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## The Relationship of Print Reading in Tier I Instruction and Reading Achievement for Kindergarten Students At-Risk for Reading Difficulties

**Jeanne Wanzek,**

Florida State University

**Greg Roberts,**

The University of Texas at Austin

**Stephanie Al Otaiba,** and

Southern Methodist University

**Shawn C. Kent**

Florida State University

### Abstract

For many students at risk for reading difficulties, effective, early reading instruction can improve reading outcomes and set them on a positive reading trajectory. Thus, response-to-intervention models include a focus on a student's Tier I reading instruction as one element for preventing reading difficulties and identifying students with a learning disability. The purpose of this study was to examine the amount of time kindergarten students at risk for reading difficulties actively engaged in reading print during Tier I reading instruction, and the extent to which time in reading print was related to end-of-year reading achievement. Findings revealed the amount of time students were engaged in reading print predicted end-of-year reading achievement, although time engaged in reading print during Tier I was limited overall. Student and teacher level factors and their relationship to the amount of time students engage in reading print is also examined.

### Keywords

response to intervention; reading instruction; reading difficulties

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Effective, early reading instruction is important for setting positive reading trajectories for many young students (Good, Simmons, & Smith, 1998; Juel, 1988). For most students in the United States, formal reading instruction begins in kindergarten. As a result, kindergarten reading instruction provides one important link to a student's beginning reading achievement.

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Correspondence concerning this article should be addressed to Jeanne Wanzek, FCRR, Florida State University, 1107 W. Call St., P.O. Box 306-4304, Tallahassee, FL 32306. [jwanzek@fcrr.org](mailto:jwanzek@fcrr.org).  
Jeanne Wanzek, Florida Center for Reading Research and School of Teacher Education, Florida State University; Greg Roberts, Meadows Center for Preventing Educational Risk, The University of Texas at Austin; Stephanie Al Otaiba, Annette Caldwell Simmons School of Education, Southern Methodist University; Shawn C. Kent, Florida Center for Reading Research and School of Teacher Education, Florida State University.

However, there are students who enter kindergarten already at risk for reading difficulties due to lack of early literacy skills (National Early Literacy Panel, 2008; Stanovich & Siegel, 1994; Wagner et al., 1997; West, Denton, & Germino-Hausken, 2000). Several early or precursor literacy skills measured in preschool or kindergarten have demonstrated moderate to strong relationships with future decoding and reading comprehension achievement. These include alphabet knowledge (including the names and sounds of printed letters), phonological awareness, rapid naming (letters, digits, objects, colors), writing name, concepts of print, and oral language (National Early Literacy Panel, 2008). The National Early Literacy Panel also noted phonological memory and print knowledge were moderately related to future comprehension. Demographic characteristics such as socioeconomic status have also been examined as factors related to student achievement, with socioeconomic status generally demonstrating a moderate to strong relationship with academic achievement (Caldas & Bankston, 1997; Herbers et al., 2012; Sirin, 2005). Students with low socioeconomic status are also less likely to participate in early intervention and early childhood special education (Morgan, Farkas, Hillemeier, & Maczuga, 2012). Despite these risk factors, effective, early reading instruction can improve reading outcomes and set students on a positive reading trajectory (Al Otaiba & Fuchs, 2006; Torgesen et al., 1999; Vellutino et al., 1996). For students with reading disabilities this early instruction can also lessen the impact of their disability (O'Connor, Notari-Syverson, & Vadasy, 1996). Thus, the importance of this first year of schooling cannot be underestimated.

Response to intervention (RTI) models include a focus on a student's core instruction in the general education classroom as one element for preventing reading difficulties and identifying students with a learning disability. The Individuals with Disabilities Education Act (2004) confirms the importance of enhancing both the general education instruction and the use of a student's response to intervention for identifying a learning disability. Thus, core classroom instruction is a student's first line of response to reading instruction and its effectiveness is paramount to appropriately identifying students who have more severe reading disabilities that are not due to lack of effective instruction. In the current study, we observed students who entered kindergarten at-risk for reading difficulties during their Tier I, general education, reading instruction. We focused on the opportunities for these students to actively engage in reading print and whether this time was related to their end of year reading outcomes.

## Kindergarten Reading Instruction

The research base on effective reading instruction at kindergarten provides much direction for teachers. Providing instruction in phonological awareness, reading print, language/vocabulary, and comprehension has been shown to result in positive effects in kindergarten students' literacy (National Early Literacy Panel, 2008). The positive impact of instruction in phonological awareness on students' reading achievement has been studied extensively at the kindergarten level, and large effects have been noted for students at-risk for reading difficulties receiving this instruction (Cavanaugh, Kim, Wanzek, & Vaughn, 2004). Some studies also indicate the effects of phonological awareness instruction on student reading outcomes are strengthened when it is integrated with print (National Reading Panel, 2000). In fact, the importance of early code-focused print instruction including teaching letter

sounds and decoding was noted in the meta-analysis of the National Early Literacy Panel (2008).

Thus, in addition to early instruction in phonological awareness, oral language/vocabulary, and listening comprehension, print-focused instruction is an important part of kindergarten reading instruction. As a result of the importance of early, code-focused instruction, state standards, including the new Common Core standards (National Governors Association & Council of Chief School Officers, 2010), also include several print-related standards in kindergarten. For example, kindergarten students are expected to be able to demonstrate letter-sound correspondence with the most frequent sounds of consonants and vowels, read high-frequency words, and read emergent reader texts with understanding.

## Observational Studies of Print Reading

Despite the importance of student instruction and practice with print, observational studies through the years suggest students are provided limited opportunities to actively engage with print and text in school. Thirty years ago, Allington (1980, 1984), examined the print reading provided by teachers to groups of poor readers relative to groups of good readers in the elementary grades through observations, recordings, and teacher logs of instruction. The groups of students who were considered poor readers read significantly less print than the groups of students rated as good readers. The differences in print reading between the groups of readers rated as poor or good were largest in the lower elementary grades. However, the data were collected related to instruction provided to groups of students and the amount of print reading for individual students within this instruction was not examined.

Several studies have also examined the print reading of students with disabilities in relation to students without disabilities. Haynes and Jenkins (1986) observed reading instruction for upper elementary students, including students with disabilities receiving reading instruction in both general and special education settings. Across the school day, the students with disabilities read orally for an average of four min across both general and special education settings, with one min of that time occurring in the general education setting. An additional 27 min of silent reading time was noted across settings. Reading time for the students without disabilities was only a bit higher, with two min of time in oral reading and an average of 26 min of time in silent reading. Similar findings were reported by Sindelar, Harriman, Hale, and Wilson (1986) for upper elementary students with learning disabilities in special education settings though they did not compare with students without disabilities in general education settings. Directed, oral text reading occurred for 1.7% of reading instruction with silent text reading occurring an additional 8.2%. Time spent in this oral or silent text reading was not related to student achievement. However, in the observations, print reading that did not include text (e.g., word reading) was captured under a category of teacher questioning, which was the single best predictor of reading achievement in the study. O'Sullivan and colleagues (O'Sullivan, Ysseldyke, Christenson, and Thurlow, 1990) further confirmed these findings in younger grades, reporting students with disabilities in Grades 2–4 averaged approximately eight min of reading print in special education settings and six min of reading print in general education settings. Approximately one min of time was devoted to oral reading in the general education setting for both students with and without

disabilities. Thus, in the elementary grades there is a history of limited print reading, particularly for students with reading difficulties or disabilities.

