

A Diagnostic Teaching Intervention for Classroom Teachers:

Helping Struggling Readers in Early Elementary School

Lynne Vernon-Feagans

Kathleen Gallagher

Marnie Ginsberg

Steve Amendum

Nathan Vandergrift

Kirsten Kainz

Jason Rose

Margaret Burchinal

The Targeted Reading Intervention Investigators

University of North Carolina at Chapel Hill

DRAFT (DO NOT QUOTE)
UNDER REVIEW

Authors' Notes

Funding for this study was provided by the National Research Center on Rural Education Support awarded by the Institute of Educational Sciences, R305A040056 to Thomas Farmer and Lynne Vernon-Feagans. We want to thank all the teachers and children who collaborated with us over the last two years and to the many TRI staff and graduate students who contributed to the success of the project.

Address:

Lynne Vernon-Feagans, University of North Carolina, 301K Peabody Hall, #3500,
Chapel Hill, North Carolina, 27599, email: lynnevf@email.unc.edu

A Diagnostic Teaching Intervention for Classroom Teachers:
Helping Struggling Readers in Early Elementary School

Introduction

Although most children learn to read during early elementary school through a variety of effective reading instructional programs delivered by the classroom teacher, some children do not seem to profit from regular classroom instruction in reading. It has generally been acknowledged that there are two groups of children who are at highest risk for reading failure when exposed only to regular classroom instruction in reading (Whitehurst & Lonigan, 1998; Foorman & Torgesen, 2001). The first group comes to school with adequate oral language skills but has trouble with the processes involved in the relationship between oral language and the printed word. The second even larger group is characterized by problems in both oral language/vocabulary and print related/phonological knowledge. This latter group is composed mostly of low-income children who come to school without the prerequisite experiences in emergent literacy to allow them to profit from most whole class instructional practices (Snow, Burns & Griffin, 1998; Vernon-Feagans, in press). Both groups seem to fall behind their peers in school, with a growing achievement gap over the early elementary school years (Alexander & Entwisle, 1988; Entwisle & Alexander, 1999; Morrison, Bachman & Connor, 2005; Snow et al, 1998). Children who are both low-income and come from minority families appear to be doubly disadvantaged, creating an even larger achievement gap over time (Lee & Burkham, 2002; Vernon-Feagans, 1996).

A rather understudied group of children who are at risk for suboptimal academic achievement are children who live in rural areas of the United States. A greater percentage of children in rural areas live in poverty compared to children from urban/suburban areas and they are poorer than children in urban/suburban areas (US Census Bureau, 2001). About one third of all schools are located in rural areas and about 20% of all school age children attend rural schools in this country (NCES, June, 2007); yet there is very little information about how they might differ from urban and suburban schools and whether specific interventions are more or less effective in rural schools. In an analysis of school entry for the children in the ECLS-K sample, Lee & Burkham (2002) found that rural children performed more poorly at school entry and had less access to high quality schools and teachers than children in the suburbs. Many rural school districts have struggled to recruit and retain highly qualified teachers (Collins, 1999; Reeves, 2003), with teacher pay about 80% of what urban teachers make (National Education Association, 2005). These factors together may put children in rural areas at risk, especially in rural areas where there is high poverty and geographic isolation. Thus, it is important to develop strategies that might aid rural schools and teachers become more effective with children at risk for reading failure. The purpose of the present study was to investigate whether a targeted reading intervention for rural classroom teachers in low wealth schools might help improve the reading skills of struggling readers.

Intervention for Struggling Readers

Research and intervention studies in a variety of contexts over the last 20 years have shown that children who are at risk for reading failure, including children from low-income families, can be helped through more explicit and intensive instruction in reading.

Although two consensus documents on early reading development have been very helpful in delineating the most important components of reading instruction for most children (National Reading Panel, 2000; Snow, Burns & Griffin, 1998), recently a number of scholars have reviewed the intervention studies on children with reading difficulties with the aim of synthesizing the reading intervention components that appear to be most successful in promoting the reading success for these children. Foorman & Moats (2004) summarized the elements of the most effective instruction to prevent reading failure in young children with reading difficulties. They stressed the importance of three basic elements, including: explicit instruction in the alphabetic principle and related processes, while at the same time integrating these processes with reading for meaning; early intervention/prevention efforts in the first few grades in school; and small group/and or one on one intensive instruction. Foorman & Torgesen (2001) also stressed these factors in their review of the literature, but also included a fourth important element: an effective emotional and cognitive relationship between the teacher and the child with reading difficulties, a relationship that has recently been shown to be important for academic success in the early grades for all children (Hamre & Pianta, 2006). Finally a fifth factor has been stressed by a number of studies and reviews of the literature: instruction that is matched to the child's level of skill, or assessment based intervention (Foorman & Torgesen, 2001; Morrison, Bachman & Connor., 2005; Vernon-Feagans, Gallagher & Kainz, in press).

Explicit Reading Instruction in Early Elementary School. The first and second elements of interventions to prevent reading failure (explicit reading instruction and a focus on early elementary school) have been endorsed by the National Reading Panel

(2000) and the framework for Reading First Program for early elementary school reading (2001). These include five aspects of early reading, including phonological awareness, phonics, and fluency that are key to word level reading along with vocabulary and comprehension that are key to the end result of competent reading comprehension. Consensus documents have shown the critical importance of explicit phonological awareness and phonics training for children at risk for reading failure, including children from low-income backgrounds (National Reading Panel, 2000; Snow, Burns & Griffin). For instance, Foorman, Francis, Fletcher, Schatschneider & Mehta (1998) evaluated the effectiveness of different reading curricula for Title I students in 1st and 2nd grade. The classroom teachers implemented one of three types of instruction: Explicit direct instruction in letter/sound correspondence that emphasized phonological awareness and phonics; embedded code instruction that emphasized sound/spelling patterns within connected text; and implicit code instruction that emphasized reading connected text. They found that children made the greatest gains in word reading in the direct instruction group compared to the others. The direct instruction group had higher reading recognition scores at the end of the year in comparison to the other groups although there were no differences on vocabulary and marginal differences on reading comprehension. In a national randomized trial of the effectiveness of 4 explicit small group reading programs provided outside the regular classroom for children with reading difficulties (Torgesen, Myers, Schirm, Stuart, Vartivarian, Mansfield, Stancavage, Durno, Javorksy & Hann, 2006), findings suggested that all small group intensive interventions in third and fifth grade made a positive difference in reading for children who had reading difficulties. Children in third grade benefited more than children in fifth grade, yet

children who were eligible for free and reduced lunch made very few gains. Thus, these studies suggest that gains for children with reading difficulties are possible but that it may be more difficult to achieve gains for older children and those who come from low-income families.

In conjunction with explicit instruction in phonics and decoding, it has been shown that vocabulary skills and oral language provide the foundation for reading comprehension (Whitehurst & Lonigan, 1998; Stork & Whitehurst, 2002; NICHD ECCRN, 2005). The diversity of vocabulary knowledge in children has been found to be especially important (Neuman & Dickinson, 2002) in laying the foundation for reading comprehension (NICHD ECCRN, 2005; Scarborough, 2001; Whitehurst & Lonigan, 1998). Children from low-income families are at risk for academic failure, in part, because they are more likely to come to school with a paucity of vocabulary words (Brody & Flor, 1998; Burchinal et al, 2006). For example, Hart and Risley (1995) examined the vocabulary input of urban low-income children versus more advantaged children. They found that the children's exposure to diverse vocabulary was much greater in the advantaged families and that the gap between the groups increased over time. These differences were related to the children's early vocabulary and their later reading achievement in school. Thus, exposure to a diverse vocabulary during oral language interactions and using explicit instruction may be necessary for some children, especially those from low-income and disadvantaged families.

Intensive Intervention in Small Groups and/or One on One Instruction. Studies have also shown support for the third recommendation for struggling readers, that instruction be delivered intensively in small group and/or one to one explicit instruction.

