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A Second Chance in Second Grade: The Independent and Cumulative Impact of First- and Second-Grade Reading Instruction and Students' Letter-Word Reading Skill Growth

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This study examines the relation of language arts instruction to students' letter-word reading skill growth from the beginning of 1st grade to the end of 2nd grade using cross-classified random effects models. Amounts of teacher-managed, code-focused instruction in 1st and 2nd grade each uniquely predicted students' letter-word reading skill growth; plus, there were child-by-instruction interactions. Students with weaker fall 1st grade letter-word reading scores demonstrated stronger letter-word reading at the end of 2nd grade when they spent more time in 1st- and 2nd-grade teacher-managed, code-focused instruction. Students with stronger initial reading skills demonstrated higher 2nd-grade reading scores when they spent less time in 1st grade but more time in 2nd-grade teacher-managed, code-focused instruction. Students who participated in optimally effective 1st-grade and 2nd-grade classroom instruction demonstrated greater letter-word reading growth from the beginning of 1st grade to the end of 2nd grade than did students who participated in less effective instruction in either 1st or 2nd grade, or both. Still, for children who entered 1st grade with weaker reading skills, results indicate that

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effective 2nd-grade instruction might offer a 2nd chance to achieve grade appropriate reading skills.

Although the nation's report card, the National Assessment of Educational Progress, has suggested some improvement in the overall reading skills of U.S. fourth-grade students (http://www.nationsreportcard.gov), the proportion of children falling below basic levels of reading (> 40%) has not changed appreciably from 1993 to 2005. Moreover, the stability of individual students' reading skills is well documented and the majority of children who enter first grade with very low levels of early reading skills are, overwhelmingly, students who fail to reach basic levels of reading proficiency later in their schooling career (Foorman et al., 2006; Juel, 1988; Lazar, Darlington, Murray, Royce, & Snipper, 1982; Phillips, Norris, Osmond, & Maynard, 2002; Raskind, Goldberg, Higgis, & Herman, 1999). However, there is emerging evidence that students' reading skills are not as stable as they might appear (Phillips et al., 2002) and that classroom instruction can explain substantial amounts of the variability in students' reading achievement (Foorman et al., 2006; L. S. Fuchs & Fuchs, 1998; Torgesen, 2000; Torgesen et al., 2001; Vellutino et al., 1996). The implication is that effective instruction can change the course of achievement for students, including those most at risk of academic failure. Research on the nature and content of effective first-grade reading instruction is becoming more widely available (Connor, Morrison, & Katch, 2004; Foorman, Francis, Fletcher, Schatschneider, & Mehta, 1998; Juel & Minden-Cupp, 2000; Wharton-McDonald, Pressley, & Hampston, 1998). These studies, however, were less clear about the role of instruction in the second grade and its impact on students' reading development. In the few studies that examined second-grade instruction, the samples were largely cross-sectional (Foorman et al., 2006; Ross & Smith, 1994), focused only on students with low initial reading skills (O'Connor, Fulmer, Harry, & Bell, 2005), or did not closely examine the content of the classroom instruction that children received (Phillips et al., 2002). Yet second grade may represent a watershed year for students (Spira, Bracken, & Fischel, 2005). The purpose of this study is to follow an academically and ethnically diverse sample of students from the beginning of first grade to the end of second grade and to investigate the independent and combined effects of the instruction they receive on their letter- and word-reading development. According to the Simple View of reading (Hoover & Gough, 1990), fluent word reading, along with oral language or listening comprehension skills, is an essential component of effective reading comprehension. In more complex models of reading (National Reading Panel, 2000; Rayner, Foorman, Perfetti, Pesetsky, & Seidenberg, 2001), the constellation of skills that comprise fluent reading reveals the importance of strong code-related skills. Fluent decoding, for example, releases working memory resources, which may then be used to extract meaning from text (Rayner et al., 2001).

There is compelling evidence that explicit systematic phonological decoding instruction in first grade contributes to students' reading skill growth (Adams, 1990; National Reading Panel, 2000; Snow, Burns, & Griffin, 1998). This is especially true for students who begin first grade with weaker phonological awareness (Foorman et al., 1998), weaker reading skills (Juel & Minden-Cupp, 2000), weaker letter-word recognition (Connor, Morrison, & Katch, 2004), or higher risk for reading difficulties (Hatcher, Hulme, & Snowling, 2004). Explicit code-focused instruction includes the alphabetic principle, phonological awareness, phonics, sight word reading, and some word-level fluency activities. The extant literature on learning disabilities underscores these findings (Torgesen et al., 2001; Torgesen et al., 1999). Meaning-focused activities—such as reading aloud, teaching comprehension strategies, repeated reading, and vocabulary—predict student outcomes as well (Al'Otaiba et al., in review; Connor, Morrison, & Petrella, 2004; Connor, Morrison, & Slominski, 2006; National Reading Panel, 2000; Snow, 2001).

In first grade (Connor, Morrison, & Katch, 2004), children with low initial letter-word reading and vocabulary skills demonstrated greater letter-word reading growth in classrooms where teachers provided greater amounts of teacher-managed (TM) explicit code-focused instruction all year long. This was in combination with smaller amounts in the fall, which increased to higher amounts by spring of child-managed (CM) meaning-focused instruction (primarily sustained silent reading). In contrast, for children with high initial letter-word reading and vocabulary skills, lesser amounts of explicit code-focused instruction and greater amounts of CM meaning-focused instruction all year long were associated with greater letter-word reading skill growth. Students' initial letter-word reading and vocabulary skills operated independently—letter-word reading skills interacted with explicit code-focused instruction, and initial vocabulary skills instruction interacted with CM meaning-focused instruction.As noted previously, less is known about the nature and impact of language arts instruction in second grade, although both first and second grade appear to be critical years for struggling readers. For example, Spira et al. (2005) investigated the reading skill growth trajectories for students entering first grade with reading skills falling below the 30th percentile. A substantial proportion of these children (30%) demonstrated significant growth in reading by the end of second grade and continued to improve through fourth grade, achieving scores at the 50th percentile on average. However, children who ended second grade with weak reading skills (below the 30th percentile) failed to achieve grade level reading by the end of third grade. Indeed, on average, their scores fell at the 9th percentile at the end of fourth grade.

At the same time, extant research has revealed that generally less time is spent on explicit code-focused instruction in second grade compared to first grade. For example, Foorman et al. (2006) observed 90- to 120-min language arts blocks in Houston, TX classrooms. About 28% of this time included explicit code-focused instruction in first grade but only 14% in second grade. In a sample of Reading

First Schools in Florida, the amount of code-focused instruction decreased by one half from first to second grade (Connor, Jakobsons, & Granger, in review). The implicit assumption appears to be that that code-focused instruction is more important in first grade than in second grade.

But is systematic explicit code-focused instruction less important in second grade than it is in first grade? Results from the National Reading Panel meta-analysis (McCardle & Chhabra, 2004; National Reading Panel, 2000) have tended to support this assumption. Results revealed that the overall effect size for phonics instruction was moderate to large for children in kindergarten and first grade (.55). For children in second through sixth grade, mean effect size was smaller (.27). When prior achievement was considered, phonics instruction had no significant effect size for children with low reading skills in second through sixth grade but a large effect size (.74) for first-grade children considered at risk for academic underachievement.

Foorman et al. (2006) discovered that very different patterns of instruction affected children's reading outcomes in first and in second grade. For example, students with teachers who were rated more competent on a scale that examined planning, management, instruction, monitoring student learning, and knowledge about reading instruction, and who spent more time engaged in phonemic awareness and alphabet instruction than in non-reading activities achieved stronger word-attack skills in first grade. However, for second-grade students, the opposite—less phonemic awareness and more non-reading time—was associated with stronger word-attack scores. Foorman et al. suggested that this is because "presumably, phonemic awareness and alphabet activities are no longer critical elements of instruction in second grade and, in this sample, accounted for only 5% of instructional time" (p. 22).

However, these studies generally relied on cross-sectional examination of first- and second-grade effects and did not assess whether, for the same children, there might be a cumulative or additive effect of language arts instruction. Longitudinal mixed models of math instruction have revealed additive effects. Sanders and Horn (1998) found that the impact of effective math teaching was cumulative for students in third through eighth grade. Students assigned to "ineffective" math teachers "continue[ed] to show the effects of such teachers even when these students [were] assigned to very effective teachers in subsequent years … the teacher effects are both additive and cumulative with little evidence of compensatory effect of more effective teachers in later grades " (p. 254, Sanders & Rivers as cited in Sanders & Horn, 1998). Yet with regard to literacy, returning to Spira et al. (2005), second grade may offer children a second chance. Longitudinal examination of instruction effects on children's reading growth is challenging because the data have a cross-classified structure. Children attend one set of classrooms in first grade and different classrooms with different teachers and peers in second grade. Fortunately, analytic strategies have been developed to accommodate cross-classified

data structures—cross-classified random effects models (Raudenbush & Byrd, 2002). Using these models we can also examine child-by-instruction interactions.