More recently, Chard & Kame'enui (2000) examined the print reading of first-grade students at-risk for reading difficulties. Students were observed during their reading instruction in general education and/or Title I intervention. Event recording was used to determine the amount of print reading occurring per minute during instruction. The authors reported an average of .60 print reading events per minute during reading instruction across settings; however some students did not read at all during observations. However, the actual amount of time individual students at-risk for reading difficulties spent in print reading could not be calculated from the data collection.

The most recent study of student print reading suggests that little has changed over the years in the amount of reading students at-risk for reading difficulties experience in their reading instruction, and indicates this lack of print practice may start as early as kindergarten. Kent, Wanzek, and Al Otaiba (2012) studied the amount of time students at-risk for reading difficulties in kindergarten spent actively engaged in print reading (sounds, words, or text) during Tier I, core reading instruction. Students at-risk for reading difficulties (scoring less than 8 letters correct on a letter naming fluency measure) were identified at the beginning of kindergarten and observed individually in their Tier I reading instruction at two timepoints during the year, fall and spring. Findings revealed that during an average 90 min reading instructional block, kindergarten students at-risk for reading difficulties read orally on average for just over one min despite receiving large amounts of code-focused instruction. Ninety percent of the print reading time for students at-risk for reading difficulties was choral responding. Students spent about equal amounts of time reading sounds, words, or connected text. A significant amount of variance (38%) was noted at the teacher level, suggesting classroom level factors may have also played a part in the amount of print reading students at-risk for reading difficulties experienced.

These two most recent studies provide troubling evidence that student practice with reading print is limited for students at-risk for reading difficulties from the earliest grades. However, the relationship of student time spent actively engaged in print reading during instruction and student reading achievement was not examined. This relationship has important implications not only for the experiences and instructional response of students at-risk for reading difficulties in Tier I instruction but also for instructional elements included in targeted Tier II interventions for these students. Additionally, factors related to the variance of print reading observed by Kent et al. (2013) at the student and teacher levels has not been examined.

## Study Purpose

The purpose of this study was to replicate the Kent et al. (2012) study, and extend their findings by examining the extent to which the amount of print reading students at-risk for reading difficulties participated in during Tier I instruction was related to reading achievement at the end of kindergarten. We were also interested in examining whether differences in beginning of the year risk factors noted earlier (e.g., low alphabet knowledge,

phonological awareness, oral language, print knowledge) and/or the Tier I instructional context (e.g., instructional activities, grouping, or quality) were related to the amount of print reading students at-risk for reading difficulties experience during Tier I instruction.

## Method

### Participants

The participants for this study were drawn from a larger study investigating approaches for defining, classifying, and preventing learning disabilities in reading (Al Otaiba et al., 2011). As a part of this larger study, kindergarten students ( $n = 568$ ) from eight elementary schools in one school district were given a rapid letter naming screen, a predictor of later reading development (Joshi & Aaron, 2000; O'Connor & Jenkins, 1999; Stage, Sheppard, Davidson, & Browning, 2001). A total of 109 kindergarten students ( $M$ age = 5.14 years) from 26 kindergarten classrooms scored at the risk level (fewer than eight letters correct per min) on the Dynamic Indicators of Basic Early Literacy Skills Letter Naming Fluency subtest (Good & Kaminski, 2002) in the fall of kindergarten and were selected for the present study. The sample of students at-risk for reading difficulties included 69 (63%) males and 40 (37%) females with 69.7% Black, 19.3% Caucasian, 5.5% multiracial, and 5.5% other ethnicities (American Indian, Asian, unknown). Approximately 85% of the students in the sample were enrolled in the free or reduced-price lunch programs, and 25% had an identified disability (i.e., speech impairment, language impairment, developmental delay, specific learning disabilities, other health impaired). In addition, depressed scores on phonological awareness, letter and word identification, and oral language were noted at the beginning of the year, confirming the sample's risk status (see Table 1). Average teacher rating of academic competence on Social Skills Rating Scale (Gresham & Elliott, 1990) administered in the fall after the first report card period were also nearly one standard deviation below average ( $M = 86.89$ ,  $SD = 11.27$ ).

### Measures

In addition to the letter naming screening measure, data on student pre-reading and reading achievement (phonological awareness, alphabetic principle, letter and word reading) were collected at the beginning of the school year (September). At the end of the school year (May), data on standardized measures of student reading achievement (letter and word reading, word attack, comprehension) were collected. Observational data of general reading instruction and students' time spent actively engaged in the act of reading print were collected in the fall and spring of the school year.

**Comprehensive Test of Phonological Processing (CTOPP; Wagner, Torgesen, & Rashotte, 1999)**—The CTOPP is an individually-administered test of consisting of 13 subtests. For this study, two subtests of phonological awareness were administered, Blending Words and Elision. Blending Words requires students to blend orally presented sounds to form words. The Elision measure requires students to say words after deleting a specific sound. The overall reliability coefficient alphas are reported as ranging from .79–.97. Criterion-related validity for Blending Words and Elision subtests with the Word Identification subtest of the Woodcock Reading Mastery Test-Revised (Woodcock, 1987)

and the Test of Word Reading Efficiency (Torgesen, Wagner, & Rashotte, 1999) ranged from .48–.67.

**Dynamic Indicators of Basic Early Literacy Skills (DIBELS; Good & Kaminski, 2002)**—The DIBELS are brief, individually-administered, timed measures of early literacy skills. We used the Letter Naming Fluency (LNF) subtest to identify students as at-risk for reading difficulties at the beginning of kindergarten. The Phonemic Segmentation Fluency (PSF) subtest, a measure of phonological awareness, was also administered in the fall. During LNF administration, students are presented a page of random upper- and lowercase letters and asked to name as many letters as they can in a minute. PSF provides information on a student's ability to orally segment three- and four-phoneme words in a minute. The kindergarten one-month alternate form reliabilities for LNF and PSF are reported as .88 and .79, respectively (Good et al., 2001). The predictive validity of LNF and PSF in kindergarten with first grade Woodcock-Johnson Psycho-Educational Battery Reading Cluster score is .65 and .54, respectively.