Foorman & Torgesen (2001) argue that struggling readers need more intensive and explicit instruction compared to instruction for children who are progressing normally in reading. Many of the small group and one to one interventions reviewed here and elsewhere could now be construed to be tier 2 and/or tier 3 interventions from the perspective of the Response to Intervention (RTI) literature. Children who do not learn from competent classroom instruction are children at risk for school/reading failure. (National Joint Committee on Learning Disabilities, 2005). The goal of RTI is to identify children at risk for failure early in the school years before they are identified as needing special education services and providing them with a tiered system of interventions that can prevent learning/reading disabilities. Tier one interventions are high quality instruction and behavioral supports for all children in general education. Tier 2 interventions are for children who lag behind their peers and need more specialized services within general education. Tier 3 interventions are conducted by a multidisciplinary team to determine eligibility for special education services, with more intensive individualized intervention.

A number of recent studies show the effectiveness of these tiered interventions in helping children who are at risk for reading disabilities or who have already been identified as reading disabled. These studies generally employ specialized teachers/staff to deliver the intervention outside the regular classroom setting (Denton, Fletcher, Anthony & Francis, 2006; Mathes, Denton, Fletcher, Anthony, Francis & Schatschneider, 2005; O'Connor, Harty & Fulmer, 2005). Using the RTI framework, these recent studies examined the effectiveness of tier 2 and tier 3 interventions for children who were not progressing even with exemplary regular classroom instruction.

All showed remarkable gains by young children who were provided intervention early in elementary school so that many of them were on grade level by 2nd or 3rd grade.

For instance, Mathes et al. (2005) evaluated two theoretically different tier 2 interventions delivered intensively in small groups for 40 minutes a day from October to May of the school year. They also examined whether children would benefit from an enhanced classroom teacher intervention that included providing the classroom teachers with detailed diagnostic information on children and access to literacy consultants. One of the two targeted interventions was more behavioral and the other more cognitive in nature but both were intensive and delivered by well trained teachers in a small group setting outside the regular classroom. Both interventions produced significant gains for students over the school year in reading while the enhanced classroom teacher intervention was not effective. Denton et al (2006) examined the effectiveness of a tier 3 intervention for those students from the previous study who did not profit from the tier 2 interventions. These 27 non-responsive students in grades 1 to 3 participated in an intensive tier 3 intervention delivered by a specially trained teacher outside the regular classroom setting. Children gained significantly from the tier 3 intervention on reading, with 12 of the 27 children gaining at least a half of a standard deviation on the Woodcock Johnson Basic Reading Cluster.

Two other related studies (Torgesen et al., 1999; 2001), provide good examples of tier 2 and tier 3 interventions that also helped struggling readers, although these studies did not use the RTI framework. The first study (Torgesen et al., 1999) identified children at risk for reading failure in kindergarten who were randomly assigned to four conditions, 1) a control condition, 2) a tutorial condition geared to the curriculum in the

classroom, 3) a Phonological Awareness plus Synthetic Phonics (PASP) intervention that stressed phonological awareness and decoding in isolation; and 4) an Embedded Phonics intervention that emphasized embedded phonics, stressing phonics within the context of the word and text. Children were randomly assigned to groups. Each provided one on one tutoring sessions for 20 minutes per day, 4 days a week from the second semester of kindergarten through second grade. Children in the PASP group gained the most over the 2^{1/2} years, with nearly half the children performing above grade level on two of the three reading outcomes. Like the Mathes et al. (2005) study, the tutorial condition geared to the regular classroom instruction was not effective. In a related study (Torgesen et al., 2001), children from 8 to 10 years of age who were identified as learning and reading disabled were randomly assigned to two intensive instructional conditions, using one on one instruction for 8 weeks by highly trained project teachers. Both programs emphasized direct instruction but differed in the depth of phonological and decoding instruction. One group received a version of the Lindamood program (Lindamood & Lindamood, 1998) that focused explicitly on phonological and decoding instruction while the other group received an embedded phonics program that stressed skills within the context of the word and text. Children greatly benefited from both theoretically derived instructional programs in reading, with very large effect sizes compared to reading gains before the initiation of the interventions. A year later 40% of the children no longer needed special education services. Thus, tier 2 and 3 interventions that use one on one and/or small group instruction by highly trained special teachers who work with children outside of the regular classroom appear to benefit children who do not seem to profit from regular reading instruction in the classroom.

Effective Teacher/Child Instructional Relationship. Although teacher-child relationships have been a focus of much research, only recently has there been consistent evidence of the importance of this relationship in the early years of formal schooling for predicting early literacy. Hamre and Pianta (2005) reported that gaps in reading achievement growth in first grade were narrowed when first grade teachers displayed both sensitive behaviors toward children and implemented specific instructional supports. In addition, there is evidence that children's positive perceptions of their relationship with their teacher in elementary school predict their later academic outcomes (Hughes, Cavell & Wilson, 2001). These studies have focused on all children in early elementary school but there is convincing evidence that this teacher/child relationship is even more important for children who are at risk for reading failure.

Children who have reading difficulties and/or are learning disabled often display behavior and skills that challenge the instruction of the teacher and may result in a poorer teacher/child instructional relationship and less academic progress and adjustment in school (Vaughn, Elbaum & Boardman, 2001; Wanzek, Vaughn, Kim & Cavanaugh, 2006). Foorman & Torgesen (2001) emphasized both the emotional and cognitive support from the teacher as critical for children who have reading difficulties. They stressed two kinds of cognitive scaffolding support, including the careful sequencing of reading tasks to build the child's skills and teacher/child dialogue that fostered the child's thinking skills during reading. In a Meta analysis of reading programs for learning disabled children, Swanson (1999a) found that although direct instruction was important, carefully sequenced teacher instruction with systematic feedback contributed additional significance to the effectiveness of the intervention. In an additional Meta analysis

(Swanson, 1999b) Swanson reported that the combination of direct instruction with strategy instruction produced the largest gains for reading in children with learning disabilities with an effect size of .84. The specific components that seemed to contribute to this effect were teacher one on one instruction, scaffolding, technology, teacher modeling of problem solving and the use of small interactive groups. It is likely that reading programs that promote this positive one on one and small group effective sequenced and scaffolded instruction can enhance both the children's skills and the teacher/child relationship. This teacher/child relationship might be especially important in the early school years to increase motivation and engagement when children relish individualized attention by the classroom teacher.

Diagnostic Teaching. Finally, it is particularly important to understand whether teacher instructional activities are appropriate for the individual characteristics of children. Although education has endorsed individualized instruction that meets the needs of different children in programs like *Reading First*, most reading instructional programs do not offer specific strategies that match the level of the child's literacy skills. This match between skills and instruction may be particularly important for struggling readers who come to school without the preliteracy skills that allow them to profit from many general reading programs. Foorman & Torgesen (2001) propose that struggling readers need the same set of skills as other children but they will need more effective and more intensive instruction that considers the interaction of child characteristics with specific characteristics of the instruction. Thus, reading failure is seen as not just a child characteristic, but involves a 'mismatch' between child skills and the instruction. A number of recent studies suggest that children who do not benefit from regular classroom

instruction, might particularly benefit from the match between the child's skills and the instruction provided. This child by instruction interaction has been supported by a number of recent research studies.

Juel and Minden-Cupp (1998) observed that children with better reading skills made more progress in classrooms that used a *meaning-based approach* (instruction that helps children extract and construct meaning from text) while children with weaker skills seemed to gain more from classrooms with a *code-based emphasis* (explicit instruction that helps children become proficient in phonological decoding and word reading skills). Similarly, Connor, Morrison and Katch (2004) reported that children who entered first grade with low letter- word reading progressed more when they received explicit *code-managed instruction* while students with higher letter-word skills progressed more with less *code-managed instruction*. In addition, children with higher entry vocabulary scores progressed more in literacy with *meaning-based instruction* while children with lower vocabulary scores progressed more with *code-based instruction* in the beginning of the year and *meaning-based instruction* near the end of the year. In a follow up study when children were in 3rd grade, Connor, Morrison and Petrella (2004) found that children with average to low reading comprehension achieved greater growth in classrooms that spent more time on *code- managed instruction* but demonstrated less growth in classrooms with more time spent on *meaning-focused instruction*. In their most recent study, they examined the effect of software developed to individualize instruction based on the assessed skills of the children. Similar to their other work, they examined the effect of this A2i software that helped teachers decide on whether to use *code-managed instruction* or to use *meaning-focused instruction*. The teachers in the experimental schools, who

were trained to use the A2i software to individualize instruction, produced children who progressed more in literacy than the control teachers who did not have access to such software and training. Additionally, those teachers who implemented the A2i the most had children who gained the most in literacy over the school year. Although these descriptive studies have contrasted rather molar aspects of assessment based instruction, it would seem particularly important to use an even more refined diagnostic approach for children who are struggling with reading, thus breaking down code-based teaching into more fine grained levels. It also seems important to document the fidelity of the intervention to examine whether teachers who implemented the best practices had children who profited the most from the intervention.