MULTIPLE DIMENSIONS OF INSTRUCTION

The reading wars notwithstanding (Ravitch, 2001), there are theoretical and practical differences regarding the kinds of instructional strategies that are emphasized in first- and second-grade classrooms. The most recent research has strongly indicated that effective instruction provides both code-based and meaning-focused content (Pressley, 1998; Pressley & Wharton-McDonald, 1997; Taylor, Pearson, Clark, & Walpole, 2000; Wharton-McDonald et al., 1998). It also employs multiple strategies including systematic teacher-directed instruction (National Reading Panel, 2000; Rayner et al., 2001) and child-focused strategies (Snow, 2001), such as peer-assisted tutoring (D. Fuchs & Fuchs, 2005) and reciprocal teaching (Palincsar & Brown, 1984). In this study we use a framework that views instruction multi-dimensionally (Connor et al., in review; Connor, Morrison, & Katch, 2004; Connor, Morrison, & Petrella, 2004; Connor et al., 2006; Morrison, Bachman, & Connor, 2005). Viewing instruction multi-dimensionally, we elucidate the nature and content of instruction, as well as complex child-by-instruction interactions in multiple samples from preschool through third grade.

The dimensions used in this study include TM versus CM instruction, code- versus meaning-focused instruction, and change in amount of instruction over time.

The dimension code- versus meaning-focused speaks to the content or goal of particular instruction strategies. Foorman et al. (1998) utilized this dimension in their study—explicit code-focused, embedded code, and whole language. Code-focused instruction includes those activities that are designed to help students achieve proficient phonological decoding and fluent word reading skills, including letter-sound connections, phonological awareness, print awareness, repeated reading of words, and other word-level activities that are specifically designed to teach children how to decode words fluently. Meaning focused instruction is designed to teach children how to extract and construct meaning from text (Snow, 2001). This includes explicit instruction in comprehension strategies (e.g., Palincsar & Brown, 1984), discussion, reading aloud, peer reading (D. Fuchs & Fuchs, 2005), independent or repeated reading (Therrien, 2004), and so on.

TM versus CM instruction identifies who is responsible for focusing the students' attention on the learning activities at hand—the teacher or the student (Connor, Morrison, & Katch, 2004; Morrison, Bachman, & Connor, 2005). This dimension is important because it reflects how a particular activity is implemented. There are fundamental differences in learning opportunities when they involve the teacher (i.e., TM) or when students are working independently or with peers (i.e., CM). For example,

for students who are struggling with reading, the involvement of a knowledgeable adult appears to be critical (National Reading Panel, 2000; Palincsar, Collins, Marano, & Magnusson, 2000; Torgesen et al., 2001). TM instruction may be highly interactive, such as when the teacher is leading a discussion or monitoring a child's oral reading. In other studies (Connor et al., 2006), we included a TM–CM dimension in contrast to a TM dimension to capture the joint attention required in highly interactive activities. However, the coding scheme used in this study was not fine-grained enough to distinguish them reliably. Therefore, they are collapsed.The change-over-time dimension captures the impact of changing the focus or amount of instruction over the school year. For example, Pearson and Gallagher (1983) observed that decreasing the amount of TM instruction and increasing CM instruction may promote student learning (they called this "release of responsibility"). Additionally, Juel and Minden-Cupp (2000) reported stronger student reading growth in the classroom when the teacher changed the amount of code-focused instruction from high amounts in the fall to less by spring.

These dimensions operate simultaneously (see Table 1). Thus, there may be TM, code-focused instruction and CM code-focused instruction, which differ only in who is directing attention to learning—the teacher or the child. Similarly, there may be TM, code-focused instruction and TM, meaning-focused instruction, which differ in the content of the activity (code focused vs. meaning focused), although the teacher is managing instruction in both instances (see Table 1).

Child Characteristics

In this study, our outcome of interest is letter-word reading skill. Current models of reading suggest that fluent decoding and word reading skills are critical components of reading and, along with vocabulary and oral language, form an early foundation for proficient reading (National Reading Panel, 2000; Rayner et al., 2001; Snow et

TABLE 1
Translation of Language Arts Instruction Activity Codes into Dimensions of Instruction

Instruction	*Teacher Managed*	*Child Managed*
Code-focused	Alphabet activity	Spelling
	Letter sight-aound	
	Initial consonant stripping	
	Word segmentation	
Meaning-focused	Vocabulary	Student read Aloud, individual
	Teacher read aloud	Sustained silent reading
	Student read aloud, choral	Reading comprehension worksheets
	Group writing, writing instruction, model writing	Student individual writing
	Listening comprehension	
	Discussion	

al., 1998). Moreover, there are multiple sources of influence on children's reading achievement, including home learning environment and family socioeconomic status (Connor, Son, Hindman, & Morrison, 2005; Morrison, Bachman, & Connor, 2005; National Institute of Child Health and Human Development–Early Child Care Research Network, NICHD–ECCRN, 2004). In this study, we closely examine these sources of influence.

In addition to sociocultural variables, child characteristics include vocabulary and letter-word reading skills at the beginning of first grade. Research has revealed that students' oral language skills, including vocabulary and linguistic ability overall, are highly predictive of students' long-term academic outcomes (Catts, Fey, Zhang, & Tomblin, 1999; Loban, 1976; Scarborough, 2001). The National Reading Panel (2000) meta-analysis compiled causal evidence that strengthening students' vocabulary skills led to stronger reading skills. Children's vocabulary skills appear to be highly stable over time; their rates of vocabulary growth do not tend to change, even with intensive intervention (Hart & Risley, 1995). Nor are there schooling effects on vocabulary growth using the "cutoff" procedure, which is in contrast to observed schooling effects for early word reading skill growth (Morrison, Griffith, & Alberts, 1997). The school cutoff procedure relies on the natural experiment provided by the fairly arbitrary birthday cutoff date set by school districts. Children born before a certain date may begin kindergarten, whereas children born after the cutoff date must wait until the following year to start school. Thus, we can separate the effects of schooling and maturation.

Family and community socioeconomic status (McLoyd, 1990, 1998) and the richness of the home literacy environment (Morrison, Connor, & Bachman, 2005; Morrison & Cooney, 2002) are also highly related to students' long-term academic outcomes. Socioeconomic status, including parents' educational levels, appears to operate through parenting and the home learning environment, preschool experiences, and access to high-quality schools and teachers (Connor et al., 2005; NICHD–ECCRN, 2002). In this study we examine the influence of parent education and home learning environment as they relate to students' vocabulary and letter-word reading skill development.

Child-by-Instruction Interactions

In addition to instruction and child characteristics, and their unique contributions to student academic achievement, accumulating evidence has revealed that there are child-by-instruction interactions. In other words, the impact of particular instruction strategies may depend on children's reading and vocabulary skills. These interactions have been found across first-grade samples (Connor, Jakobsons, & Granger, in review; Foorman et al., 1998; Juel & Minden-Cupp, 2000) and from preschool through third grade (Connor, Jakobsons, & Granger, in review; Connor, Morrison, & Katch, 2004; Connor, Morrison, & Petrella, 2004; Connor et al., 2006; Foorman et al., 1998; Hatcher et al., 2004). For example, Foorman et al. found that explicit

phonological awareness instruction was more effective for children with lower initial skill levels than it was for children with higher initial skill levels. Similarly, Hatcher et al. (2004) found that preschool age children at risk of reading delay achieved stronger literacy skills when provided explicit instruction in phonological awareness and letter-sound associations, although this added instruction had little effect for children who were not at risk for reading delay. In this study we investigate these child-by-instruction interactions in first and second grade.

Research Questions

We relied on the naturally occurring variability in amounts and types of instruction children experience in both first and second grade to examine the independent effects of first- and second-grade language arts instruction simultaneously. The following research questions were posed:

1. What is the nature of, and variability in, first- and second-grade language arts instruction? We anticipate that the amount of language arts instruction overall will remain stable or will increase. However, we predict that the amount of code-focused instruction will decrease from first to second grade.
2. What is the association between amount and types of instruction received in first and second grade and students' letter-word reading skill growth? Based on the results in the first-grade study, we anticipate that instruction will predict students' second-grade word reading skills but that the relations among sources of influence will be complex.
3. Does the effect of particular instructional strategies depend on students' initial (i.e., fall of first grade) vocabulary and reading skills? Are there child-by-instruction interactions? We anticipate that the effect of particular instructional strategies will depend on students' initial skills, particularly on their letter-word reading skills. In first grade, we expect to replicate our previous findings (i.e., letter-word reading × TM code-focused instruction and vocabulary × CM meaning-focused instruction amount and slope interactions; Connor, Morrison, & Katch, 2004). We hypothesize that there will be similar interactions in second grade, although there is little research to guide us in specific predictions. We hypothesize that TM code-focused instruction will have a greater effect on student outcomes in first grade than in second grade based on the findings reported by Foorman et al. (2006).