**Test of Language Development – Primary, Third Edition (TOLD; Newcomer & Hammill, 1997)**—The Grammatical Completion and Sentence Imitation subtests of the TOLD were administered as measures of oral language in the fall of kindergarten. For the Grammatical Completion subtest, the student is provided sentences missing the last word and must supply the missing word. In addition, students hear complete sentences and must determine whether the sentence is grammatically correct. Sentence Imitation requires the student to repeat verbatim the sentences that the examiner says. Test-retest reliability is reported as .90 and .91 respectively for the Grammatical Completion and Sentence Imitation subtests. Criterion-related validity of these subtests with the Bankson Language Test - Second Edition (Bankson, 1990) were reported as .79 for Grammatical Completion and .86 for Sentence Imitation.

**Test of Preschool Early Literacy (TOPEL; Lonigan, Wagner, Torgesen, & Rashotte, 2007)**—The TOPEL is a standardized measure of early literacy skills for young children. The Print Knowledge subtest of the TOPEL was administered in the fall of kindergarten. On this subtest, students identify pictures of letters or words, point to and name specific letters, identify letters associated with specific sounds, and say sounds associated with letters. The internal consistency of the Print Knowledge subtest is reported as .95. Correlations of Print Knowledge with the Test of Early Reading Achievement-Third Edition (Reid, Hresko, & Hammill, 2001) Alphabet subtest and Reading Quotient were reported as .77 and .55, respectively.

**Woodcock-Johnson III Tests of Achievement (WJ-III; Woodcock, McGrew, & Mather, 2001)**—The WJ-III is a nationally standardized, individually administered battery of achievement tests. The Letter Word Identification subtest, a measure of letter knowledge and word recognition, was administered in the fall and spring of kindergarten, requiring students to identify letters and read words of increasing levels of difficulty. The Word Attack and Passage Comprehension subtests were administered in the spring. Word Attack, a measure of decoding, requires students to identify letter sounds and decode pseudo-words.

Passage Comprehension, a measure of reading comprehension, utilizes a cloze procedure to assess sentence level comprehension by requiring the student to read a sentence or short passage and fill in missing words based on the overall context. Median split-half internal consistency reliabilities for the Letter Word Identification, Word Attack, and Passage Comprehension subtests are reported as .94, .95, and .88 respectively. Criterion-related validity correlations between the Basic Reading Skills construct, comprised of Letter Word Identification and Word Attack, were reported as .67 and .63, respectively, with the Reading Composite and Basic Reading subtests of the Wechsler Individual Achievement Test (WIAT; Wechsler, 1992). Moderate to strong criterion validity were reported for the Passage Comprehension subtest with the WIAT Reading Composite ( $r = .78$ ) and Reading Comprehension subtest ( $r = .79$ ).

**Observational coding**—Observational data were collected in two ways. First, data on student time spent actively engaged in the act of reading print were coded from existing videotapes of the targeted students during their Tier I reading instruction at two time points (November and April). Each student was individually videotaped within the classroom with multiple cameras. Active engagement in the act of reading print was defined as the student orally reading print, including word parts (e.g. identifying the sound of a letter presented in isolation), isolated words, or connected text. For each student, every instance of print reading, along with its duration, was coded. Coding occurred continuously throughout the instructional session in each individual classroom for all targeted students to capture all print reading instances for each individual student. The average amount of time students were actively engaged in reading print across fall and spring observations was calculated.

Second, data on the teachers' reading instruction were obtained from the larger study (Al Otaiba et al., 2011). Data on the teacher's quality of instruction, average time spent in various instructional groupings, and average time spent on various instructional activities during the Tier I reading block were collected. These data had also been collected from the videotaped Tier I instruction. Quality of instruction was observed using a measure adapted from Haager, Gersten, Baker, and Graves (2003). A 3-point rating scale was used based on warmth with students, classroom management (e.g., clear behavioral expectations, reinforces appropriate behavior, etc.), organization (e.g., efficient use of materials, efficient use of time), and the degree to which teachers were effective at keeping students on task during instruction (e.g., engages students). Time spent on the instructional groupings of whole class, small group, or individual/independent instruction as well as the instructional activities of phonological awareness, phonics, fluency, vocabulary, comprehension, and non-literacy activities (e.g., transitions, classroom management, etc.) were collected using the same instructional period videotapes coded for reading print.

Three observers were trained on the video coding. The training consisted of four parts: (a) instruction on the meaning of each code with several examples provided, (b) modeling by the trainer (first author) of the coding process including thinking aloud with a short segment of video (10–15 minutes), (c) practice coding with discussion using videotapes of kindergarten instruction from a previous study, and (d) a videotape reliability test with the first author. Interrater reliability for the teacher instruction codes from the larger study ranged from .77–.83 with an average of .80 (agreements divided by agreements plus

disagreements). Interrater reliability averaged 99.97% across the three coders for the reading print codes. Cohen's kappa coefficients were also calculated and ranged from .94–1.0. To further ensure continued reliability of coding observations, 20% of the videotaped instructional periods were coded by two observers, with an interrater reliability average of 99.1%.

## Procedures

Students who met the selection criterion were observed twice during the school year. Using multiple cameras, each student in the sample was videotaped during the Tier I instructional block in the fall and spring. In previous research conducted as part of the larger study (Al Otaiba et al, 2008), there were three observations of classroom instruction conducted; however, the teachers' literacy instruction was found to be highly stable with no significant differences noted in type or quality of instruction when three versus two observations were examined. Active engagement in the act of reading print was coded continuously for each individual student from these videotapes. Each videotape consisted of a complete reading instructional period for the students' classroom ( $M_{\text{Length}}=90.41$  minutes,  $SD=15.0$ ). Noldus Information Technology (Noldus, 1991) software was custom-designed and used to view the videotapes and code the data for each student. The Noldus software specifically tracks the time between the start and end of each coded segment in seconds, allowing for total time in the activity to be calculated. The software allows for observers to start and stop the videotape at any point, review any section of a given videotape, and change to a different videotape of the same instructional period from a different camera angle. As part of the larger study, the identified students were assessed on pre-literacy and literacy skills in the fall and spring of kindergarten (see *Measures*).

## Results

### Amount of Time Engaged in Print Reading

On average, students were actively engaged in the act of reading print for just over one and a half min during reading instruction with a mean of 100.07 s ( $SD = 129.31$  s). Values ranged from a low of 0 (i.e., no reading print) to a high of 789.5 s. Of the 109 students for whom data were available for the fall and spring observational periods, five students (4.6 percent) did not actively engage in reading print and 50 students (45.9%) actively engaged in reading print for less than one min. About 62% of the variance in the time students spent actively engaged in reading print was at the classroom or teacher level ( $ICC = 0.6239$ ;  $p < .001$ ). No variance was noted at the school level. Figure 1 summarizes the average time students were actively engaged in the act of reading print by classroom. Note, however, that the amount of time students were actively engaged in reading print was generally limited across classrooms, with over 75% of teachers providing less than two min, on average, of time in print reading to students at-risk for reading difficulties.