The Purpose of the Study

The following study was designed to test the effectiveness of a new diagnostic-based reading intervention, called the Targeted Reading Intervention (TRI). This intervention was specifically designed for struggling readers in kindergarten and first grade in rural low wealth communities whose schools had little access to specialized reading instruction and other ancillary services. The TRI was developed to include the five elements of intervention that appeared crucial for the success of struggling readers, based on the literature just reviewed: explicit phonics and word-based instruction in reading, in early elementary school, in one on one and small groups, with an emphasis on the teacher/child relationship, and with a particular stress on diagnostic teaching.

Unique to this intervention compared to other interventions was the use of the classroom teacher as the primary source of delivering the intervention to children, with the support of our TRI literacy consultant and an on-site consultant. Although the

research literature has not generally supported the effectiveness of classroom teacher interventions for struggling readers, the classroom teacher may become effective when given appropriate assessment based strategies that meet the needs of individual struggling readers. The length of time each week of this intervention was less than in other studies that used specially trained teachers to work with students for more time outside of the regular classroom (Mathes et al., 2005; Morris, et al., 2000; Torgesen et al., 1999; 2001) but we planned that the efficient use of diagnostic-based strategies by the classroom teacher might allow for more effective use of time with individual children, especially because classroom teachers are limited in the amount of time they can spend with any one student on a daily basis. The time per week of our intervention was similar to the effective tier 2 interventions developed by O'Connor et al. (2005). They initially implemented their intervention for only 10 or 15 minutes three times a week in kindergarten and then doubled that time in first grade if the children were still having reading difficulties. They found that most children benefited greatly from this tier 2 intervention. The hope in this study was to demonstrate that the classroom teacher could be an effective tier 2 intervention agent for children at risk for reading failure as well as to demonstrate that if this worked these low wealth schools could sustain the TRI by using a part-time on site consultant with little additional cost.

We hypothesized that our classroom intervention for struggling readers would benefit basic word identification and vocabulary skills of the experimental children as well as benefit the successful transition for children into the next grade in comparison to the control children. Because the teachers in the experimental group were asked to work with only those children chosen as our focal children, we expected those children would

gain the most compared to all other children. In particular, we hypothesized that those teachers who faithfully implemented the TRI would be those teachers whose children would gain the most from the intervention in comparison to other children.

Method

The Context of the Study

Schools and Teachers. This study originally included 4 schools in a rural persistently poor county in the Southeastern United States. Schools were paired and matched based on demographic characteristics and randomly assigned to the experimental or control condition. After random assignment, changes in administration at the school and district level led to the withdrawal of one experimental school. The 3 remaining participating schools included 20 classrooms, 8 experimental classrooms and 12 control classrooms. Class size ranged from 15 to 18 students in Kindergarten and averaged 22 students in 1st grade (NCES, 2007). All three schools received Title 1 funding and generally used their Title 1 funds to reduce class size and provide classroom aides. Teacher access to classroom aides varied with the school needs, such that their time in the classroom was not predictable from day to day. There were no other on-site support staff in the experimental school, including special educators, reading teachers, school psychologists or counselors to help support the instruction of children with reading difficulties. Teacher demographics are presented in Table 1, and consistent with literature on rural schools, these teachers had many years of classroom experience but their advanced education was less than might be expected for their years of teaching.

Insert Table 1 about here

Students. The overall profile of the students in the study schools was diverse. Minority students comprised 45% to 60% of the students in the schools, and most of the students (56%-100%) were eligible for free and reduced lunch (NCES, 2007). One hundred percent of the children in the experimental school were eligible for free and reduced lunch. State-wide achievement tests for this district reflected typical achievement gaps: 3rd grade reading achievement percentiles were between the 68th -78th percentile, while minority children and children in poverty scored at or below the 40th percentile (NC Dept of Public Instruction, 2007).

Research Design and Participants

Kindergarten and 1st grade children in the experimental and control schools were initially eligible for this study if they were: 1) not diagnosed with a severe disability and 2) spoke English in the home. These criteria eliminated very few children in the classrooms. Further eligibility was determined by the classroom teacher and one of our TRI reading consultants, using a two-step process. First, teachers administered a state-mandated kindergarten/1st grade assessment of emergent reading skills in 1:1 sessions with each child in her classroom. The assessments included phonological awareness, phonics (decoding), print awareness, and fluency skills. Second, based on this assessment and the teacher's knowledge of the child's progress in school, our reading consultants helped the teacher rank each child in the classroom using the *TRI Screening Instrument*.

During the first 6 weeks of school, teachers ranked students in the classroom by whether they were: 1) profiting from regular classroom instruction, and 2) were below, at, or above grade level. From among the students in each class who were rated below grade level and were struggling with learning to read, 5 were randomly selected as *focal* children. From among those students rated at or above grade level and profiting from regular classroom instruction, 5 children were randomly selected to be *non-focal* children. This was accomplished in both the experimental and the control schools. Thus, each experimental and control classroom contained 5 *focal* students and 5 *non-focal* students. Focal children in the experimental schools received our Targeted Reading Intervention (TRI) from January to May of the academic year. Focal and Non-focal children in control schools as well as the Non-focal children in the experimental school received regular classroom instruction in reading, based on the North Carolina Course of Study. The demographics of the students in the study can be found in Table 2.

Insert Table 2 about here

The Targeted Reading Intervention (TRI)

The TRI (Ginsberg, Amendum & Vernon-Feagans, 2007) was based on research based evidence for early reading instruction for all children, endorsed by the National Reading Panel (2000) and now incorporated into *Reading First* (2001). This framework was used for our intervention because of its inclusiveness of both word and text reading and because teachers have become familiar with the language of *Reading First*, especially in low wealth schools.

The TRI also included all five elements discussed in the literature review that were specific components that appeared to be effective with struggling readers. We targeted children in early elementary school in kindergarten and first grade who were struggling in beginning reading and provided the teacher with assessment based direct instructional strategies. The TRI was delivered in one on one (and sometimes small group) sessions by the classroom teacher in kindergarten and first grade with the guidance of both an on site literacy consultant and one of our TRI literacy consultants. We stressed the teacher/child dialogue and feedback as a way to motivate and engage children in the learning process. We especially stressed the match between the child's skills and the instruction that was delivered to the child to ensure success in each session, using assessment tools that were linked with specific reading strategies in a continuous diagnostic teaching cycle.

Thus, the TRI was designed to help teachers: (a) acquire essential knowledge of early reading development that is especially critical for struggling readers; (b) learn a set of assessment based reading strategies to match the skill level of each child; and (c) apply these strategies in one to one and small group instruction with individual struggling readers in 15 minute daily diagnostic teaching sessions. Schools implementing these strategies did not have to change their reading curriculum but were able to use the TRI to supplement instruction for struggling readers in the regular classroom.

In the context of a 15 minute one on one TRI lesson, the classroom teacher led a student through three TRI components: *Re-Reading for Fluency* (about 2 minutes), *Word Work* (about 6 minutes), and *Guided Oral Reading* (about 7 minutes). The teacher strategies used in each of these three components were geared to help students who

demonstrated great difficulties with beginning reading to progress rapidly in reading (e.g., Morris, Tyner, & Perney, 2000; Shanahan & Barr, 1995). Students moved flexibly into and out of TRI time with their teacher, allowing the teacher to meet the needs of multiple struggling readers across the school year. As children began to make rapid progress in these 1:1 sessions, teachers were able to move them to small group sessions and/or developed independent activities for the children to maintain progress in reading.

In the first TRI component, *Re-Reading for Fluency*, the teacher asked the student to re-read a selection that she/he had read at least once the previous day for the purpose of developing reading fluency. The teacher typically timed and charted the student's reading speed for one minute, and might model fluent, expressive reading with some or all of the text, depending on the skill level of the child. This was done even with children who were non-readers through scaffolding and modeling.