METHOD

Participants

Children (n = 108) were recruited to the study in either kindergarten or first grade in three waves with most of the children recruited in Waves 1 and 2. Children who

were proficient in English and had no reported disabilities were eligible for the study. Students were followed longitudinally through third grade. For this study, we focus on first- and second-grade achievement and classroom instruction. A total of 89 children were assessed in both first and second grade. Three of these children were in second-grade classrooms that were not observed. Thus, 86 children were included in the cross-classified random effects models. Missing data analyses reveal that children who were in the first-grade sample but not the second-grade sample did not differ significantly except for the following: race–ethnicity (the second-grade sample included fewer African American students), cognitive scores (missing = 93 vs. 103), and fall first-grade reading recognition scores (missing grade equivalent = 0.73 vs. 1.4). There were no significant differences in fall first-grade vocabulary scores or years of parent education.

Descriptive information is provided in Table 2 for the 86 participating children. Forty were girls and 46 were boys. A total of 69% of the children were Caucasian, 15% of the children were African American, 4% were Hispanic, and 12% belonged to other racial and ethnic groups. On average, parents reported on questionnaires completed at the beginning of the study that they had 16 years of education, but this ranged from 3 years to 23 years with 72% completing at least 16 years of schooling (i.e., 4 years of college). Sixteen percent of the parents reported 12 years of education (high school) or less. On average, children had cognitive scores falling within normal limits (*M* IQ = 102, *SD* = 15) as measured by the Stanford–Binet Intelligence Scale–4 (Thorndike, Hagen, & Sattler, 1986). In preliminary models, cognitive scores did not contribute to letter-word reading skill growth once fall first-grade vocabulary and other scores were included in the models.

Forty first-grade and 33 second-grade classrooms were located in five schools in a middle-sized city, which included a university but also included neighborhoods with high levels of poverty. In first grade, there were between 1 and 12 study children per classroom (*M* enrollment = 25 children per classroom), and in second

TABLE 2
Child and Family Descriptive Statistics

Variable Name	*M*	*SD*	*Minimum*	*Maximum*
Parents' education (years)	16.09	3.175	3	23
Home literacy environment score	13.13	3.23	3	18
Age in the fall of first grade (years)	6.5	0.5	6	7

Means for Student Outcomes

Variable Name	*Fall First Grade*	*Spring First Grade*	*Fall Second Grade*	*Spring Second Grade*
Letter-word reading grade equivalent	1.4	2.4	2.9	3.8
Vocabulary age equivalent in years–months	6;01	6;06	6;11	7;03

grade, there were between 1 and 7 study children per classroom. Teachers met all state certification requirements including a bachelor's degree and a teaching certificate in this highly regarded district. The district reported that it uses a whole language approach, including a focus on using trade books instead of a core curriculum and providing opportunities for students to read for substantial amounts of time with peers and independently. First- and second-grade data were collected between 1996 and 1999.

Measures

Child assessments. Student language and literacy skills were assessed in the fall and spring of both first and second grade using a battery of measures. The specific assessments are described next. Assessments were conducted by trained graduate students in a quiet location at the school. The outcome measure, letter-word reading, was assessed using the Peabody Individual Achievement Test–Revised Reading Recognition Test (Markwardt, 1989). In this task, children were first asked to identify letters and letter sounds. For example, they were shown a picture of a needle and were asked to identify one of four printed words that started with the same sound. For later items, they were asked to read increasingly unfamiliar words. Raw scores were used in the analyses. Vocabulary was assessed using the Peabody Picture Vocabulary Test–Revised (Dunn & Dunn, 1981). In this task, the examiner said increasingly unfamiliar words and the child had to select the most representative picture from a set of four. Again, raw scores were used in the analyses.

At the beginning of the study, students' parents completed background questionnaires that were used to determine years of parent education and home literacy environment. Home literacy scores were based on parents' responses to how frequently they use a library card, number of adult and child magazine subscriptions, number of newspaper subscriptions, how often the family reads together, number of children's books, hours of television the child watches per week, and how frequently parents read themselves (Griffin & Morrison, 1997). The reliability of the measure was good (Cronbach's $\alpha = .72$). Scores could range from 0 (*weak home literacy environment*) to a maximum of 25 (*very strong home literacy environment*). Descriptive statistics are provided in Table 2.

Classroom observations and coding. Classrooms were observed all day three times per year in the fall, winter, and spring during both first and second grade by the project director and trained research assistants including doctoral students. The observation system was designed to capture the best estimate of classroom instructional (across content areas) and non-instructional activities in which the teachers and students were engaged. The focus of the study was on literacy, so observations were scheduled on days with few special or exceptional activities

(e.g., art, gym, and field trips). If the teacher or target children were absent, the observation was rescheduled. The observer sat quietly in the classroom and recorded a written timed narrative of the teacher and student activities (see Appendix A). This included non-instruction time such as transitions, explaining procedures, and behavior management. In this way, the entire school day was recorded. The sample forms and excerpts from the coding manual are provided in Appendixes A and B. Any activity (instructional and non-instructional) that lasted at least 1 min was recorded. Observers were rotated among classrooms to minimize the influence of observer expectation. Additionally, whenever possible, observations were scheduled on different days of the week. Inter-observer reliability was obtained for all observers yearly by observing nonparticipating classrooms for one half of a day at the beginning of the school year. In every case, reliability (number of agreements ÷ by number of agreements + disagreements × 100) was acceptable at levels of 95% or above for activity length (in minutes) and type.

The narratives were then coded for type of instructional activity using a system based on one described by Durkin (1987). For each non-instruction area (e.g., organization, disruption, and transition; Cameron, Connor, & Morrison, 2005) and content area (e.g., language arts, math, social studies, etc.) there were subactivities. The non-instruction and content area activity and subactivity codes were developed based on the activities recorded in the written narrative and with the focus of the research objectives in mind. Codes were also developed using curriculum guidelines, which were provided by district staff for each grade observed. The final coding system included non-instruction activities, as well as 19 content areas–activities and 99 subactivities (see Appendix A). These codes were then applied to the written timed narratives (see Appendix B). If target children were involved in different activities, the activity in which the greater number of students was involved was coded as the classroom activity. In this way, the typical classroom experience was recorded, and the coding remained a classroom-level variable. Once inter-coder reliability was established at 85% and coding was completed for each year of the study, 10% of the coded narratives were selected at random and recoded by another trained researcher. Inter-coder reliability for first- and second-grade observations for all coders was between 85% and 92%. Only language arts subactivities were used for this study.Using the dimensions of instruction, the subactivities were then assigned to a quadrant (see Table 1), TM versus CM instruction and code- versus meaning-focused instruction for each grade. TM activities are those in which the teacher is responsible for focusing attention on learning, whereas CM activities are those in which the student or other students are responsible for focusing attention on learning; for example, while working independently or with peers. Code-focused activities are those in which the content includes explicit instruction in decoding and word reading, including alphabet knowledge, letter-sound correspondence and phonics, phonological awareness, sight word reading, and so forth. Meaning-focused activities include instruction that focuses on

the extraction or construction of meaning; for example, listening comprehension, reading aloud, comprehension strategies, writing, and so on. In this way, four instructional variables were identified for each grade (one and two), in which each variable represented the amount of instruction in minutes per day. The dimension change over time was computed using procedures described next.

RESULTS

Students' Letter-Word Reading and Vocabulary in First and Second Grade

Students demonstrated substantial gains in both letter-word reading and vocabulary scores from the beginning of first grade to the end of second grade, on average (see Table 2), with letter-word reading raw scores increasing from 25 (grade equivalent = 1.7), on average, to 58 (grade equivalent = 3.8). There was, however, substantial variability among children with fall first-grade, letter-word reading scores ranging from 7 to 70 (grade equivalent = 0.2, beginning of kindergarten–5.8, end of fifth grade) and spring second-grade, letter-word reading scores ranging from 25 to 93 (grade equivalent = 1.7–12.5). Vocabulary raw scores increased from 85 (age equivalent = 6 years, l month) in the fall of first grade to 101 (age equivalent = 7 years, 2 months) by spring of second grade.

Generally, students whose parents had more years of education had stronger home literacy environments. They also tended to have stronger first- and second-grade vocabulary scores and spring letter-word scores than did students whose parents had fewer years of education and whose homes provided less support for literacy (see Table 3). Home literacy environment and parent education did not correlate significantly with fall first- and second-grade, letter-word reading scores. In addition, the correlations to spring first- and second-grade, letter-word scores were only weakly to moderately positive.

Students with stronger fall first-grade, letter-word and vocabulary scores were more likely, on average, to have stronger spring first-grade and stronger spring and fall second-grade vocabulary and letter-word scores (see Table 3). Correlations within assessment types were stronger than were correlations between assessment types. Not surprisingly, the letter-word scores were moderately correlated to each other, although the magnitude of the correlation decreased as the assessments became farther apart in time. In contrast, vocabulary scores were all highly correlated regardless of proximity in time.