Results suggested that a far greater proportion of time spent orally reading print was done chorally versus individually in these classrooms. On average, students engaged in choral reading across print types for approximately 64 seconds, accounting for 90% of all print

engagement. Meanwhile, individual oral reading accounted for 7 seconds per instructional reading period, or 10% of the total time spent in oral reading.

### Relationship of Print Reading and Spring Reading Achievement

Table 1 provides the means and standard deviations for the reading achievement measures. Multilevel models were fit to examine the relationship of average time actively engaged in reading print to end-of-year reading achievement. Students (level 1) were nested in teachers (level 2) which were nested in schools (level 3). Three models were fit to examine the relationship of the amount of active engagement in reading print to end-of-year reading achievement controlling for fall letter word identification (MLwIN version 2.26; Rasbash, Steele, Browne, & Goldstein, 2012). Intercorrelations among the variables are summarized in Table 2. Table 3 presents the results for the multilevel regression models. The majority of variance resided at the student level (96.5% for letter word identification; 99.7% for word attack; and 100% for passage comprehension). Additionally, there was a significant positive association between time actively engaged in reading and all three of the measures of reading achievement, including letter-word identification ( $\beta = 0.04$ ,  $SE = 0.02$ ,  $p < .05$ ), word attack ( $\beta = 0.05$ ,  $SE = 0.02$ ,  $p < .01$ ), and passage comprehension ( $\beta = 0.02$ ,  $SE = 0.01$ ,  $p < .05$ ).

### Relationship of Fall Pre-Reading Skills and Print Reading

We then examined whether students' initial levels of literacy were related to the amount of time they spent actively engaged in reading print in Tier I instruction. Means and standard deviations for the pre-reading measures are provided in Table 1. As shown in Table 5, there were no significant correlations between active engagement in reading print and the pre-reading skills measures, including CTOPP Blending Words ( $r = .056$ ;  $p > .05$ ), CTOPP Elision ( $r = .127$ ;  $p > .05$ ), DIBELS PSF ( $r = .042$ ;  $p > .05$ ), WJ-III Letter Word Identification ( $r = .102$ ;  $p > .05$ ), TOLD Grammatical Completion ( $r = -.007$ ;  $p > .05$ ), TOLD Sentence Imitation ( $r = -.049$ ;  $p > .05$ ), or TOPEL Print Knowledge ( $r = .165$ ;  $p > .05$ ).

### Relationship of Teacher Instruction and Print Reading

Finally, we considered the usefulness of Level 2 teacher variables (i.e., instructional quality, instructional groupings, and instructional activities) for predicting the amount of active engagement in reading print during Tier I instruction for kindergarten students at-risk for reading difficulties. We used three-level hierarchical regressions, allowing us to consider the unique contribution of each variable set. Table 5 presents intercorrelations among predictors and outcomes, and Table 6 summarizes results for the regression models. Model 1 represents a baseline, with estimates for the proportion of variance explained at student (residual), teacher, and school levels in the amount of time actively engaged in reading print. Model 2 includes instructional quality as a fixed effect associated with active engagement in the act of reading print. Model 3 extends Model 2 by including three instructional grouping variables as fixed effects associated with active engagement in the act of reading print. Finally, Model 4 adds a set of six instruction-related variables. At each stage, the fit of the model was assessed and the contribution of predictor set was estimated.

There was significant variation at Levels 1 and 2 of the baseline model, with 62.39% of the total variance at the teacher level and 37.61% at the student level. Instructional quality was not a significant predictor of print reading (Model 2;  $\beta = 66.06$ ;  $SE = 39.21$ ;  $p > .05$ ), nor did its inclusion yield a significantly better fit compared to Model 1, based on change in  $-2 \times \log$  likelihood ( $p > .05$ ). In Model 3, instructional grouping variables (average seconds spent in whole class instruction, small group instruction, and working individually) were included along with instructional quality as predictors of print reading. Their addition as a set improved fit compared to Model 2 ( $p < .001$ ). Individually, average seconds spent in whole class instruction was positively and significantly associated with active engagement in the act of reading print ( $\beta = .42$ ;  $SE = .02$ ;  $p < .001$ ), indicating that the more time the teacher spent in whole class instruction the more time students were actively engaged in reading print. Associations between active engagement in reading print and time spent in small group instruction ( $\beta = -.01$ ;  $SE = .08$ ;  $p > .05$ ) or working individually ( $\beta = .11$ ;  $SE = .08$ ;  $p > .05$ ) were not statistically significant.

In Model 4, six instructional activity variables (average seconds spent on teaching phonological awareness, phonics and word recognition, fluency, vocabulary, comprehension, and nonliteracy activities) were added along with instructional quality and the instructional grouping variables as predictors of active engagement in reading print. Entering these factors did not significantly improve model fit ( $p > .05$ ). The estimate for average seconds spent on whole class instruction remained significant. There were no significant positive associations between active engagement in reading print and any of the instructional activity factors, including phonological awareness ( $\beta = .02$ ;  $SE = .15$ ;  $p > .05$ ), phonics and word recognition ( $\beta = -.22$ ;  $SE = .22$ ;  $p > .05$ ), fluency ( $\beta = .05$ ;  $SE = .11$ ;  $p > .05$ ), vocabulary ( $\beta = -.20$ ;  $SE = .25$ ;  $p > .05$ ), or nonliteracy activities ( $\beta = .05$ ;  $SE = .15$ ;  $p > .05$ ). The relationship between average s spent on teaching comprehension and active engagement in the act of reading print was negative and statistically significant ( $\beta = -.35$ ;  $SE = .13$ ;  $p < .05$ ), indicating that the more time the teacher spent on teaching comprehension the less time students were actively engaged in the act of reading print.

## Discussion

The purpose of this study was to examine the amount of time kindergarten students at-risk for reading difficulties spend actively engaged in the act of reading print during their Tier I reading instruction and its relationship with end-of-year reading achievement. In addition, we examined the relationship of student pre-literacy skills and teacher instructional factors to the amount of engagement in reading print individual students experience during instruction.

Similar to Kent et al. (2012), we found that kindergarten students at-risk for reading difficulties averaged only one min and 40 s of active engagement in reading print during Tier I reading instruction. Given the average reading instructional time period of 90 min, the amount of time students were actively engaged with print appears very limited (approximately 1.84% of the instruction). It is also striking that the previous studies examining the duration of time students with reading difficulties/disabilities read print during general education instruction across multiple elementary grade levels and over many

years have consistently found an average of about one min of oral reading time (Haynes & Jenkins, 1986; Kent et al., 2012; O’Sullivan et al., 1990). Although there was a range of average time actively engaged in reading print among the students in the sample from 0 min to just over 13 min, 46% of the students in the sample read on average for less than one min per lesson and nearly 5% of the students did not orally read any print during the observations. These findings suggest low amounts of time spent actively engaged in reading print was commonplace during Tier I instruction for these students.