In the second and most innovative component of the TRI, *Word Work* provided the teacher with a variety of assessment based strategies for helping the child manipulate, say, and write words (Ball & Blachman, 1992; Bear, Invernizzi, Templeton, & Johnston, 2003; Beck, 2006; Clay, 1993; Dwyer, 2004; El'Konin, 1999; McCandliss, Beck, Sandak, & Perfetti; 2003; McGuinness, 1997; Moats, 1998; Morris, Tyner, & Perney, 2000). These strategies demonstrated the alphabetic principle, helped students learn phoneme-grapheme (sound-symbol) relationships, developed students' segmenting and blending abilities (phonemic awareness tasks), and helped students learn to recognize sight words.

In the third component of the TRI, *Guided Oral Reading (GOR)* strategies were employed in a text chosen for the child's instructional reading level. The teacher provided

comprehension strategies, word identification and vocabulary support that was built on the *Word Work* sessions. Teachers paid particular attention to scaffolding children's abilities to summarize, predict, make connections, and make inferences through interactive coaching before, during and after the reading. Instruction was closely matched to the individual student, and also focused on word-level, moment-by-moment coaching, in addition to the traditional guided oral reading focus on comprehension. Again, children were scaffolded so that each child experienced success in each session.

TRI Professional Development

The TRI strategies were delivered through an ongoing, collaborative consultation model that was geared to the constraints of rural isolated schools. The TRI provided classroom teachers with a highly trained TRI literacy consultant and an on site consultant to facilitate the TRI implementation, using a community of practice approach that promoted teacher ownership of the TRI process that would sustain the intervention in the rural context.

Four key professional development activities facilitated the learning and the development of a community of practice for classroom teachers, professional staff in the schools and the on-site consultant: 1) a summer institute that included classroom teachers, classroom aides, and other relevant school/school district professionals, 2) weekly/biweekly collaborative consultation visits to the classroom by a highly trained TRI reading consultant, 3) weekly grade level collaborative problem-solving meetings about individual children, and 4) monthly/bimonthly two-hour professional development sessions designed to meet the needs expressed by the classroom teachers.

The three day summer institute introduced teachers and professionals to the TRI content through interactive large and small group sessions that included practicing the strategies and using problem solving strategies with case studies of struggling readers. Small group discussions laid the groundwork for the preparation of classrooms during the fall so the TRI could be implemented in January.

The weekly/biweekly TRI literacy consultant visits had two foci: 1) modeling, coaching and problem solving with teachers as the TRI was implemented with their struggling readers and 2) supporting the on-site school consultant as she assumed responsibilities of the consultation process. In the current study, because of the paucity of on site professional staff, a local retired elementary teacher served as the school's on-site (part-time) consultant. Creating a professional learning community and problem solving about individual children were facilitated by weekly meetings of 30 minutes or less that focused on TRI implementation with focal students, case analysis of TRI students and planning TRI instruction for students. Periodic meetings by TRI staff with the principal, school board, and other school district staff encouraged the commitment needed for the success of the intervention. These kinds of activities have been shown to be particularly effective in creating sustainable teacher change that is supported by a community of practice professionals, especially important in rural communities (Buisse & Wesley, 2007; Stigler & Hiebert, 1999; Vernon-Feagans et al., in press).

Finally, the TRI professional development process also provided ongoing, integrated professional development for teachers on a monthly basis. The monthly two-hour sessions were based on what the teachers thought would be helpful in the implementation of the TRI, including advanced discussions of TRI components, new

ideas for extending the learning during independent work, and honing the diagnostic thinking process ().

In the fall of the school year, teachers participated in monthly workshops and the TRI consultants worked with individual teachers to help them prepare for the implementation of the TRI. This involved problem solving sessions that allowed teachers to arrange and manage their classrooms so that they would be able to work one on one with individual children. The shortage of available classroom aides and the teachers' limited experience with student led instruction, presented major barriers to the implementation of the TRI in the fall. By January of the school year, teachers were equipped with TRI skills and classroom management strategies that allowed TRI implementation.

Procedure and Measures

All children in the study were administered a battery of standardized tests in the fall and again in the spring of the school year. Teachers filled out questionnaires about their professional background and classroom. All child assessments were done in the schools in a quiet room. Graduate students from the University of North Carolina at Chapel Hill conducted the child assessments. The assessors had previous testing experience and participated in a two-day training, which included the administration of the complete battery with non-participating students. Assessors were not informed as to which schools were experimental or control. The following measures were administered to children in the fall and the spring.

The Woodcock-Johnson Tests of Achievement, III (WJTA, III) (Woodcock, Mather & Schrank, 2004). Two subtests of the *WJTA, III* (2004) were administered to all

children. *Word Attack* measures skill in applying phonic and structural analysis skills to the pronunciation of unfamiliar printed sounds and words. The initial items require the child to produce the sounds for single letters. The remaining items require the child to read aloud letter combinations that are phonetically consistent, or regular, patterns in English orthography but are non-words or low-frequency words. The items become more difficult as the orthographic complexity of the non-words increases. *Word Attack* has a median reliability of .87 in the 5 to 19 age range (Woodcock, Mather & Schrank, 2004). The *Letter-Word Identification* subtest measures the child's word identification skills. The initial items require the child to identify letters that appear in large type on the subject's side of the test book, and the remaining items require the child to pronounce words correctly. The child is not required to know the meaning of any words. The items become increasingly difficult as the selected words appear less and less frequently in written English. *Letter-Word Identification* has a median reliability of .91 in the 5 to 19 age range (Woodcock, Mather & Schrank, 2004). Although we report grade standard scores in the results section, we used *W* scores for analysis purposes since many of our children scored near the floor on the *WJTA, III*. Raw scores were converted into *W* scores, which are a special transformation of the Rasch ability scale. The *W* scale has mathematical properties (e.g., equal interval units) that make it well suited for use as an intermediate step in the interpretation of test performance and especially useful for interpreting gain scores.

The Peabody Picture Vocabulary Test-Third Edition (PPVT-III) (Dunn & Dunn, 1997) is an individually administered, norm-referenced test of receptive vocabulary knowledge. Children are asked to select a picture, from among four black-and-white

illustrations presented, that best represents the meaning of the stimulus word presented orally by the examiner. Raw scores are determined by subtracting the number of errors above the basal from the ceiling item total. Raw scores are then converted to a percentile score using a table corresponding to the child's age. Alpha coefficients for the PPVT-III for elementary age students range from .92 to .95.

Student Retention in Grade data were gathered for all children in the fall of the next academic year from teachers.

The *TRI Intervention Fidelity Measure* assessed the quality and duration of TRI instruction for each Experimental Focal child from January to May in order to monitor whether these children were receiving consistent and quality intervention. We developed two separate 5-point Likert scales. The first assessed the *duration* of TRI practices, and the second assessed fidelity *quality* of TRI practices. The *duration of TRI* was reported by teachers in their regular meetings with TRI consultants. The scale reflected the total number of weeks an experimental focal child received TRI-specific literacy practices. A rating of "1" indicated no weeks of TRI intervention; "3" indicated 4 to 9 weeks of total TRI intervention; and "5" indicated 19 weeks or more of total TRI intervention. The *quality of intervention* scale rated the classroom teachers' use of diagnostic assessing/planning tools, and faithfulness to TRI strategies for each focal student as assessed by the TRI literacy consultants. In making the ratings of individual classroom teachers, the TRI consultants used anchor points to guide the ratings. These included: regular use of the TRI (at least 15 minutes/4 times per week), the use of diagnostic assessing/planning tools, and the faithfulness to the TRI strategies. A score of "1" indicated little or no instruction akin to the TRI, and "3" indicated at least moderate

fidelity of the TRI instruction at least twice a week, using at least two of the three components (fluency, word work, or guided oral reading), using some of the diagnostic tools available in the TRI. A rating of “5” indicated high quality TRI instruction at least 4 times a week, including all three major components, with consistent use of the TRI diagnostic tools.

TRI consultants completed the *TRI Intervention Fidelity Measure* in the spring using observation and weekly records on classroom teacher implementation. The *Duration of Intervention* and *Quality of Intervention* scales were highly correlated ($r = 0.89$), and thus were combined to form a *Total Fidelity* variable that was the average of the two scales combined.