Nature and Amount of First- and Second-Grade Language Arts Instruction

Because we wanted to examine the dimension of change over time and had three observations for each grade (fall, winter, and spring), instructional variables used in the

TABLE 3
Correlation Coefficients for Child Characteristics, Including Vocabulary and Letter-Word Reading (Reading) Skills in First and Second Grade

Variable Name	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
1. Parent education (years)	.551***	.198	.454***	.291**	.539***	.216	.517***	.257*	.481***
2. Home literacy environment score	—	.156	.514***	.271**	.559***	.167	.654***	.229*	.553***
3. First grade reading (fall)		—	.257**	.757***	.277**	.664***	.296**	.541***	.395***
4. First grade vocabulary (fall)			—	.384***	.831***	.345***	.787***	.317***	.710***
5. First grade reading (spring)				—	.422***	.896***	.422***	.796***	.573***
6. First grade vocabulary (spring)					—	.390***	.865***	.363***	.803***
7. Second grade reading (fall)						—	.415***	.854***	.554***
8. Second grade vocabulary (fall)							—	.405***	.816***
9. Second grade reading (spring)								—	.549***
10. Second grade vocabulary (spring)									—

*$p < .05$. **$p < .01$. ***$p < .001$.

final models were computed using hierarchical linear modeling growth models (Raudenbush & Bryk, 2002). Growth between fall and spring, centered at the winter observation, was modeled at Level 1, with individual classrooms modeled at Level 2. The variable values are empirical Bayes residuals that were computed by the hierarchical linear modeling software (Raudenbush, Bryk, Cheong, Congdon, & du Toit, 2004). Thus, they represent the classroom's deviance from the mean for the sample (i.e., the amount above or below the mean for the entire sample of classrooms at that grade level). In this way, each of the four variables for each grade and classroom was expressed with both an intercept and a slope centered at the winter observation. The intercept represents the fitted mean number of minutes per day of the instructional activity. The dimension of instruction, change over time, is represented by the slope, which is the change (up or down) in the amount of the activity in minutes per month. Computing the classroom variable in this way allowed us to examine whether, on average and individually, teachers changed the amount of instruction they provided from the beginning to the end of the school year. Modeled growth trajectories are provided in Figure 1 (top and middle).

The total amount of the classroom day devoted to language arts instruction increased, on average, from about 63 min per day in first grade to about 88 min per day in second grade, supporting our hypothesis. Overall, about 3-min less TM code-focused instruction was provided in second grade compared to first grade—one half the amount of TM code-focused instruction, from about 7 min per day to 3.5 min per day (see Figure 1, bottom). The amount of TM meaning-focused instruction stayed fairly constant at about 24 min per day for both first and second grade. In contrast, substantially more CM meaning-focused instruction was provided in second grade—fully 26 min per day more than in first grade.

There was substantial variability in amounts and types of instruction provided across classrooms in both first and second grade (see Table 4). In first grade, for example, amount of TM code-focused instruction ranged from about 4 min per day to 16 min per day, whereas amount of CM meaning-focused instruction ranged from 13 to 52 min per day. In second grade, TM code-focused instruction ranged from 2 to 9 min per day, whereas CM meaning-focused instruction ranged from about 28 to more than 95 min per day.

Change over the school year was an important characteristic of first-grade instruction in the first-grade study (see Figure 1, top). In preliminary analyses, first-grade CM meaning-focused slope interacted with vocabulary. Of the second-grade classroom variables, only TM meaning-focused slope was significantly different than zero (see Figure 1, middle), coefficient = –1.68, $t(32) = -2.45$, $p = .02$. Yet, neither amount or slope of second-grade TM meaning-focused instruction varied significantly by classroom; amount, $\chi^2(32) = 27.6$, $p > .500$, and slope, $\chi^2(32) = 40$, $p = .156$. Additionally, second-grade TM meaning-focused intercept and slope were highly correlated ($t_{(corr)} = .982$). Teacher who started the school year providing higher amounts of second-grade TM meaning-focused instruction,

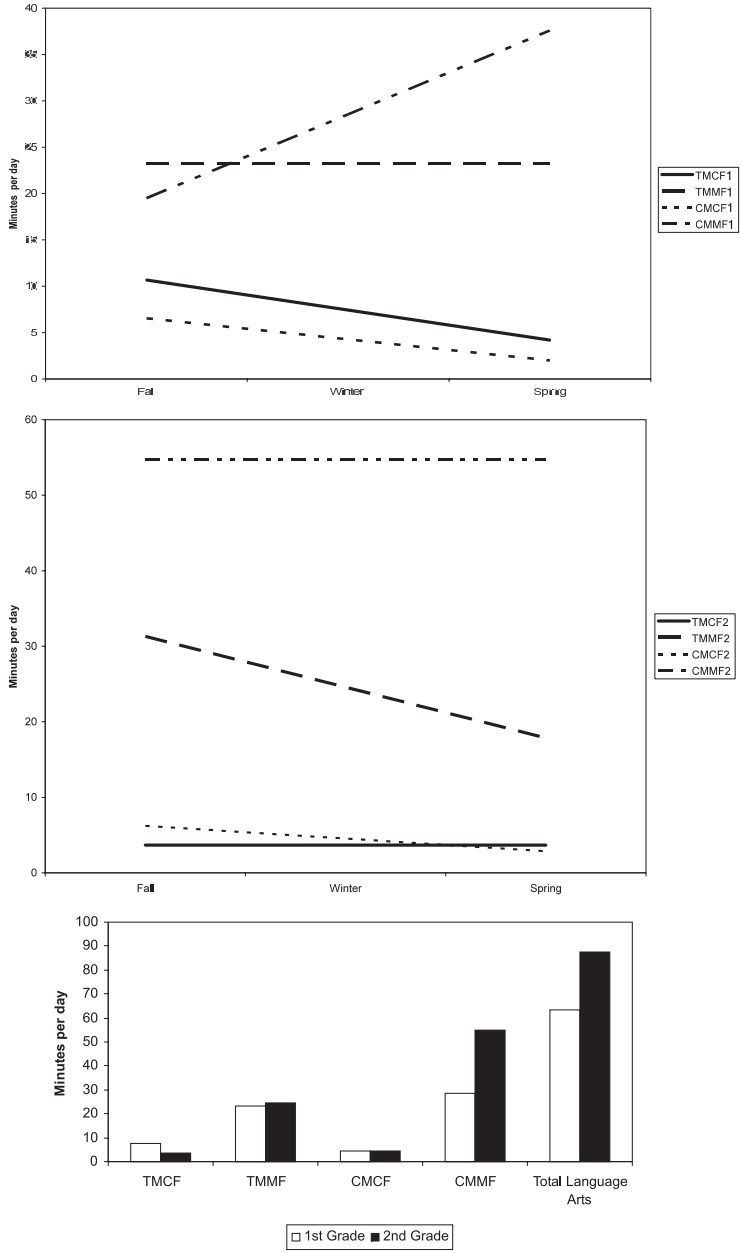

FIGURE 1 Amounts and types of instruction in first and second grade (top). First-grade instruction from fall to spring fitted trajectories. Types of instruction include teacher-managed, code-focused instruction (TMCF, solid line); teacher-managed, meaning-focused instruction (TMMF, dashed line); child-managed, code-focused instruction (CMCF, dotted line); and child-managed, meaning-focused instruction (CMMF, dash-dot-dot-dashed line, middle). Second-grade instruction from fall to spring fitted trajectories (bottom), comparing first- and second-grade instruction means. White bars represent first-grade amounts, and black bars represent second-grade amounts.

TABLE 4
Level 1, Row, and Column Descriptive Statistics

Variable Name	*M*	*SD*	*Minimum*	*Maximum*
Level 1 descriptive statistics[a]				
G1 Fall letter-word	25.38	13.56	7.00	70.00
G1 Fall vocabulary	85.03	16.19	48.00	119.00
G1 Spring letter-word	42.34	15.51	7.00	81.00
G1 Spring vocabulary	92.97	15.68	57.00	126.00
G2 Fall letter-word	49.56	15.56	23.00	86.00
G2 Fall vocabulary	97.90	13.66	64.00	122.00
G2 Spring letter-word	58.97	14.61	25.00	93.00
G2 Spring vocabulary	101.5	14.63	67.00	140.00
Row level (first grade) descriptive statistics				
TMCF1 amount	7.43	3.73	3.70	15.82
CMCF1 amount	4.27	2.55	2.04	11.62
TMMF1 amount	23.26	3.94	17.65	33.71
CMMF1 amount	28.54	9.27	13.79	52.47
CMMF1 slope	2.26	2.11	–.79	8.08
Column level (second grade) descriptive statistics				
TMCF2 amount	3.69	1.39	2.10	8.86
CMCF2 amount	4.53	0.08	4.41	4.79
TMMF2 amount	24.58	15.56	22.57	27.52
CMMF2 amount	54.78	1.08	27.79	97.21

Note. 40 classrooms at row level (first grade), and 33 classrooms at the column level (second grade). G1 = XXX; TM = teacher managed; CF = code focused; CM = child managed; MF = meaning focused.