The majority of the variance in the amount of time students spent actively engaged in reading print occurred at the teacher level suggesting the print reading kindergarten students at-risk for reading difficulties engaged in during Tier I instruction was largely dependent on the classroom where they received their instruction. The students in this study were all in classrooms where phonological awareness, and phonics and word recognition instruction were consistently observed, demonstrating there was print-focused instruction occurring. Thus, as Kent et al. (2012) reported, these kindergarten students at-risk for reading difficulties were engaging in instruction that was related to teaching students skills for how to read print, yet were receiving very limited opportunities to apply these skills. It may be that teachers provided limited application activities and practice with print to students in the class throughout instruction or that these opportunities were largely provided to other students in the class allowing only passive learning opportunities for the students at-risk for reading difficulties.

Despite the low levels of time for print reading overall, the average amount of time kindergarten students at-risk for reading difficulties spent actively engaged in reading print predicted their end-of-year reading achievement in letter and word recognition, decoding, and reading comprehension. Students who spent more time actively engaged in reading print had higher end-of-year reading outcomes. Thus, given the overall limited amount of time in print reading for students, it appears that even relatively small differences in time active engagement in reading print were related to differences in student outcomes for these kindergarteners. Across a school year, even minutes of print reading per day becomes hours of additional practice. Though not causal, these findings indicate active engagement in reading print may be a meaningful instructional variable to consider for students at-risk for reading difficulties. It is perhaps not surprising that active practice opportunities with print would predict student facility with reading and understanding of print. Student opportunities to practice and apply newly learned skills, particularly in situations where feedback can be provided are relevant to student learning (Brophy & Good, 1989; Swanson, Hoskyn, & Lee, 1999). Yet, the current limited time available for active engagement in reading print for students at-risk for reading difficulties signifies an area that may need to be examined and altered either within Tier I instruction and/or with interventions for students demonstrating insufficient response to instruction. There certainly may be a limit to the amount of active print reading that can occur in Tier I instruction given the large, diverse classes. Knowledge of the current conditions in Tier I instruction can help interventionists plan lessons that provide increased attention to meet student needs when these needs cannot be met fully through Tier I instruction. Thus, depending on student needs, reading intervention teachers may consider increased opportunities for print reading practice as one avenue to supplement and increase the intensity of intervention over and above what is available in students’ Tier I

instruction. However, further research is needed to examine interventions that manipulate the amount of print reading integrated in reading instruction to determine the effects of increasing the amount of time students are actively engaged in print reading and to provide guidance on the emphasis of print reading during instruction.

Although this sample began the year with multiple preliteracy skills more than one standard deviation below normative samples, the sample overall ended the year with standard scores within the average range. The instructional activities noted in the classes suggest students were involved in literacy activities designed to improve their reading achievement, and end of year outcomes suggest generally effective instruction was occurring. The findings of this study provide evidence that students at-risk for reading difficulties who spent more time actively engaged in reading print during this instruction had higher end of year outcomes. Thus, active engagement in print reading may be an important variable in the instructional context even with generally effective literacy instruction.

It is possible that print reading opportunities were differentially provided in Tier I classrooms based on student need or that students with higher initial literacy levels engaged in more print reading opportunities, thus explaining the relationship with end-of-year reading achievement. However, our examination of initial student literacy levels demonstrated no relationship to the amount of print reading these kindergarten students at-risk for reading difficulties engaged in during Tier I instruction. These students received similar opportunities for actively engaging in print reading regardless of their incoming literacy levels. We do note that the sample was restricted by design, and, therefore, we cannot generalize these findings to the students who were not at-risk for reading difficulties. In addition, specific reading instruction may have been differentiated among students in these classes that did not affect the amount of time students spent actively engaged in reading print. Nonetheless, the finding that student level pre-literacy skills were not significantly related to the amount of time students were actively engaged in reading print during Tier I instruction is perhaps not surprising given that 62% of the variance in print reading occurred at the classroom level. It may be that print reading activities for these students were predicated more on group level activities and practices than in response to individualized needs.

As a result, we examined teacher-level instructional factors to try and explain the classroom level variance in the amount of time students were actively engaged in reading print. Overall teacher quality did not explain the amount of time students at-risk for reading difficulties spent actively engaged in print reading. Thus, students in classrooms with overall better quality features of instruction, such as organization, classroom management, etc. did not engage in higher amounts of reading print. Controlling for teacher quality, one instructional grouping variable, the amount of time spent in whole class instruction, was significantly and positively related to the amount of time students at-risk for reading difficulties actively engaged in reading print. This finding is somewhat counterintuitive in that we might expect larger amounts of small group instruction to increase the time and opportunities for students to practice reading print. However, larger amounts of small group instruction can often mean larger amounts of student independent work as well in order to allow teachers to meet with other small groups.

The whole class instruction variable remained significant even after types of instructional activities were added to the model. In addition, one instructional activity variable, amount of time in comprehension instruction, was significantly and negatively related to the amount of time students were actively engaged in print reading. The negative association is likely the result of the age group, in that kindergarten students are most frequently working on listening comprehension due to their early reading levels, and thus are not likely reading print during this instruction. The types of print kindergarten students, particularly students at-risk for reading difficulties, are likely to be reading and practicing do not often lend themselves to in-depth comprehension instruction. No other instructional activity variables were significantly related to the amount of time spent actively engaged in reading print for these kindergarteners. However, there was more variance across teachers in the instructional grouping variables than there was in the types of instructional activities employed. The reduced variance in type of instructional activity may be the result of the materials the teachers were using. This study was conducted in one district, which mandated a 90 min reading block, and the schools involved were implementing either Open Court (Bereiter et al., 2002) or Reading Mastery Plus (Engelmann & Bruner, 2002) as their core reading program. The consistency of materials may have constrained the variance seen in the amount of time spent on the various reading components.

### Implications

The consistent findings across studies, years, and grade levels regarding the limited amount of time students with significant reading difficulties have to actively engage in reading print in general education suggests there may be a missing component to Tier I instruction. The key components of reading instruction, including phonological awareness, phonics and word recognition, fluency, oral language/vocabulary, and comprehension, must include explicit, systematic instruction that also allows ample practice and application to print. In addition to considerations for Tier I instruction, there are implications for the reading interventions that are provided to students at-risk for or with reading difficulties and disabilities. The knowledge that limited engagement in reading print is available to these students in their Tier I instruction, provides reading interventionists with a key area that may be needed to effectively supplement Tier I instruction for some intervention students. Thus, when examining students' response to instruction and planning for supplemental intervention we recommend consideration for the amount of practice and application with print reading as one important component.