From the beginning of the implementation of the intervention, we realized that there was great variability in TRI implementation for individual children. First, we had overestimated the number of children that a teacher could actually work with over the course of the semester. Therefore there were a number of Experimental Focal children who were never worked with by the classroom teacher, using the TRI. Second, there were also children who did not receive TRI training because the teacher was unable to find time and/or was not able to deliver the TRI faithfully. Students whose *Total Fidelity* values were less than or equal to three were assigned to the *Experimental Inadequate Fidelity Focal* Group. The mean Total Fidelity score for this group was 2.08, with a standard deviation of .75. Generally this group included students who received the TRI for less than four weeks with almost no fidelity to the TRI protocol. We did not expect students in this group to benefit from so little intervention. Students whose *Total Fidelity* values were greater than three were placed in the *Experimental Adequate Fidelity*

Focal Group. The mean for this group was 4.03 with a standard deviation of .63. These students generally received more than 9 weeks of the TRI with higher fidelity of implementation. Thus, based on Total Fidelity and experimental assignment, we defined 5 groups of children for analysis purposes and to test our hypotheses about the effectiveness of the TRI.

1. Control Non-focal
2. Control Focal
3. Experimental Non-focal
4. Experimental, Inadequate Fidelity Focal (≤ 3).
5. Experimental, Adequate Fidelity Focal (> 3)

Results

Analysis Strategy

In order to understand whether the intervention had an effect on academic outcomes for those children who actually received the TRI, we estimated mixed models of children's one-semester growth in Word Attack, Letter/Word ID and Vocabulary (PPVT-R). Since both gender and maternal education have been shown to be related to reading failure, we controlled for these in the regressions in order to understand if our intervention was effective after accounting for gender and family background. In change score models, individuals serve as their own controls in order to factor out exogenous effects of measured and unmeasured variables alike; thus, reducing bias in the estimate of intervention effects (Allison, 1990). To estimate the change score models, we used a

mixed models approach in order to account for the separate sources of variance due to children being nested within classrooms. These models insured that the standard errors of the parameter estimates were correct (Raudenbush and Bryk, 2002). Each model estimated the effect of the membership status in the 5 group variable that was defined at the end of the method section.

Table 3 contains the unweighted mean gain scores and standard deviations for the three outcomes across the five groups, before accounting for the covariates. Given that we used *W* gain scores for the Woodcock-Johnson subtests that do not easily translate into interpretable scores and gains. Table 4 contains the fall and spring means for the Woodcock-Johnson subtests, using grade standard scores to help anchor the scores for the reader. Many of our Experimental Focal children scored too low to obtain a standard score so the means presented in Table 4 are especially inflated for the Experimental Focal children in the study. For instance, more than half of the Experimental Adequate Fidelity Focal children did not score high enough to obtain a grade standard score for Word Attack.

Insert Tables 3 and 4 about here

Analyses

For the regression analyses parameter estimates (*B*) were reported for Maternal Education and Gender. Adjusted means (*M*) were calculated for each group.

The following planned contrasts were estimated to test our hypotheses:

1. Experimental Focal vs. Control Focal (Groups 4, 5 vs. 2)

2. Experimental Focal vs. Experimental non-Focal (Groups 4,5 vs. 3)
3. Experimental Adequate Fidelity Focal vs. Control Focal. (Group 5 vs. 2)
4. Experimental Adequate Fidelity Focal vs. Experimental Inadequate Fidelity Focal (Group 5 vs. 4)
5. Experimental Adequate Fidelity Focal vs. other 4 groups (Group 5 vs. 1, 2, 3, 4)

Academic Performance Outcomes. For the analyses for the *WJTA, III* and the *PPVT*, group means, adjusted for covariates and the interaction term, and contrast estimates are reported in Tables 5 through 7. Effect sizes for all contrasts are reported, as well. These effect sizes were calculated using a method for clustered analysis detailed by Raudenbush and Xiao-Feng (2001) and are scaled like a d-type effect.

Insert Tables 5, 6, and 7 about here.

There was no effect of the covariates and no contrasts were significant for *Word Attack*, although the effect sizes were moderate to large and in the right direction for the intervention contrasts (See Table 5). For *Letter/Word Identification* (See Table 6) the covariates were again non-significant and the contrast between the focal children in the experimental schools (Groups 4 and 5) versus the focal children in the control schools (Group 2) was not significant although the effect size was still large. The gains for the Experimental Group (Groups 4 and 5) did not differ from the Experimental non-Focal Group (Group 3). All three contrasts comparing the Experimental Adequate Focal Group were significant. The Experimental Adequate Fidelity Focal Group (Group 5)

made more gains on *Letter /Word Identification* compared to the Focal Control Group (Group 2) ($p < .01$). They also made more gains in comparison to the Experimental Inadequate Fidelity Focal Group (Group 4) ($p < .01$). Lastly, the Experimental Adequate Fidelity Focal Group made more gains in comparison to all the other groups combined ($p < .01$). The effect sizes were very large for each significant effect, with effect sizes ranging from 1.09 to 1.27. In comparison to all other 4 groups, the Experimental Adequate Fidelity Focal group gained 15 more points on the *Letter/Word Identification* subtest.

For the *PPVT* there were two marginally significant results favoring the Experimental Adequate Fidelity Focal Group, similar to the results on *Letter/Word Identification*. No other effects were significant. The Experimental Adequate Fidelity Focal Group (Group 5) gained more on the *PPVT* compared to the Experimental Inadequate Fidelity Focal Group (Group 4) ($p < .055$). They also gained more in comparison to all other groups ($p < .082$). The effect sizes were large at .51 and .72.

Grade Retention. Because there were so few children who were retained in grade, it was not possible to do any formal analyses but it is noteworthy that of the 10 children retained in grade, none were in the experimental school. All were in the control schools.

Discussion

The aim of this study was to evaluate whether classroom teachers could implement a one on one intervention in the regular classroom that could benefit struggling readers in kindergarten and first grade. The results of the study suggest that a comprehensive assessment based literacy instruction delivered in one to one 15 minutes

sessions over the course of a semester could benefit struggling readers word level reading and vocabulary, but only if the classroom teacher implemented the intervention with adequate fidelity. Our significant effects were found with a fairly modest intensity of intervention and with low-income children who have been found to benefit the least from intensive interventions (Torgesen et al., 2006). In addition, no children in the experimental school were retained in grade while 10 were retained in the control schools.

These findings support previous research that has found that one on one and small group instruction can benefit struggling readers in early elementary school (Denton et al., 2006; Mathes et al., 2005; Morris et al., 2000; Torgesen et al., 1999; 2001). Most notably, the classroom teacher was the one who implemented the intervention within the regular classroom and that teachers who implemented the TRI faithfully had children who gained considerably on emergent reading skills compared to the control children, the inadequate intervention group and all other groups combined. This was demonstrated in one semester of intervention in kindergarten and first grade when it seems most important to intervene with struggling readers (Foorman & Torgesen, 2001).

Most of the other intervention studies have not found that enhanced classroom instruction was effective in increasing the skills of struggling readers either through the provision of workshops, diagnostic information for each struggling reader and consultation from literacy consultants (Mathes et al., 2005); or through the provision of out of class intensive instruction that stressed the classroom teachers' existing reading instructional approach (Torgesen et al., 1999). This may have been the case because teachers were not instructed to work one on one with children and/or to carefully match their teaching strategies to the skill level of the child. Our TRI intervention may have

been effective because the teachers were instructed to deliver a carefully crafted diagnostic teaching cycle for each individual child that was quite different from what the teachers were doing with other children in the classroom. Morrison and his colleagues have shown in a series of observational studies that when regular classroom teachers match their instruction to the skills of the child in the regular classroom, those children make the most reading progress in early elementary school (Morrison et al., 2005; Connor et al., 2004; 2007), suggesting that this match is important for all children. For children who are struggling readers, it seems particularly important that teachers not only can assess the skill levels of children but that they have the appropriate instructional strategies that can help that child progress in reading. Thus, even though the Mathes et al. (2005) study used an enhanced classroom intervention that provided the teachers with the assessment data from the Texas Primary Reading Inventory (TPRI), this instrument was not linked to fine grained teacher strategies that matched the specific assessment profiles of students. Thus teachers might not be able to take the assessment information and be able to craft the appropriate reading strategy without explicit links to help them. The TRI, on the other hand, has made a direct link between fine distinctions in assessment and appropriate teacher instructional strategies for each child.