[a]$N = 86$.

for example, increased this amount as the year progressed, whereas teachers who taught less TM meaning focused in the fall decreased the amount by spring.

First- and second-grade language arts activities comprising TM code-focused instruction. A closer look at first- and second-grade TM code-focused activities is revealing (see Figure 2; excerpts from the coding manual defining language arts activities are described in Appendix A). Proportionally, more time was spent in word segmentation activities in both first and second grade than was spent in the other activities with just less than twice as much time spent in word segmentation in first grade compared to second grade. Virtually the same amount of time was spent in alphabet activities across grades. About one half the amount of time spent in letter-sight sound activities in first grade was spent in second grade. No initial consonant stripping activities were observed in second grade. For the most part, the TM code-focused activities provided in second grade tended to include more challenging code-focused activities than provided in first grade (e.g., segmenting words is more challenging than identifying initial consonants).

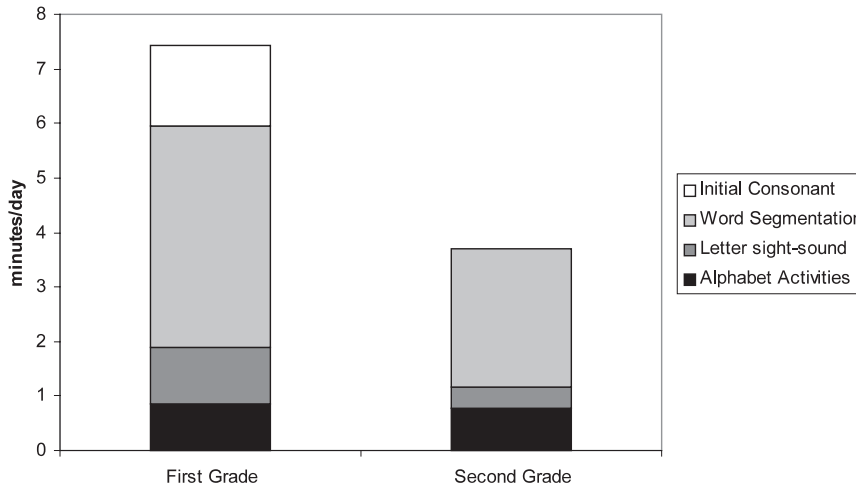

FIGURE 2 Mean amounts in minutes per day of the specific activities comprising first-grade teacher-managed, code-focused instruction and second-grade teacher-managed, code-focused instruction.

Relation of First- and Second-Grade Instruction to Students' Second-Grade, Letter-Word Reading Outcomes

Because children were nested in classrooms and also changed classrooms from first to second grade, cross-classified random effects models using Hierarchical Cross–classified Modeling, HCM2 (Raudenbush & Bryk, 2002) were used to examine the association between first- and second-grade language arts instruction and students' letter-word reading scores at the end of second grade. It is easier to understand how these models work if one envisions a matrix in which first-grade classrooms are in rows and second-grade classrooms are in columns. Students can then be assigned to the cell in this matrix that reflects their assigned classrooms in both first and second grade. Consider that Child A has Teacher 1–1 in first grade and Teacher 2–1 in second grade. Child B has Teacher 1 in first grade but Teacher 2–2 in second grade. Children C and D have Teacher 1–2 in first grade and Teacher 2–1 in second grade. The matrix would look like this:

Teacher	*Teacher 2–1*	*Teacher 2–2*
Teacher 1–1	Child A	Child B
Teacher 1–2	Child C, Child D	—

Note. No child has Teacher 1–2 in first grade and Teacher 2–2 in second grade; this is an empty cell.

We first created an unconditional model with spring letter-word reading as the outcome using the following model:

$$\text{Level 1(1)} \quad Y_{ijk} = \pi_{0jk} + e_{ijk}$$
$$\text{Level 2} \quad \pi_{0jk} = \theta_0 + b_{00j} + c_{00k} \tag{1}$$

Where Y_{ijk} is the second-grade spring letter-word reading score for Child i who attended Classroom j in first grade (rows) and Classroom k in second grade (columns). θ_0 represents the grand mean second-grade spring letter-word reading score for all children, b_{00} is the random main effect of first-grade Classroom j (row), and c_{00} is the random main effect for second-grade Classroom k (column; $\theta_0 = 59.0$, $\tau_{b00j} = .27$, $\tau_{c00k} = .16$, $\sigma^2 = 210$). The intra first-grade classroom correlation is estimated to be .001, whereas the intra second-grade classroom correlation is estimated to be .0007. Overall, most of the variance lies within classrooms with very little of the variance lying between either first- or second-grade classrooms. Only 0.2% of the variance lies between cells (i.e., the correlation between two students who attended the same first- and second-grade classrooms). When home literacy environment and parent education were added to the model at Level 1, they did not significantly predict second-grade spring letter-word reading and were trimmed from the model.

Then we added children's fall first-grade letter-word reading (π_{1jk}) and vocabulary (π_{2jk}) scores to control for initial status with regard to letter-word reading and vocabulary at the beginning of first grade. Thus, our outcome, second-grade spring letter-word reading, is controlling for initial status. In this way, we can compare growth in children's scores from first to second grade. Fall first-grade letter-word reading and vocabulary scores significantly and positively predicted second-grade spring letter-word reading score (Y_{ijk}): fall first-grade letter-word reading $\pi_1 = .53$, $t(83) = 5.51$, $p < .001$, and fall first-grade vocabulary $\pi_2 = .19$, $t(83) = 2.35$, $p = .021$. This model accounted for 33% of the variability in student scores. The amount of between-classroom variability for both first and second grade remained essentially unchanged ($\tau_{b00j} = .28$, $\tau_{c00k} = .17$). Guided by the results of the first-grade study, we then added all of the instruction amount variables for both first and second grade, first-grade CM meaning-focused slope, plus the hypothesized interactions. The latter included: (1) first- and second-grade TM code-focused by fall letter-word reading score; (2) first grade CM meaning-focused amount by fall vocabulary; and (3) second grade CM meaning-focused amount by fall vocabulary. No other slope variables contributed significantly to the model. Other interactions were tested, but none achieved set levels of significance ($\alpha = .05$). This model explained 56% of the variability in students' spring second-grade letter-word reading scores. Instruction alone accounted for 23% of the variance in students' second-grade, letter-word reading scores. Only the second-grade TM code-focused coefficient was significantly greater than zero, B01 = 2.93, 7(70) = 2.67, $p = .01$. There were also interactions between fall first-grade, letter-word reading scores and first-grade TM

code-focused scores and second-grade TM code-focused scores, TMCF1 γ_{12} = –.05, $t(70) = -2.74$, $p = .007$, and, TMCF2 $\beta_{11} = .49$, $t(70) = 3.60$, $p = .001$. No other instruction variable coefficients were significantly greater than zero, although both fall first-grade, letter-word reading and vocabulary coefficients were, first-grade fall letter-word reading $\theta_1 = .90$, $t(70) = 8.12$, $p < .001$; first-grade fall vocabulary $\theta_2 = .19$, $t(70) = 2.65$, $p = .01$.

Because parsimony is an important consideration in these highly complex cross-classified random effects models (Raudenbush & Bryk, 2002), instruction variables were trimmed using the following theoretical and practical considerations: Instructional variables that significantly predicted students' first-grade, letter-word reading outcomes in the first-grade study were retained. Second-grade instruction variables that significantly predicted students' second-grade, letter-word reading scores in this analysis were retained. This meant, however, that we were not controlling for the total amount of instruction children received over the course of first and second grade. Nonetheless, results of the parsimonious model were highly similar to the results of the complex model and continued to explain 50% of the variability in students' second-grade spring letter-word reading scores. For this reason, the parsimonious model is presented in detail (see Equation 2).