This study cannot provide the recommended amount of time students should spend actively engaged in reading print (sounds, words, or text) relative to the instruction in the various components of reading for either Tier I instruction or supplemental interventions. But, we do feel that spending less than 2% of the instructional block on active engagement in reading print is probably not sufficient given that the ultimate goal of reading instruction is for students to actively read and understand text. The positive relationship between increases in time in print reading and reading achievement for these students at-risk for reading difficulties suggests there is room for improvement. However, print reading is not a separate instructional component to be added in isolation, but rather a key part of any ongoing print-based instruction allowing students to actively apply the print-based skills they are learning.

## Limitations and Future Research

This study examined kindergarten students at-risk for reading difficulties in one school district with a high percentage of students from low socioeconomic backgrounds. As a result, the findings do not necessarily generalize to other school districts, grade levels, or students without reading difficulties. Future research could examine the reading instruction experiences of both students with reading difficulties as well as those without reading difficulties to further inform Tier I instruction as well as Tier 2 and 3 interventions. In addition, although the amount of active engagement in reading print was one variable that was significantly related to end-of-year reading outcomes for these students, the findings here are not causal and future research examining interventions that systematically increases the amount of time students spend reading print integrated with other reading instruction is needed to improve our knowledge regarding the role of print reading within an effective instructional package for students.

Finally, we examined only the Tier I reading instruction time. We acknowledge that additional time reading print may have occurred outside of the reading block. Thus, these findings are specific to print reading that is directly tied to the Tier I reading instruction time and may not be representative of the print exposure students at-risk for reading difficulties experience throughout the school day.

## Acknowledgments

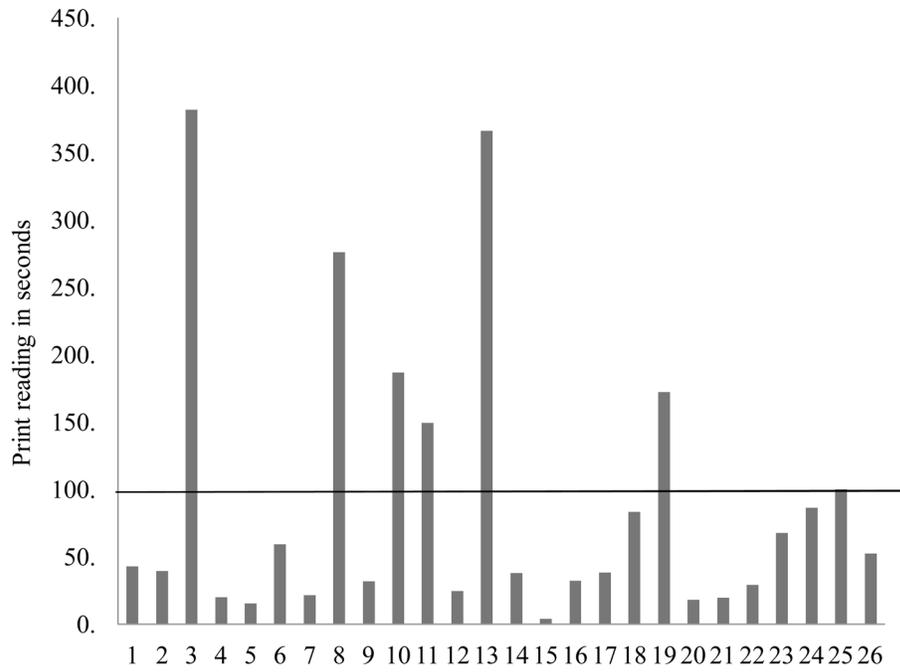
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## References

- Allington RL. Poor readers don't get to read much in reading groups. *Language Arts*. 1980; 57:872–876.
- Allington RL. Content coverage and contextual reading in reading groups. *Journal of Reading Behavior*. 1984; 16:85–95.
- Al Otaiba S, Fuchs D. Who are the young children for whom best practices in reading are ineffective? An experimental and longitudinal study. *Journal of Learning Disabilities*. 2006; 39:414–431.10.1177/00222194060390050401 [PubMed: 17004674]
- Al Otaiba S, Connor CM, Folsom JS, Greulich L, Meadows J, Li Z. Assessment data-informed guidance to individualize kindergarten reading instruction: Findings from a cluster-randomized control field trial. *Elementary School Journal*. 2011a; 111(34):535–560.10.1086/659031 [PubMed: 21818158]
- Bankson, NW. *Bankson Language Test. 2*. Austin, TX: Pro-Ed; 1990.
- Bereiter, C.; Brown, A.; Campione, J.; Carruthers, I.; Case, R.; Hirshberg, J.; Treadway, GH. *Open court reading*. Columbus, OH: SRA McGraw-Hill; 2002.
- Brophy, J.; Good, T. Teacher behavior and student achievement. In: Wittrock, MC., editor. *Handbook of research on teaching*. New York, NY: Macmillan; 1989.
- Caldas SJ, Bankston C. Effect of school population socioeconomic status on individual academic achievement. *The Journal of Educational Research*. 1997; 90(5):269–277.10.1080/00220671.1997.10544583
- Cavanaugh CL, Kim A, Wanzek J, Vaughn S. Kindergarten reading intervention for at-risk students: Twenty years of research. *Learning Disabilities: A Contemporary Journal*. 2004; 2:9–21.