Using the National Reading Panel (2000) approach within the context of the word and text not only facilitated phonics and word level reading but also vocabulary through guided oral reading. Our study did find effects on vocabulary and this was all the more significant because the classroom teacher was the one implementing the intervention. Many intervention studies that stress the teaching of phonics and word level strategies for struggling reader, including the TRI, have found positive gains on word

level reading but very few studies have found significant gains in vocabulary (Torgesen et al, 1999; 2001). The only recent study that has found vocabulary gains from an early reading intervention is Connor et al., 2007. In this study, the classroom teacher was the implementer of the intervention. It may also have been the case that classroom teachers practiced this broad vocabulary intervention throughout the day so that children actually had exposure to vocabulary enhancement beyond the TRI sessions. In any case, the more broad based language and comprehension training incorporated into the TRI may be important in enhancing the spectrum of skills that are eventually necessary for competent reading comprehension.

The TRI was also implemented for less time than most other interventions for struggling readers and yet had positive effects. Most of those studies of early reading intervention entailed more time per day, usually 20 to 60 minutes over the course of 8 weeks to two and a half school years. In our intervention the adequate fidelity children received 15 minutes per day for greater than 9 weeks. Although the effect sizes in the current study were not as great as for some of other long term intervention studies (probably because of the lesser time) , our results were fairly comparable to many of the other reading studies for struggling readers that provided services outside the regular classroom with a specialized professional for a limited amount of time (Torgesen et al., 1999, 2006; Morris et al., 2000; Mathes et al., 2005). Thus, even though teachers only worked 15 minutes a day four days a week with each child for part of a semester, we found significant effects for two of our three outcome measures. Yet, it is likely that if we had implemented the TRI for a longer period of time, the effects would have been greater.

Our study also linked the fidelity of the implementation of the intervention with outcomes for children. Although we can not make a causal link, it appeared that only those children who received adequate levels of intervention profited from the intervention. Children who did not get adequate levels of intervention gained in a similar way to those children in the control schools who received no intervention. Fidelity of implementation has always been important to measure in intervention studies. Those studies that employed their own intervention specialist teachers, typical of most of the studies reviewed here, were almost always able to achieve very high levels of fidelity. On the other hand, when classroom teachers deliver the intervention, there is much less control over the fidelity of intervention. Thus it is even more important to measure intervention fidelity in these more naturalistic settings where control of over implementation is limited. For instance, Connor et al. (2007) found that the children who gained the most in the A2i intervention were those whose teachers implemented the intervention with the highest fidelity. In a study of the effects of the Voyager reading program in regular classrooms, the fidelity of the implementation was very significantly related to the outcomes for children (Frechtling, Zhang & Silverstein, 2006). In the most recent Social Policy Report from the Society for Research in Child Development (Ludwig & Phillips, 2007), the benefits of Head Start were estimated by examining those children who actually received Head Start and therefore received the treatment as planned. The effect sizes for the comparison between the experimental and control group on the Woodcock-Johnson were 50% greater when the analysis took into consideration the children who actually received the Head Start treatment and thus had adequate fidelity. Our study found that the quality and duration of the implementation were the

most important factors in the gains children made in reading and vocabulary. Most children in the experimental focal group received adequate intervention but certainly not all. Yet, the experimental adequate fidelity group gained 15 more points on *Letter/Word identification* compared to all other groups and gained 4 points more on the *PPVT* compared to all other groups. Children in the experimental inadequate fidelity group gained at the same rate as those children receiving no intervention, suggesting that a certain level and intensity of intervention is needed in order to produce gains for struggling readers.

Overall, this study helps demonstrate that the classroom teacher may be an effective agent for positive change in children with reading difficulties, at least in early elementary school and in low wealth schools. One explanation for this finding might be because the classroom teacher had more knowledge about the overall performance of the child, given the extensive experience of especially these rural teachers. Another possibility is that the teachers' use of the TRI diagnostic-based tools helped struggling readers make more efficient gains. It is also possible that the strategies a teacher used one on one with the focal children became generalized to other times of the day during her classroom teaching so that these struggling readers actually received more instruction than we measured. Last, the focal children may have been more motivated to improve in reading because they were receiving positive individualized instruction from the teacher. Unfortunately, we do not have the data to disentangle all the possibilities that made the classroom teacher effective but it is likely that they all might have contributed to the success of the intervention.

Finally, although this study is encouraging in understanding the role of the classroom teacher in helping struggling readers, it has a number of limitations that need to be addressed in future research. The study showed that when the intervention was implemented it did have an effect on word reading and vocabulary. On the other hand, some teachers were not able to implement the intervention for a variety of reasons. In future studies with classroom teachers, more effective ways to motivate the teachers to actually implement tier 2 interventions faithfully need to be explored. This may be especially true in low wealth schools, where teachers are responsible for more of the teaching with less support. Given the small sample size in this study, we were also not able to really examine subgroups of students who profited most and least from the study. Lastly, it would be helpful to understand whether these gains could be sustained over time with and without continuing intervention.

References

- Alexander, K. L., & Entwisle, D. R. (1988). Achievement in the first 2 years of school: Patterns and processes. *Monographs of the Society for Research in Child Development, 53*(2), 1-157.
- Allison, P. D. (1990) Change scores as dependent variables in regression analysis. *Sociological Methodology, 20*, pp 93-114.
- Ball, E.W., & Blachman, B.A. (1991). Does phoneme awareness training in kindergarten make a difference in early word recognition and developmental spelling? *Reading Research Quarterly, 26*(1), 49-66.
- Bear, D.R., Invernizzi, M., Templeton, S., & Johnston, F. (2003). *Words their way: Word study for phonics, vocabulary, and spelling instruction (3rd ed.)*. Upper Saddle River, NJ: Prentice Hall.
- Beck, I.L. (2006). *Making sense of phonics: The hows and whys*. NY: The Guilford Press.
- Brody, H. B., & Flor, D. L. (1998). Maternal resources, parenting practices, and child competence in rural, single-parent African American families. *Child Development, 69*(3), 803-816.
- Burchinal, M., Roberts, J. E., Zeisel, S. A., Hennon, E. A., & Hooper, S. (2006). Risk and resiliency: Protective factors in early elementary school years. *Parenting: Science and Practice, 6*, 79-113.
- Buysse, V., & Wesley, P. W. (Eds.) (in press). *Evidence-based practice in the early childhood field*. Washington, DC: Zero To Three Press.

- Clay, M. (1979). *Stones—the concepts about print test*. Auckland, NZ: Heinemann.
- Collins, T. (1999). *Attracting and retaining teachers in rural areas*. Charleston, WV: ERIC Clearinghouse on Rural and Small Schools.
- Connor, C.M., Morrison, F.J., Fishman, B.J., Schatschneider, C. & Underwood, P. (2007). Algorithm-guided individualized reading instruction. (2007). *Science*, 315, 464-465.
- Connor, C. M., Morrison, F. J., & Katch, L. E. (2004). Beyond the reading wars: Exploring the effect of child-instruction interactions on growth in early reading. *Scientific Studies of Reading*, 8(4), 305-336.
- Connor, C. M., Morrison, F. J., & Petrella, J. N. (2004). Effective reading comprehension instruction: Examining child x instruction interactions. *Journal of Educational Psychology*, 96(4), 682-698.
- Denton, C. A., Fletcher, J. M., Anthony, J. L., & Francis, D. J. (2006). An evaluation of intensive intervention for students with persistent reading difficulties. *Journal of Learning Disabilities*, 39(5), 447-466.
- Dunn, L., & Dunn, L. (1997). *Peabody Picture Vocabulary Test III*. Circle Pines, MN: American Guidance Service.
- Dwyer, M.I. (2004). A path for the exploration of any language leading to writing and reading as part of the Total Montessori Approach the development of language. *The NAMTA Journal*, 29(3), 9-40.
- Ehri, L.C. (1992). Reconceptualizing the development of sight word reading and its relationship to recoding. In P.B. Gough & L.C. Ehri (Eds.), *Reading Acquisition* (pp. 107-143). Hillsdale, NJ: Erlbaum.

