, junk, dump, sung, bend, left, self, golf, melt Worksheets
Lesson 22 Letter introduction – k, n, l Letter discrimination – a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z Irregular word – the Passage reading – The boy is big. Worksheets	**Lesson 26** Sight reading – blend, blot, brag, brat, bred, brim, clad, clam, clan, clap, clip, clot, club Irregular word – some, come, live, give Worksheets
Lesson 23 Letter introduction – j, k, l, h Letter discrimination – a, b, c, d, e, f, g, h, I, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z Irregular word – then Passage reading – The big pen is in the bag. Worksheets	**Lesson 27** Irregular words – some, come, talk, walk, chalk, mother, brother, other Passage reading – The other girl is running. Worksheets
Lesson 24 Letter discrimination – a, b, c, d, e, f, g, h, I, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z Isolated sounds for letter combination – sh Words with letter combination – shin, ship, bath, thin, better, sadder Worksheets	**Lesson 28** Sight reading – and, can, fin, fit, log, mud Irregular word – then, the Worksheets

APPENDIX B

RELIABILE CHANGE INDEX – 1st Quartile (Beginning Phonics Assessment)

Student	Pre-Test	Post-Test	Change	RCI	Edwards-Nunnally Corrected RCI
1	15	47	32	4.81*	2.95*
2	23	33	10	1.50	0.22
3	26	33	7	1.05	0.00
4	26	35	9	1.35	0.30
5	27	39	12	1.80	0.82
6	29	39	10	1.50	0.67
7	29	43	14	2.10*	1.27
8	30	40	10	1.50	0.72
9	31	34	3	1.95	1.26
10	31	44	13	1.95	1.26
11	32	40	8	1.20	0.58
12	32	44	12	1.80	1.19
13	32	40	8	1.20	0.58
14	32	40	8	1.20	0.58
15	32	44	12	1.80	1.19
16	33	39	6	0.90	0.36
17	33	47	14	2.10*	1.56
18	34	44	10	1.50	1.03
19	34	44	10	1.50	1.03
20	34	41	7	1.05	0.58
21	35	42	7	1.05	0.65
22	35	42	7	1.05	0.65
23	35	41	6	0.91	0.50
24	35	42	7	1.05	0.65
25	35	43	8	1.20	0.83
M	***30.80***	***40.80***	***10***	***1.56***	***0.86***
SD	***4.63***	***3.85***	***5.32***	***0.77***	***0.58***

RELIABILE CHANGE INDEX – 2nd Quartile (Beginning Phonics Assessment)

Student	Pre-Test	Post-Test	Change	RCI	Edwards-Nunnally Corrected RCI
26	36	49	13	1.95	1.68
27	36	37	1	0.15	-0.18
28	36	39	3	0.45	0.16
29	36	36	0	0.00	-0.33
30	37	43	6	0.90	0.65
31	38	45	7	1.50	0.67
32	38	41	3	0.45	0.27
33	38	45	7	1.05	0.87
34	39	41	2	0.30	0.19
35	39	35	-4	-0.60	-0.71
36	39	40	1	0.15	0.04
37	39	39	0	0.00	-0.18
38	39	40	1	0.15	0.04
39	40	36	-4	-0.60	-0.63
40	40	36	-4	-0.60	-0.63
41	40	39	-1	-0.15	-0.18
42	41	46	5	0.75	0.79
43	41	44	3	0.45	0.49
44	41	46	5	0.75	0.79
45	42	40	-2	-0.30	-0.19
46	42	42	0	0.00	0.11
47	42	39	-3	-0.45	-0.34
48	42	46	4	0.91	0.50
49	42	38	-4	-0.60	-0.49
50	42	45	3	0.45	0.56
51	42	41	-1	-0.15	-0.04
52	42	44	2	0.30	0.41
53	42	40	-2	-0.30	-0.19
54	42	41	-1	-0.15	-0.04
55	42	39	-3	-0.45	-0.34
M	***39.83***	***41.07***	***1.23***	***0.21***	***0.13***
SD	***2.17***	***3.57***	***4.00***	***0.64***	***0.54***

RELIABILE CHANGE INDEX – 3rd Quartile (Beginning Phonics Assessment)

Student	Pre-Test	Post-Test	Change	RCI	Edwards-Nunnally Corrected RCI
56	43	44	1	0.15	0.34
57	43	48	5	0.75	-0.94
58	43	45	2	0.30	0.47
59	43	42	-1	-0.15	0.04
60	43	41	-2	-0.30	-0.12
61	44	45	1	0.15	0.41
62	44	48	4	0.60	0.86
63	44	47	3	0.45	0.71
64	44	43	-1	-0.15	0.11
65	44	45	1	0.15	0.41
66	45	44	-1	-0.15	0.18
67	45	41	-4	-0.60	-0.27
68	45	45	0	0.00	0.33
69	45	41	-4	-0.60	-0.27
70	45	46	1	0.15	-0.48
71	45	42	-3	-0.45	-0.12
72	45	43	-2	-0.30	0.03
73	45	45	0	0.00	0.33
74	45	47	2	0.30	0.63
75	45	40	-5	-0.75	-0.42
76	45	40	-5	-0.75	-0.42
77	45	39	-6	-0.90	-0.57
78	45	43	-2	-0.30	0.03
M	***44.35***	***43.65***	***-0.70***	***-0.10***	***0.55***
SD	***.83***	***2.62***	***2.96***	***0.44***	***0.45***

RELIABILE CHANGE INDEX – 4th Quartile (Beginning Phonics Assessment)

Student	Pre-Test	Post-Test	Change	RCI	Edwards-Nunnally Corrected RCI
79	46	47	1	0.15	0.55
80	46	47	1	0.15	0.55
81	46	42	-4	-0.60	-0.20
82	46	40	-6	-0.90	-0.50
83	46	47	1	0.15	0.56
84	47	48	1	0.15	0.63
85	47	47	0	0.00	0.48
86	47	46	-1	-0.15	0.32
87	47	48	1	0.15	0.63
88	47	48	1	0.15	0.63
89	47	48	1	0.15	0.63
90	48	49	1	0.15	0.70
91	48	48	0	0.00	0.55
92	48	49	1	0.15	0.71
93	48	47	-1	-0.15	0.40
94	48	49	1	0.15	0.71
95	48	49	1	0.15	0.71
96	48	48	0	0.00	0.55
97	48	48	0	0.00	0.55
98	49	48	-1	-0.15	0.47
99	49	49	0	0.00	0.62
100	49	47	-2	-0.30	0.32
101	49	39	-10	-1.50	-0.88
102	50	49	-1	0.15	0.54
M	***47.58***	***46.96***	***-0.63***	***-0.81***	***0.43***
SD	***1.14***	***2.73***	***2.65***	***0.40***	***0.40***

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