- Chard DJ, Kame'enui EJ. Struggling first-grade readers: The frequency and progress of their reading. *The Journal of Special Education*. 2000; 34:28–38.10.1177/002246690003400103
- Engelmann, S.; Bruner, EC. Reading mastery plus. Columbus, OH: SRA McGraw-Hill; 2002.
- Good, RH.; Kaminski, RA., editors. Dynamic indicators of basic early literacy skills. 6. Eugene, OR: Institute for Development of Educational Achievement; 2002.
- Good RH, Simmons DC, Kame'enui EJ. The importance and decision-making utility of a continuum of fluency-based indicators of foundational reading skills for third-grade high-stakes outcomes. *Scientific Studies of Reading*. 2001; 5:257–288.10.1207/S1532799XSSR0503\_4
- Good RH, Simmons DC, Smith SB. Effective academic interventions in the United States: Evaluating and enhancing the acquisition of early reading skills. *Educational and Child Psychology*. 1998; 15:56–70.
- Haager, D.; Gersten, R.; Baker, S.; Graves, AW. The English-language learner classroom observation instrument for beginning readers. In: Vaughn, S.; Briggs, KL., editors. *Reading in the classroom: Systems for the observation of teaching and learning*. Baltimore, MD: Brookes; 2003. p. 111-144.
- Haynes MC, Jenkins JR. Reading instruction in special education resource rooms. *American Educational Research Journal*. 1986; 23:161–190.10.3102/00028312023002161
- Herbers JE, Cutuli JJ, Supkoff LM, Heistad D, Chan C, Hinz E, Masten AS. Early reading skills and academic achievement trajectories of students facing poverty, homelessness, and high residential mobility. *Educational Researcher*. 2012; 41:366–374.10.3102/0013189X12445320
- Joshi RM, Aaron PG. The component model of reading: Simple view of reading made a little more complex. *Reading Psychology*. 2000; 21:85–97.10.1080/02702710050084428
- Juel C. Learning to read and write: A longitudinal study of 54 children from first through fourth grades. *Journal of Educational Psychology*. 1988; 80:437–447.10.1037/0022-0663.80.4.437
- Kent SC, Wanzek J, Al Otaiba S. Print reading in general education kindergarten classrooms: What does it look like for students at-risk for reading difficulties? *Learning Disabilities Research & Practice*. 2012; 27:56–65.10.1111/j.1540-5826.2012.00351.x [PubMed: 23087545]
- Individuals with Disabilities Education Improvement Act of 2004, 20 U.S.C. 1400 et seq. (2004)
- Lonigan, C.J.; Wagner, R.K.; Torgesen, J.K.; Rashotte, C.A. *Test of preschool early literacy*. Austin, TX: Pro-Ed; 2007.
- Morgan PL, Farkas G, Hillemeier MM, Maczuga S. Are minority children disproportionately represented in early intervention and early childhood special education? *Educational Researcher*. 2012; 41:339–351.10.3102/0013189X12459678 [PubMed: 24683265]
- National Early Literacy Panel. *Developing early literacy: Report of the National Early Literacy Panel*. Washington, D.C: National Institute for Literacy; 2008.
- National Governors Association Center for Best Practices, Council of Chief State Schools Officers. *The Common Core State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects*. 2010. Retrieved from <http://www.corestandards.org/ELA-Literacy>
- National Reading Panel.. *Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction: Reports of the subgroups*. Bethesda, MD: National Institute of Child Health and Human Development; 2000.
- Newcomer, P.L.; Hammill, D.D. *Test of Language Development-Primary*. Austin, TX: PRO-ED; 1997.
- Noldus LPJJ. *The Observer: A software system for collection and analysis of observational data*. Behavior Research Methods, Instruments, & Computers. 1991; 23:415–429.
- O'Connor RE, Jenkins JR. Prediction of reading disabilities in kindergarten and first grade. *Scientific Studies of Reading*. 1999; 3:159–197.10.1207/s1532799xssr0302\_4
- O'Connor RE, Notari-Syverson A, Vadasy PF. Ladders to literacy: The effects of teacher-led phonological activities for kindergarten children with and without disabilities. *Exceptional Children*. 1996; 63:117–130.
- O'Sullivan PJ, Ysseldyke JE, Christenson SL, Thurlow ML. Mildly handicapped elementary students' opportunity to learn during reading instruction in mainstream and special education settings. *Reading Research Quarterly*. 1990; 25:131–146.

- Rasbash, J.; Steele, F.; Browne, WJ.; Goldstein, H. A user's guide to MLWIN v. 2.26. Centre for Multilevel Modelling, University of Bristol; 2012.
- Reid, D.; Hresko, W.; Hammill, D. Test of Early Reading Ability-Third Edition. Austin, TX: PRO-ED; 2001.
- Sindelar PT, Smith MA, Harriman NE, Hale RL, Wilson RJ. Teacher effectiveness in special education programs. *Journal of Special Education*. 1986; 20:195–207.
- Sirin SR. Socioeconomic status and academic achievement: A meta-analytic review of research. *Review of Educational Research*. 2005; 75:417–453.10.3102/00346543075003417
- Stage SA, Sheppard J, Davidson MM, Browning MM. Prediction of first-graders' growth in oral reading fluency using kindergarten letter fluency. *Journal of School Psychology*. 2001; 39:225–237.10.1016/S0022-4405(01)00065-6
- Swanson, HL.; Hoskyn, M.; Lee, C. Intervention for students with learning disabilities: A meta-analysis of treatment outcomes. New York, NY: Guilford Press; 1999.
- Torgesen JK. Individual responses in response to early interventions in reading: The lingering problem of treatment resisters. *Learning Disabilities Research & Practice*. 2000; 15:55–64.10.1207/SLDRP1501\_6
- Torgesen, JK.; Wagner, RK.; Rashotte, CA. Test of Word Reading Efficiency. Austin, TX: PRO-ED; 1999.
- Torgesen JK, Wagner RK, Rashotte CA, Rose E, Lindamood P, Conway T, Garvan C. Preventing reading failure in young children with phonological processing disabilities: Group and individual responses to instruction. *Journal of Educational Psychology*. 1999; 91:579–593.10.1037/0022-0663.91.4.579
- Stanovich KE, Siegel LS. The phenotypic performance profile of reading disabled children: A regression-based test of the phonological core variable-difference model. *Journal of Educational Psychology*. 1994; 86:24–53.10.1037/0022-0663.86.1.24
- Vellutino FR, Scanlon DM, Sipay ER, Small S, Chen R, Pratt A, et al. Cognitive profiles of difficult-to-remediate and readily remediated poor readers: Early intervention as a vehicle for distinguishing between cognitive and experiential deficits as basic causes of specific reading disability. *Journal of Educational Psychology*. 1996; 88:601–638.10.1037/0022-0663.88.4.601
- Wagner, RK.; Torgesen, JK.; Rashotte, CA. Comprehensive Test of Phonological Processing (CTOPP). Austin, TX: Pro-Ed; 1999.
- Wagner RK, Torgesen JK, Rashotte CA, Hecht SA, Barker TA, Burgess SR, et al. Changing relations between phonological processing abilities and word level reading as children develop from beginning to skilled readers: A 5-year longitudinal study. *Developmental Psychology*. 1997; 33:468–479.10.1037/0012-1649.33.3.468 [PubMed: 9149925]
- Wechsler, D. Wechsler Individual Achievement Test. San Antonio, TX: The Psychological Corporation; 1992.
- West, J.; Denton, K.; Germino-Hausken, E. America's kindergartners: Findings from the Early Childhood Longitudinal Study, kindergarten class of 1998–99, fall 1998. Washington, DC: National Center for Education Statistics, U. S. Department of Education, Office of Educational Research and Improvement; 2000.
- Woodcock, RW. Woodcock Reading Mastery Tests-Revised. Circle Pines, MN: American Guidance Service; 1987.
- Woodcock, RW.; McGrew, KS.; Mather, N. Woodcock-Johnson III Test of Achievement. Itasca, IL: Riverside; 2001.