- El'Konin, D.B. (1999). How to teach children to read. *Journal of Russian and East European Psychology*, 37(6), 93-119.
- Entwisle, D. R., & Alexander, K. (1999). Early schooling and social stratification. In R. C. Pianta & M. J. Cox (Eds.), *The transition to kindergarten* (pp. 13-38). Baltimore, MD: Paul H. Brookes.
- Feagans, L. V. & McKinney, J. D. (1991). Subtypes of learning disabilities: A review. In L. V. Feagans, E. J. Short, & L. Meltzer (Eds.), *Subtypes of learning disabilities* (pp. 3-31). Hillsdale, NJ: Erlbaum.
- Foorman, B. R., & Moats, L. C. (2004). Conditions for sustaining research-based practices in early reading instruction. *Remedial and Special Education*, 25(1), 51-60.
- Foorman, B. R., & Torgesen, J. K. (2001). Critical elements of classroom and small-group instruction promote reading success in all children. *Learning Disabilities Research & Practice*, 16, 202–211.
- Foorman, B. R., Francis, D. J., Fletcher, J. M., Schatschneider, C., & Mehta, P. (1998). The role of instruction in learning to read: Preventing reading failure in at-risk children. *Journal of Educational Psychology*, 90, 37–55.
- Frechtling, J.A., Zhang, X. & Sliverstein, G. (2006). The Voyager Universal Literacy System: Results from a study of kindergarten students in inner-city schools. *Journal of Education for students placed at risk*, 11, 75-95.
- Ginsberg, M. C. (2006). *Transactions among early reading development and individual and environmental conditions: A case study*. Unpublished doctoral dissertation, University of North Carolina at Chapel Hill, Chapel Hill, NC.

- Ginsberg, M. C. & Amendum, S. & Vernon-Feagans, L. (2007). *Accelerating Student Growth with the Targeted Reading Intervention: A Dual-Level Professional Development Intervention for K-1 Struggling Learners*. Manuscript in preparation.
- Hamre, B. K., & Pianta, R. C. (2005). Can instructional and emotional support in the first-grade classroom make a difference for children at risk of school failure? *Child Development, 76*(5), 949-967.
- Hart, B., & Risley, T. R. (1995). *Meaningful differences in the everyday experience of young American children*. Baltimore: Paul H. Brookes.
- Hughes, J. N., Cavell, T. A., & Wilson, V. (2001). Further support for the developmental significance of the quality of the teacher–student relationship. *Journal of School Psychology, 39*(4), 289–301.
- Juel, C., & Minden-Cupp, C. (1998). *Learning to read words: Linguistic units and strategies*. Ann Arbor, MI: Center for the Improvement of Early Reading Achievement.
- Lee, V. E., & Burkham, D. T. (2002). *Inequality at the starting gate: Social background differences in achievement as children begin school*. Washington, DC: Economic Policy Institute.
- Lindamood, C.H., & Lindamood, P.C. (1998). *The Lindamood phoneme sequencing program for reading spelling, and speech*. Austin, TX: Pro-Ed.
- Ludwig, J. & Phillips, D. (2007). The benefits and costs of Head Start. *Social Policy Report. The Society for Research in Child Development., XXI*, 3-18.

- Mathes, P. G., Denton, C. A., Fletcher, J. M., Anthony, J. L., Francis, D. J., & Schatschneider, C. (2005). The effects of theoretically different instruction and student characteristics on the skills of struggling readers. *Reading Research Quarterly, 40*, 148–182.
- McCandliss, B., Beck, I.L., Sandak, R., & Perfetti, C. (2003). Focusing attention on decoding for children with poor reading skills: Design and preliminary tests of the word building intervention. *Scientific Studies of Reading, 7(1)*, 75-104.
- McGuinness, D. (1997). *Why our children can't read—and what we can do about it: A scientific revolution in reading*. NY: Touchstone.
- Moats, L.C. (1998). Teaching decoding. *American Educator, 22* (1 & 2), 42-49, 95-96.
- Morris, D., Tyner, B., & Perney, J. (2000). Early Steps: Replicating the effects of a first-grade reading intervention program. *Journal of Educational Psychology, 92*, 681-693.
- Morrison, F. J., Bachman, H. J., & Connor, C. M. (2005). *Improving literacy in America: Guidelines from research*. Yale University Press: New Haven, CT.
- NICHD Early Child Care Research Network (2005). Pathways to reading: The role of oral language in the transition to reading. *Developmental Psychology, 41(1)*, 428-442.
- National Joint Committee on Learning Disabilities. (2005). *Responsiveness to intervention and learning disabilities*. Available from:
<http://www.ldonline.org/article/11498>

- National Reading Panel. (2000). *Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction*. Bethesda, MD: National Reading Panel.
- Neuman, S. B., & Dickinson, D. K. (Eds.) (2002). *Handbook of early literacy research*. New York: Guilford Press.
- O'Connor, R.E., Harty, K.R., Fulmer, D. (2005). Tiers of intervention in kindergarten through third grade. *Journal of Learning Disabilities*, 38, 532-538.
- Raudenbush S. W. and Bryk A. S. (2002). *Hierarchical linear models: Applications and data analysis methods (2nd ed.)*. Newbury Park, CA: Sage.
- Raudenbush, S.W., & Xiao-Feng, L. (2001). Effects of study duration, frequency of observation, and sample size on power studies in group differences of polynomial change. *Psychological Methods*, 6, 387-401.
- Reeves, C. (2003). *Implementing the No Child Left Behind Act: Implications for rural schools and districts*. Napperville, IL: North Central Regional Educational Library.
- Scarborough, H. (2001). Connecting early language and literacy to later reading disabilities: Evidence, theory, and practice. In S. B. Neuman & D. K. Dickinson (Eds.), *Handbook of early literacy research* (pp. 97–110). New York: Guilford Press.
- Shanahan, T., & Barr, R. (1995). Reading Recovery: An independent evaluation of the effects of an early instructional intervention for at-risk learners. *Reading Research Quarterly*, 30, 958-996.

- Snow, C.E., Burns, M. S., & Griffin, P. (1998). *Preventing reading difficulties in young children*. Washington, DC: National Academy Press.
- Stigler, J. W., & Hiebert, J. (1999). *The teaching gap: Best ideas from the world's teachers for improving education in the classroom*. New York: Free Press.
- Stork, S. A., & Whitehurst, G. J. (2002). Oral language and code-related precursors to reading: Evidence from a longitudinal structural model. *Developmental Psychology*, 38(6), 934-947.
- Swanson, H. L. (1999a). Instructional components that predict treatment outcomes for students with learning disabilities: Support for a combined strategy and direct instruction model. *Learning Disabilities Research & Practice*, 14, 129-140.
- Swanson, H. L. (1999b). Reading research for students with LD: A meta-analysis of intervention outcomes. *Journal of Learning Disabilities*, 32, 504-532.
- Torgesen, J. K., Alexander, A. W., Wagner, R. K., Rashotte, C. A., Voeller, K. Conway, T., et al. (2001). Intensive remedial instruction for students with severe reading disabilities: Immediate and long-term outcomes from two instructional approaches. *Journal of Learning Disabilities*, 34, 33-58.
- Torgesen, J.K., Myers, D., Schirm, A., Stuart, E., Vartivarian S., Mansfield, W., Stancavage, F., Durno, D., Javorsky R, & Haan, C. (2006). Closing the achievement gap: First year findings from a randomized trial of four reading interventions for striving readers. Washington, D.C. The Corporation for the Advancement of Policy Evaluation.
- Torgesen, J.K., Wagner, R.K., Rashotte, C.A., Rose, E., Lindamood, P., Conway, T., & Garvan, C. (1999). Preventing reading failure in young children with