Final Model

Level 1 model.

$$Y_{ijk}\ (\text{second-grade spring letter-word reading score}) = \pi_{0jk} + \pi_{1jk}*(\text{first-grade fall letter-word}_{ijk}) + \pi_{2jk}*(\text{first-grade fall vocabulary}_{ijk}) + e_{ijk}$$

Level 2 model.

$$\pi_{0jk} = \theta_0 + b_{00j} + c_{00k} + \gamma_{01}*(\text{TMCF1}_j) + \gamma_{02}*(\text{CMMF1 amount}_j) + \gamma_{03}*(\text{CMMF1 slope}_j) + \beta_{01}*(\text{TMCF2k})$$

$$\pi_{1jk} = \theta_1 + \gamma_{10}*(\text{TMCF1j}) + \beta_{10}*(\text{TMCF2k})$$

$$\pi_{2jk} = \theta_2 + \gamma_{20}*(\text{CMMF1 amount}_j) + \gamma_{21}*(\text{CMMF1 slope}_j)$$

Y_{ijk} is the predicted second-grade spring letter-word reading score for Child i who was in Classroom j in first grade and Classroom k in second grade. All covariates are centered at the grand mean of the sample and so θ_0 represents the fitted grand mean or predicted spring second-grade, letter-word reading score for children with initial vocabulary and letter-word reading skills scores falling at the sample mean. The instruction coefficients represent the effect of 1 min per day of instruction above or below the mean amount of that type of instruction provided overall (see Table 5). Taking into account child-by-instruction interactions,

TABLE 5
Hierarchical Cross–Classified Modeling (HCM2) Results with All Continuous Variables Entered at the Grand Mean for the Sample. The Outcome Variable Is Second Grade Spring Letter-word Reading Raw Score (PIAT Reading Recognition)

Fixed Effect	*Coefficient*	*SE*	*T Ratio*	*df*	*p Value*
Final Estimation of Fixed Effects					
For intercept (π_0)					
Intercept (θ_0)	61.188	1.265	48.341	75	.000
TMCF1 (γ_{01})	–0.149	0.345	–0.432		.667
CMMF1 amount (γ_{02})	–0.219	0.167	–1.310		.194
CMMF1 slope (γ_{03})	0.757	0.679	1.115		.269
TMCF2 (β_{01})	2.459	1.135	2.167		.033
For grade 1 letter-word fall score π_1					
Intercept (θ_1)	0.887	0.117	7.588	75	.000
TMCF1 (γ_{11})	–0.051	0.019	–2.619		.011
TMCF2 (β_{11})	0.435	0.139	3.133		.003
For grade 1 vocabulary fall score π_2					
Intercept (θ_2)	0.154	0.074	2.085	75	.040
CMMF1 amount (γ_{21})	0.018	0.010	1.882		.063
CMMF1 slope (γ_{22})	–0.057	0.0427	–1.341		.184

Random Effect	*SD*	*Variance Component*	*df*	*c*	*p Value*
Final estimation of row and level-variance components					
Intercept (b_{00})	0.781	0.611	35	39.112	.290
Level 1 e	10.233	104.728			
Final estimation of column level variance components					
Intercept c_{00}	0.324	0.105	28	27.945	>.500

Note. Deviance = 644.636522. A letter-word reading raw score of 61 translates to a grade equivalent of 4.1, which is the fitted score for a child with average first grade fall letter-word reading and vocabulary skills who received the mean amount of instruction in first and second grade. TM = teacher managed; CF = code focused; CM = child managed; MF = meaning focused; PIAT = Peabody Individual Achievement Tests.

classroom instruction explained almost one half (23%) of the total explained variance (50%) in students' spring second-grade, letter-word reading skills. The remaining 27% was explained by students' initial vocabulary and letter-word reading skills.The results of this model reveal that students who were in classrooms with higher amounts of TM code-focused instruction in both first and second grade demonstrated greater letter-word reading skill growth by the end of second grade than did students in first and second-grade classrooms with less TM code-focused instruction (i.e., higher spring scores controlling for initial letter-word reading and

vocabulary). Moreover, there were child-by-instruction interactions (see Table 5 and Figure 3). In first grade, students with lower initial letter-word reading scores demonstrated greater letter-word reading skill growth in classrooms with higher amounts of TM code-focused instruction (see Figure 3, top). Students with stronger letter-word reading skills at the beginning of first grade demonstrated less letter-word reading growth in these same classrooms. First-grade TM code-focused instruction had little effect on scores for students with strong letter-word reading scores at the beginning of first grade (see Figure 3, bottom).

The relation of first-grade CM meaning-focused amount to students' letter-word reading score growth just missed conventional levels of significance (p = .06). This finding was highly similar to previous findings. Children with higher vocabulary scores demonstrated stronger letter-word reading scores by the end of second grade, on average, when they were in first-grade classrooms with more CM meaning-focused instruction than when they were in classrooms with less CM meaning-focused instruction. The opposite was the case for children with low initial vocabulary scores. The relation of CM meaning-focused slope to letter-word reading growth was not significant, but trends were similar to previous findings.

The picture for second grade was quite different. In second grade, students demonstrated stronger letter-word reading score growth, on average, when they attended classrooms with greater amounts of TM code-focused instruction. The effect was greater for students with stronger letter-word reading scores at the beginning of first grade (see Figure 3). Thus, our hypothesis that TM code-focused instruction would have a greater effect in first grade compared to second grade was not supported.

Taken together, our model suggests that children with lower letter-word reading scores at the beginning of first grade demonstrate greatest levels of letter-word reading score growth in first and second-grade classrooms with greater amounts of first- and second-grade TM code-focused instruction. Students with higher initial letter-word reading scores exhibited greatest growth in classrooms with lower amounts of first-grade TM code-focused instruction in first grade but higher amounts of second-grade TM code-focused instruction. Generally, second-grade TM code-focused instruction accounted for greater student letter-word reading score growth variability overall compared to first-grade TM code-focused instruction. For example, even if a student with low initial letter-word reading scores received smaller amounts of first grade TM code-focused instruction but higher amounts of second grade TM code–focused instruction. Although it is difficult to estimate effect sizes when there are interactions, because effect size depends on the child's initial skills and the amount of instruction provided, a sense of the potential magnitude can be estimated by examining Figure 3. The effect size (d) using the difference in spring letter-word scores for children with low initial letter-word skills receiving the most effective, versus least effective, pattern of instruction in first and second grade was 1.51, a large effect. The effect size was larger for students with high initial scores (d = 2.8).

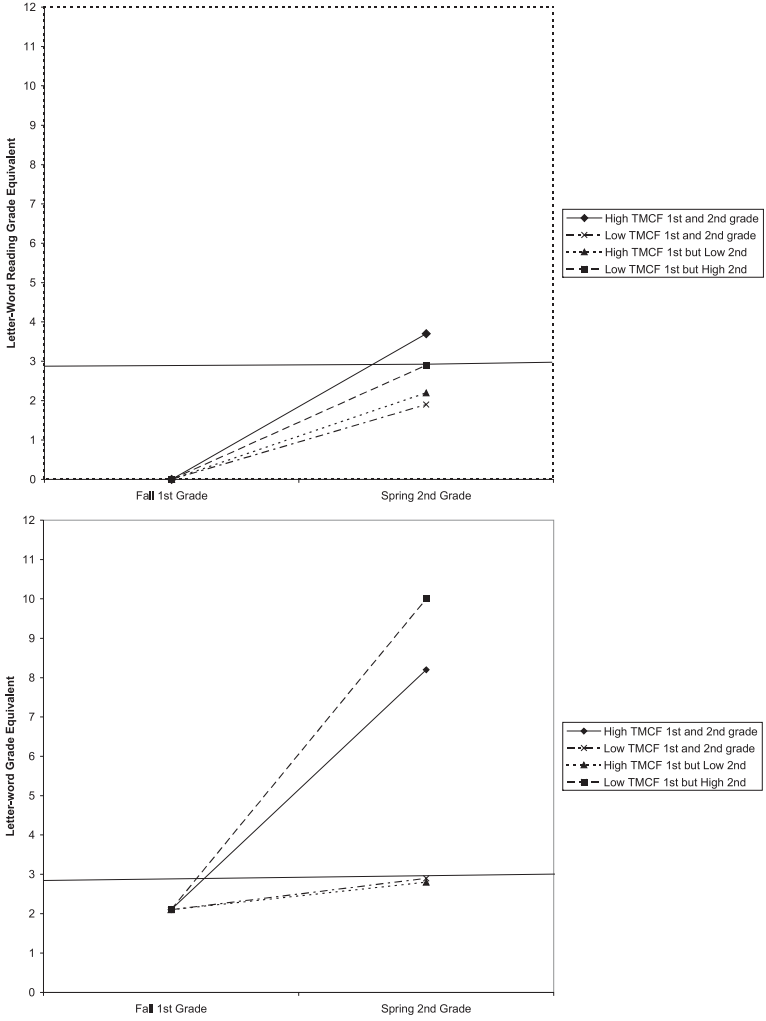

FIGURE 3 A comparison of predicted second-grade, letter-word reading grade equivalent outcomes (Y_{ijk}) across four patterns of first- and second-grade teacher-managed code-focused instruction (TMCF) for children who began first grade with low (grade equivalent = 0, fall kindergarten grade equivalent, top) versus high (grade equivalent = 2, fall second-grade equivalent, bottom) letter-word reading scores. Low TMCF instruction is 1 *SD* below the sample mean. High TMCF is 1 *SD* above the sample mean (minutes per day) so low first-grade TMCF is 3.7 min per day. High first-grade TMCF is 11.2 min per day. Low second-grade TMCF is 2 min per day, and high second-grade TMCF is 5.3 min per day. See legend for combinations of first and second-grade TMCF. Fall first-grade vocabulary is held constant at the sample mean of 85. Child-managed, meaning-focused instruction in first grade is held constant at the mean of 29 min per day. Note that these are modeled results.