**Figure 1.** Distribution of classroom means for amount of total print reading relative to the mean amount of print reading across sample.

**Table 1**

## Means and Standard Deviations for Student Measures

<b>Measure</b>	<b><i>M</i></b>	<b><i>SD</i></b>
Fall CTOPP Blending words SS	8.43	1.94
Fall CTOPP Elision SS	7.31	1.74
Fall DIBELS PSF Raw	1.70	4.64
Fall WJIII Word Identification SS	83.78	9.02
Fall TOLD Sentence Imitation SS	6.64	2.64
Fall TOLD Grammatical Completion SS	5.85	2.19
Fall TOPEL Print Knowledge Raw	20.72	8.96
Spring WJIII Word Identification SS	96.46	10.80
Spring WJIII Word Attack SS	101.06	13.11
Spring WJIII Passage Comprehension SS	90.82	11.07

*Note.* CTOPP = Comprehensive Test of Phonological Processing; SS = Standard Score; DIBELS PSF = Dynamic Indicators of Basic Early Literacy Skills Phoneme Segmentation Fluency; WJIII = Woodcock Johnson III Tests of Achievement. TOLD = Test of Language Development; TOPEL = Test of Preschool Early Literacy.

**Table 2**

## Correlations Between Print Reading And Reading Achievement

Variable	1	2	3	4
1. Amount of print reading	1.00			
2. WJ-III Letter Word Identification	.29*	1.00		
3. WJ-III Word Attack	.25*	.70*	1.00	
4. WJ-III Passage Comprehension	.20*	.40*	.45*	1.00

Note. WJ-III = Woodcock-Johnson III Tests of Achievement

\*  
 $p < .05$

**Table 3**

Multilevel Regression Parameters

	Letter Word Identification		Word Attack		Passage Comprehension	
	$\beta$	SE	$\beta$	SE	$\beta$	SE
<b>Model 1</b>						
Random effects						
Level 3	13.67	23.41	1.842	28.39	0.00	0.00
Level 2	0.00	0.00	0.00	0.00	0.00	0.00
Level 1	378.45 <sup>***</sup>	57.07	665.71 <sup>***</sup>	99.94	246.60 <sup>***</sup>	35.59
-2* log	845.15		896.78		801.18	
<b>Model 2</b>						
Fixed effects						
Intercept	371.72 <sup>***</sup>	2.46	423.23 <sup>***</sup>	3.23	409.01 <sup>***</sup>	1.98
Reading Print	0.04 <sup>*</sup>	0.02	.05 <sup>**</sup>	.02	.02 <sup>*</sup>	.01
Random effects						
Level 3	0.82	15.14	0.00	0.00	0.00	0.00
Level 2	0.00	0.00	0.00	0.00	0.00	0.00
Level 1	357.42 <sup>***</sup>	53.65	627.44 <sup>***</sup>	90.56	236.66 <sup>***</sup>	34.16
-2* log	837.03		890.84		797.23	

Note.

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

**Table 4**

**Correlations Between Print Reading And Pre-Reading Skills In The Fall**

Variable	1	2	3	4	5	6	7	8
1. Reading print	1.00							
2. CTOPP Blending words	.056	1.00						
3. CTOPP Elision	.127	.302**	1.00					
4. DIBELS PSF	.042	.118	.372**	1.00				
5. WJIII Letter Word Identification	.102	.062	.142	.126	1.00			
6. TOLD Sentence imitation	-.049	.333**	.381**	.114	.206*	1.00		
7. TOLD Grammatical completion	-.007	.450**	.266**	.120	.030	.425**	1.00	
8. TOPEL Print Knowledge	.165	.112	.200*	.326**	.510**	.273**	.064	1.00

*Note.* CTOPP = Comprehensive Test of Phonological Processing; DIBELS PSF = Dynamic Indicators of Basic Early Literacy Skills Phoneme Segmentation Fluency; WJIII = Woodcock Johnson III Tests of Achievement. TOLD = Test of Language Development; TOPEL = Test of Preschool Early Literacy.

\*  $P < .05$ .

\*\*  $P < .01$ .

**Table 5**

**Correlation Between Print Reading And Teacher Level Variables**

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Reading print	1.00										
2. Instructional Quality	.230*	1.00									
3. Whole class instruction	.396**	.272**	1.00								
4. Small group instruction	.163	.209*	-.119	1.00							
5. Working individually	.065	.008	-.381**	.596**	1.00						
6. Teaching comprehension	-.023	.195*	.548**	-.403**	-.435**	1.00					
7. Teaching fluency	.057	-.011	.132	-.385**	-.233*	.186	1.00				
8. Teaching phonics	.039	.263**	.148	-.013	.074	.063	.178	1.00			
9. Teaching phonological awareness	.157	.322**	.445**	-.091	-.233*	.316**	.228**	.317**	1.00		
10. Teaching vocabulary	.034	-.500**	-.037	.252*	.270**	-.285**	-.259**	-.417**	-.342**	1.00	
11. Teaching nonliteracy	-.129	-.330**	.106	-.458**	-.413**	.091	.282**	.279**	.042	-.036	1.00

\*  $p < .05$ .

\*\*  $p < .01$

**Table 6**

## Three-level Hierarchical Regression Parameters: Models 1–4

<b>Model</b>	<b>B</b>	<b>SE</b>
Model 1		
Random effects		
Level 3	0.00	0.00
Level 2	10788.13**	3475.85
Level 1	6503.99***	1019.87
-2*log-likelihood	1319.30	
Model 2		
Fixed effect		
Instructional quality	66.06	39.21
Random effects		
Level 3	0.00	0.00
Level 2	9709.56**	3191.66
Level 1	6480.42***	1019.07
-2*log-likelihood	1316.57	
Model 3		
Fixed effects		
Instructional quality	55.56	37.09
Whole class instruction	0.42***	0.02
Small group instruction	-.01	0.08
Working individually	.11	0.08
Random effects		
Level 3	0.00	0.00
Level 2	6545.36**	2403.09
Level 1	6817.45***	1100.68
-2*log-likelihood	1240.48	
Model 4		
Fixed effects		
Instructional quality	58.43	42.18
Whole class instruction	0.07**	0.02
Small group instruction	-.04	0.08
Working individually	0.11	0.08
Teaching phonological awareness	0.02	0.15
Teaching phonics	-0.22	0.22
Teaching fluency	0.05	0.11
Teaching vocabulary	-0.20	0.25
Teaching comprehension	-0.35**	0.13
Nonliteracy Activities	0.05	0.15
Random effects		
Level 3	1003.81	1626.38

<b>Model</b>	<b><i>B</i></b>	<b><i>SE</i></b>
Level 2	4150.74*	2096.70
Level 1	6740.52***	1086.31
-2*log-likelihood	1234.393	