- phonological processing disabilities: Group and individual responses to instruction. *Journal of Educational Psychology* 91, 579-593.
- Vaughn, S., Elbaum, B., & Boardman, A. G. (2001) The social functioning of students with learning disabilities: Implications for inclusion. *Exceptionality*, 9, 47-65.
- Vernon-Feagans, L. V. (1996). *Children's talk in communities and classrooms*. Cambridge, MA: Blackwell Publishers.
- Vernon-Feagans, L. (In press). Rural Education. In D. Crook & G. McCulloch (Eds.) *The Encyclopedia of Education*. London: Routledge.
- Vernon-Feagans, Gallagher, K & Kainz, K.. (in press) The Transition to School in Rural America: A Focus on Literacy. In J. Meece & J. Eccles (Eds.) *Schooling and Development*. Mahweh, New Jersey: Erlbaum
- Wanzek, J., Vaughn, S., Kim, A., Cavanaugh, C.L. (2006). The effects of reading interventions on social outcomes for elementary students with reading difficulties: A synthesis. *Reading and Writing Quarterly*, 22, 121-138.
- Whitehurst, G. J. & Lonigan, C.J. (1998). Child development and emergent literacy. *Child Development*, 69, 848-872.
- Woodcock, R. W., Mather, N., & Schrank, F. A. (2004) *Woodcock-Johnson III: Diagnostic Reading Battery*. Itasca, IL: Riverside Publishing

Table 1. Demographics of Teachers (n = 20)

Variable	%	<i>M</i>	<i>SD</i>
Race			
Black/African American	30.00		
White/European American	65.00		
Other	5.00		
Gender			
Female	100.00		
Age^a			
20-29	25.00		
30-39	10.00		
40-49	25.00		
50-59	30.00		
60+	5.00		
Certification Level			
Elementary Ed. Certified ^a	90.00		
Master's Degree or higher	25.00		
Experience			
Total years teaching		16.83	12.08
Total years teaching current grade		8.20	7.62
Total years teaching at current school		12.54	11.49

Struggling Readers

Total years teaching in current county	15.20	12.44
Classroom Assistance		
Hours per week with aide in classroom ^b	26.82	12.94

^aOne teacher did not report this information. ^bTwo teachers did not report this information

Table 2: Demographics of the Children (n = 186)

<i>Variable</i>	<i>n</i>	<i>%</i>
Race		
Black/African American	81	43.55
American Indian	29	15.59
White/European American	64	34.41
Other	12	6.45
Gender		
Female	88	47.31
Male	98	52.69
Grade		
K	90	48.39
1	96	51.61
Age ^a		
5 yrs	87	46.77
6 yrs	77	41.40
7 yrs	19	10.22
Mother's Education ^b		
8 th grade or less	2	1.08
Some high school	35	18.82
Diploma or GED	47	25.27
Some college or Associates degree	81	43.55

Struggling Readers

Bachelors degree	12	6.45
Graduate school	5	2.69

^aThree students' families in sample did not report this information. ^bFour students' families in sample did not report this information.

Struggling Readers

Table 3: Unadjusted W Gain Scores by Group for Child Outcomes

Variable	<u>Control/Non-focal</u>			<u>Control/Focal</u>			<u>Exp./Non-Focal</u>			<u>Exp./Inadequate/Focal.</u>			<u>Exp./Adequate/Focal</u>		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
WJ-WA ^a	55	28.56	22.92	42	24.43	24.65	31	34.35	24.46	16	25.56	23.14	18	47.28	32.25
WJ-LWI ^a	55	34.25	20.84	43	34.00	18.02	31	41.35	15.77	16	28.88	17.28	18	54.22	29.50
PPVT ^b	54	0.85	7.97	43	1.21	8.03	30	1.03	9.83	16	-0.69	8.99	18	5.00	10.20

^aGains calculated by W scores. ^bGains calculated by standard scores.

Struggling Readers

Table 4. Means and Standard Deviation for the Grade Standard Scores on the *WJ, III*

Variable	<u>Control/Non-focal</u>			<u>Control/Focal</u>			<u>Exp./Non-focal</u>			<u>Exp./Inadequate/Focal</u>			<u>Exp./Adequate/Focal</u>		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
WJ-WA															
Fall	55	112.49	11.61	38 ^a	107.05	11.13	27 ^c	106.26	9.93	16	96.00	14.09	8 ^d	95.75	9.56
Spring	55	124.35	9.31	42	116.14	8.69	31	118.90	10.00	16	108.56	17.54	17 ^e	112.29	11.99
WJ-LWI															
Fall	55	118.56	9.03	42 ^b	108.17	10.72	31	110.23	8.75	16	101.25	15.68	17 ^f	90.06	10.94
Spring	55	133.33	10.67	42 ^b	123.10	8.87	31	128.10	7.29	16	114.69	16.82	18	114.50	12.37

^aFour cases where calculated raw score = 0 in fall precluded standard score conversion, not included. ^bOne case where missing demographic information precluded standard score conversion not included. ^cFour cases where calculated raw score = 0 in fall precluded standard score conversion, not included. ^dTen cases where calculated raw score = 0 in fall precluded standard score conversion, not included. ^eOne case where calculated raw score = 0 in spring precluded standard score conversion not included. ^fOne case where calculated raw score = 0 in fall precluded standard score conversion not included.

Table 5: Regression Output for Word Attack

Effect	B/M	(SE)		<i>d</i>
Maternal Education	-0.21	(1.01)	^{ns}	
Gender	3.49	(3.69)	^{ns}	
<u>Adjusted Means:</u>				
Control Non-Focal	28.30	(4.98)		
Control Focal	26.51	(5.25)		
Exp. Non-Focal	32.67	(6.23)		
Exp Inadequate Fidelity Focal	31.87	(7.91)		
Exp Adequate Fidelity Focal	39.70	(7.75)		
<u>Planned Contrasts:</u>				
Exp. Focal vs. Control Focal	9.28	(8.27)	^{ns}	0.44
Exp. Focal vs. Exp Non-Focal	3.11	(5.68)	^{ns}	0.15
Exp. Adequate Fidelity Focal vs. Control Focal	13.19	(9.44)	^{ns}	0.62
Exp Adequate Fidelity Focal vs. Exp. Inadequate Fidelity Focal	7.83	(9.30)	^{ns}	0.37
Exp. Adequate Fidelity Focal vs. All Other groups	9.34	(7.31)	^{ns}	0.44

Note: [†] $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Different superscripts indicate significant differences. Gender and maternal education were entered into the model as covariates.

Table 6: Regression output for Letter Word Identification

Effect	B\M	(SE)		<i>d</i>
Maternal Education	0.88	(0.84)	^{ns}	
Gender	-1.01	(3.08)	^{ns}	
<u>Adjusted Means:</u>				
Control Non-Focal	34.31	(3.69)		
Control Focal	34.08	(3.90)		
Exp. Non-Focal	40.22	(4.64)		
Exp Inadequate Fidelity Focal	32.38	(6.09)		
Exp Adequate Fidelity Focal	55.06	(5.97)		
<u>Planned Contrasts:</u>				
Exp. Focal vs. Control Focal	9.64	(6.16)	^{ns}	0.54
Exp. Focal vs. Exp Non-Focal	3.50	(4.76)	^{ns}	0.20
Exp. Adequate Fidelity Focal vs. Control Focal	20.98	(7.19)	**	1.17
Exp Adequate Fidelity Focal vs. Exp. Inadequate Fidelity Focal	22.68	(7.56)	**	1.27
Exp. Adequate Fidelity Focal vs. All Other groups	19.53	(5.90)	**	1.09

Note: [†] $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Different superscripts indicate significant differences. Gender and maternal education were entered into the model as covariates.

Table 7: Regression Output for the PPVT

Effect	B\M	(SE)		<i>d</i>
Maternal Education	-0.47	(0.38)	^{ns}	
Gender	-0.47	(1.45)	^{ns}	
<u>Adjusted Means:</u>				
Control Non-Focal	0.81	(1.33)		
Control Focal	1.90	(1.44)		
Exp. Non-Focal	1.17	(1.69)		
Exp Inadequate Fidelity Focal	-1.16	(2.35)		
Exp Adequate Fidelity Focal	4.95	(2.30)		
<u>Planned Contrasts:</u>				
Exp. Focal vs. Control Focal	-0.01	(2.26)	^{ns}	0.00
Exp. Focal vs. Exp Non-Focal	0.72	(2.28)	^{ns}	0.08
Exp. Adequate Fidelity Focal vs. Control Focal	3.05	(2.74)	^{ns}	0.36
Exp. Adequate Fidelity Focal vs. Exp. Inadequate Fidelity Focal	6.11	(3.16)	[†]	0.72
Exp. Adequate Fidelity Focal vs. All Other groups	4.33	(2.47)	[†]	0.51

Note: [†] $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Different superscripts indicate significant differences. Gender and maternal education were entered into the model as covariates.