DISCUSSION

The children in this study generally achieved proficient, to above, grade level letter-word reading skills by the end of second grade. There was, however, substantial variability, with some children continuing to struggle with reading, whereas others were reading words above an eighth-grade level. For some children in our study, the instruction they received was highly effective, although for others it was not. The variability in children's outcomes was reflected in the markedly different patterns of instruction we observed between classrooms and across grades. Moreover, as we discuss, the impact of language arts activities in first and second grade depends on children's reading skills at the beginning of first grade. Children were most likely to achieve grade level, and above, reading skills by the end of second grade if they experienced optimal patterns of instruction in both first and second grade. Second-grade instruction was more predictive of students' word reading outcomes than was first-grade instruction.

What is the Nature of, and Variability in, First- and Second-Grade Language Arts Instruction?

The patterns of instruction observed in these first- and second-grade classrooms, although highly variable, generally support our hypotheses. Overall, the amount of language arts instruction offered each day increased from first to second grade (see Figure 1). Most of this increase was in CM meaning-focused activities, but there was substantial variability among classrooms in both first and second grade. The amounts of TM meaning-focused activities remained stable at about 20 min, on average, in both first and second grade with much less variability among classrooms, especially in second grade. The amount of TM code-focused instruction decreased from about 7 min to about 4 min per day, on average, between first and second grade. The amount of CM code-focused instruction (primarily spelling) was stable at about 5 min per day across first and second grade, on average.

The small amounts of code-focused instruction observed were anticipated because, as reported by school district administrators, the district promotes a whole language approach to teaching reading. Here, children are immersed in a rich text environment, provided trade books rather than a core curriculum, and are encouraged to read independently or with peers (Dahl & Freppon, 1995). Code-focused instruction tends to be brief and embedded within the meaning-focused activity (Foorman et al., 1998). The district also encourages the use of sustained silent reading—the most frequently observed activity recorded as CM meaning-focused instruction in both first and second grade.A closer look at TM code-focused instruction in first and second grade also reveals substantial variability among classrooms, even considering the small amounts of instruction provided on average. Amounts of TM code-focused instruction range between 4 and 16 min per day in

first grade and between 2 and 9 min per day in second grade. Although these may seem to be narrow ranges, consider that our metric is minutes per day. Multiplied by the number of days in a school year (approximately 180), the differences range from 12 hr (4 min per day) to 48 hr (16 min per day) in first grade and from 6 hr to 27 hr total in second grade. Moreover, the type of TM code-focused instruction differed from first to second grade (see Figure 2). In first grade, generally a higher proportion of the time was spent in basic phonological awareness activities such as teaching letter-sound relations, whereas in second grade, the greater focus was on more advanced metalinguistic awareness (e.g., homophones) and phonics instruction. Coded activities, such as alphabet activities that focus on learning letters at the beginning of first grade, represented more advanced skills, such as alphabetizing words, in second grade (see Appendix B). As discussed next, this may offer one possible explanation for the positive effect of TM code-focused instruction in second grade for all students' letter-word reading skill growth. Had more ability-appropriate, first-grade TM code-focused instruction been provided to students with high initial skill levels, TM code-focused instruction might have positively related to these students' letter-word reading growth.

What is the Association Between Amount and Types of Instruction Received in First and Second Grade and Students' Letter-Word Reading Skill Growth? And are There Child-by-Instruction Interactions?

Effective patterns of instruction (i.e., positively related to stronger second-grade spring reading skills controlling for fall first-grade reading and vocabulary) differed for children with weaker, versus stronger, initial letter-word reading skills in first grade. Generally, children with weaker initial letter-word skills demonstrated greater skill growth by the end of second grade when they were in classrooms with greater amounts of TM code-focused instruction in both first and second grade. However, for children with stronger initial skill levels, less first-grade TM code-focused instruction (but more second-grade TM code-focused instruction) was related to stronger letter-word reading skill growth (see Figure 3). Additionally, for students with lower initial skill levels, higher amounts of TM code-focused instruction in second grade appeared to help compensate for less optimal patterns of instruction in first grade. In other words, second grade may offer a second chance for children who do not achieve grade level skills in first grade because they did not receive sufficient amounts of TM code-focused instruction.

Caution is in order, however, as we make these claims because this study relies on the naturally occurring variability in both child characteristics and classroom instruction and the causal implications are unclear. Emerging evidence from a random field trial suggest that child-by-instruction interactions may be causally

related to student outcomes (Connor, Morrison, Fishman, Schatschneider, & Underwood, in press).

Although they did not reach conventional levels of significance ($p = .062$), first-grade CM meaning-focused amounts interacted with initial vocabulary skills, which, given our somewhat limited power for these complex cross-classified models, should not be disregarded. Children who started first grade with stronger vocabulary skills demonstrated stronger letter-word reading skill growth, on average, in first-grade classrooms with higher amounts of CM meaning-focused instruction than did children in first-grade classrooms with less CM meaning-focused instruction. In contrast, students with weaker fall first-grade vocabulary skills demonstrated less growth in classrooms with more CM meaning-focused instruction and greater growth in first-grade classrooms with less CM meaning-focused instruction.

As we consider the specificity of learning and the simple view of reading (Hoover & Gough, 1990; Senechal & LeFevre, 2001; Storch & Whitehurst, 2002), these results suggest that specificity of learning may be more explicit in nature for children with weaker language and literacy skills than for children with stronger language and literacy skills. In this study, meaning-focused activities had a positive relation with our code-focused outcome for students with stronger vocabulary skills but not for our students with weaker vocabulary skills. For students with stronger vocabulary skills, more kinds of instruction appear to be positively related to their outcome growth. This was observed in a study of preschoolers as well (Connor et al., 2006). For students with low initial skill levels, the type of instruction related to that skill growth was explicitly focused on that skill. For example, preschoolers with weaker fall emergent reading skills demonstrated stronger letter knowledge growth in classrooms with higher amounts of code-focused activities, whereas students with stronger fall skills demonstrated greater growth in classrooms with higher amounts of meaning-focused activities.Because vocabulary and letter-word reading skills were only weakly related, some children had strong fall vocabulary skills but weaker letter-word reading skills ($n = 12$). For these children, higher amounts of both first-grade CM meaning-focused activities and TM code-focused activities were related to stronger letter-word reading skill growth by the end of second grade. Only a very few children ($n = 2$) demonstrated strong letter-word skills but weak vocabulary skills in our sample.

Generally, students who began first grade with stronger letter-word reading skills were predicted to achieve above grade level skills as long as they received greater amounts of TM code-focused instruction in second grade (see Figure 3). If they received less TM code-focused instruction in second grade, regardless of the amount of TM code-focused instruction in first grade, then the model predicted that their spring letter-word reading skills would fall at, or just below, grade level expectations. If we consider the causal implications, the ramifications of inadequate TM code-focused instruction in second grade are alarming for students who begin first grade

with either weak or strong letter-word skills. Returning to Figure 3, the difference between 2 and 5 min per day of TM code-focused instruction in second grade is the difference between achieving a grade equivalent of third grade and a grade equivalent of eighth grade (in our sample, 5 students achieved grade equivalents of 8.0 or greater by the end of second grade). Modeled results suggest that optimally effective patterns of instruction (low first-grade TM code-focused and high second-grade TM code focused instruction) will bring students' reading to a high school level (3 students in our sample). Although caution is needed in making causal claims from these observational data, the results of a random field trial provided strong evidence that individualizing first-grade reading instruction by taking into account child-by-instruction interactions caused stronger student reading skill growth (Connor et al., in press). With this in mind, our results strongly suggest that first- and, especially, second-grade instruction are important for higher performing students and that starting first grade with stronger initial letter-word reading skills appears to offer very little protection against ineffective instruction.

For students who began first grade with letter-word reading skills falling well below grade expectations, the model predicted that they would only achieve grade level letter-word reading by the end of second grade if they were in classrooms with higher amounts of TM code-focused instruction in both first and second grade (see Figure 3). Higher amounts of TM code-focused instruction in second grade appeared to compensate somewhat for low first-grade TM code-focused amounts but not entirely. Interestingly, high amounts of TM code-focused instruction in first grade, but lower amounts in second grade, did not shield these students in the face of low amounts of second-grade TM code-focused instruction. According to the model, these children did not achieve grade expectations when they attended first-grade classrooms with higher amounts of TM code-focused instruction but attended second-grade classrooms with lower amounts of TM code-focused instruction. Second-grade TM code-focused activities appear to play a critical role in building proficient reading skills. This was unexpected because conventional wisdom has suggested, and observation of practice has revealed, that amounts of explicit code-focused instruction are typically lower in second grade. For example, in over 60 Reading First schools, the amount of code-focused instruction observed in 45 min (one half the actual 90-min block) decreased almost by one half from kindergarten to first grade (48–27%), and almost by one half again from first to second grade (27–17%; http://www.fcrr.org). Consider, also, that Reading First schools, by definition, serve children most at risk for reading difficulties. According to our results, the amount of code-focused instruction should be either maintained or increased, depending on students' progress. However, the classrooms in our study utilized a whole language approach that tends to deemphasize code-focused instruction. It may be that the impact of second-grade TM code-focused instruction would be less in schools that used more balanced approaches to teaching reading in first grade (Pressley, 1998).

There were proportionally more advanced code-focused activities (e.g., word segmentation; see also alphabet activity in Appendix B) offered in second grade than in first grade. This offers one possible explanation for the positive impact of second-grade TM code-focused instruction on all students' letter-word growth—even students with high initial letter-word reading skills. We conjecture that had more advanced code-focused activities been offered in first grade to students with stronger letter-word scores, first-grade TM code-focused instruction might have had a positive rather than a negative (or no) influence on their letter-word growth.

Our results underscore the important role of assessment in designing and implementing practice and the potential value of individualizing instruction based on students' assessed language and literacy skill. Teachers who have students with stronger academic skill growth frequently use assessment to guide instruction and implement reading instruction in small groups based on children's assessed skill levels (Taylor et al., 2000; Wharton-McDonald et al., 1998). Child-by-instruction interactions may be the causal mechanism driving these findings (Connor et al., in press). By attending to individual students' skill levels and providing instruction to smaller numbers of children at one time, teachers may be more likely to provide the amount and type of instruction that will promote each individual student's achievement.

Although it was beyond the scope of this study to investigate the impact of instruction on students' reading comprehension and fluency development, based on other research results, meaning-focused activities almost certainly contributed to these outcomes (e.g., see National Reading Panel, 2000; Snow, 2001). For example, with this same sample of children in third grade, TM meaning-focused activities that explicitly taught reading comprehension were associated with stronger reading comprehension skill growth (Connor, Morrison, & Petrella, 2004). It would be a mistake to interpret these results to suggest that meaning-focused activities have no impact on students' reading outcomes and should be discontinued.

By completing this study, we have now reported findings regarding our student participants and the language arts instruction they received in first, second, and third grade (Connor, Morrison, & Katch, 2004; Connor, Morrison, & Petrella, 2004; Morrison & Connor, 2002). The compelling theme is that, in every grade and for both letter-word reading and reading comprehension outcomes, the instruction that children received influenced their reading skill growth either positively or negatively. Furthermore, the effect of particular instructional strategies depended on the vocabulary and reading skills children brought to the classroom. The important influence of classroom instruction on children's development should not to be underestimated or under-investigated. As policy turns to a "response-to-intervention" model for identifying children with learning disabilities (L. S. Fuchs & Fuchs, 1998; Vaughn & Fuchs, 2003), how to implement effective classroom instruction (i.e., Tier 1 instruction) is going to receive increasing attention. This study demonstrates the value of directly observing instructional practices in the

classroom, and for using advanced analytic strategies to examine classrooms as complex and dynamic systems and the specificity of instruction across grades. Most important, our findings offer insights for designing effective reading instruction in the classroom, taking into account children's individual differences, with the goal that all students become proficient readers.

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REFERENCES

Adams, M. J. (1990). *Beginning to read: Thinking and learning about print*. Cambridge, MA: MIT Press.

Al'Otaiba, S., Connor, C. M., Kosanovich, M., Schatschneider, C., Dyrlund, A. K., & Lane, H. (2007). *Reading First kindergarten classroom instruction and students' phonological awareness and decoding fluency growth.* Manuscript in second review, *Journal of School Psychology.*

Cameron, C. E., Connor, C. M., & Morrison, F. J. (2005). Effects of variation in teacher organization on classroom functioning. *Journal of School Psychology, 43*(1), 61–85.

Catts, H. W., Fey, M., Zhang, X., & Tomblin, B. (1999). Language basis of reading and reading disabilities: Evidence from a longitudinal investigation. *Scientific Studies of Reading, 3*(4), 331–361.

Connor, C. M., Jakobsons, L. J., & Granger, J. (2007). *Instruction and student engagement in Reading First classrooms*. Manuscript in second review, *Elementary School Journal.*

Connor, C. M., Morrison, F. J., Fishman, B. J., Schatschneider, C., & Underwood, P. (2007). THE EARLY YEARS: Algorithm-guided Individualized Reading Instruction. *Science, 315* (5811), 464–465.

Connor, C. M., Morrison, F. J., & Katch, E. L. (2004). Beyond the reading wars: The effect of classroom instruction by child interactions on 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 by instruction interactions. *Journal of Educational Psychology, 96*(4), 682–698.

Connor, C. M., Morrison, F. J., & Slominski, L. (2006). Preschool instruction and children's literacy skill growth. *Journal of Educational Psychology, 98*(4), 665–689.

Connor, C. M., Son, S., Hindman, A., & Morrison, F. J. (2005). Teacher qualifications, classroom practices, family characteristics and preschool experience: Complex effects on first graders' vocabulary and early reading outcomes. *Journal of School Psychology, 43,* 343–375.

Dahl, K. L., & Freppon, P. A. (1995). A comparison of inner-city children's interpretations of reading and writing instruction in the early grades in skills-based and whole language classrooms. *Reading Research Quarterly, 30*(1), 50–74.

Dunn, L. M., & Dunn, L. M. (1981). *Peabody Picture Vocabulary Test: Revised*. Circle Pines, MN: American Guidance Service.

Durkin, D. (1987). A classroom-observation study of reading instruction in kindergarten. *Early Childhood Research Quarterly, 2,* 275–300.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.

Foorman, B. R., Schatschneider, C., Eakin, M. N., Fletcher, J. M., Moates, L. C., & Francis, D. J. (2006). The impact of instructional practices in grades 1 and 2 on reading and spelling achievement in high poverty schools. *Contemporary Educational Psychology, 31,* 1–29.

Fuchs, D., & Fuchs, L. S. (2005). Peer-assisted learning strategies: Promoting word recognition, fluency, and reading comprehension in young children. *Journal of Special Education, 39*(1), 34–44.

Fuchs, L. S., & Fuchs, D. (1998). Treatment validity: A unifying concept for reconceptualizing the identification of learning disabilities. *Learning Disabilities Research and Practice, 13*(4), 204–219.

Griffin, E. A., & Morrison, F. J. (1997). The unique contribution of home literacy environment to differences in early literacy skills. *Early Child Development and Care, 127–128*, 233–243.

Hart, B., & Risley, T. R. (1995). *Meaningful differences in the everyday experience of young American children*. Baltimore: Brookes.

Hatcher, P. J., Hulme, C., & Snowling, M. J. (2004). Explicit phoneme training with phonic reading instructions helps young children at risk. *Journal of Child Psychology and Psychiatry, 43,* 338–358.

Hoover, W. A., & Gough, P. B. (1990). The simple view of reading. *Reading and Writing, 2*(2), 127–160.

Juel, C. (1988). Learning to read and write: A longitudinal study of 54 children from first through fourth grades. *Journal of Educational Psychology, 80*(4), 437–447.

Juel, C., & Minden-Cupp, C. (2000). Learning to read words: Linguistic units and instructional strategies. *Reading Research Quarterly, 35*(4), 458–492.

Lazar, I., Darlington, R., Murray, H., Royce, J., Snipper, A., & Ramey, C. T. (1982). Lasting effects of early education: A report from the consortium for longitudinal studies. *Monographs of the Society for Research in Child Development, 47*(2–3).

Loban, W. (1976). *Language development: Kindergarten through grade twelve*. Urbana, IL: National Council of Teachers of English.

Markwardt, F. C. (1989). *Peabody Individual Achievement Test: Revised*. Circle Pines, MN: American Guidance Service.

McCardle, P., & Chhabra, V. (Eds.). (2004). *The voice of evidence in reading research*. Baltimore: Brookes.

McLoyd, V. C. (1990). The impact of economic hardship on black families and children: Psychological distress, parenting, and socioemotional development. *Child Development, 61,* 311–346.

McLoyd, V. C. (1998). Socioeconomic disadvantage and child development. *American Psychologist, 53*(2), 185–204.

Morrison, F. J., Bachman, H. J., & Connor, C. M. (2005). *Improving literacy in America: Guidelines from research*. New Haven, CT: Yale University Press.

Morrison, F. J., & Connor, C. M. (2002). Understanding schooling effects on early literacy. *Journal of School Psychology, 40*(6), 493–500.

Morrison, F. J., Connor, C. M., & Bachman, H. J. (2005). The transition to school. In D. K. Dickinson & S. B. Neuman (Eds.), *Handbook of early literacy: Vol. 2*: Guilford.

Morrison, F. J., & Cooney, R. (2002). Parenting and academic achievement: Multiple paths to early literacy. In J. Borkowski, S. Ramey Landesman, & M. Bristol-Power (Eds.), *Parenting and the child's world: Influences on academic, intellectual, and social-emotional development* (pp. 141–160). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Morrison, F. J., Griffith, E. M., & Alberts, D. M. (1997). Nature-nurture in the classroom: Entrance age, school readiness, and learning in children. *Developmental Psychology, 33*(2), 254–262.

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* (NIH Publication No. 00–4769). Washington, DC: U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Institute of Child Health and Human Development.

National Institute for Child Health and Human Development–Early Child Care Research Network (NICHD–ECCRN). (2002). Child-care structure–process–outcome: Direct and indirect effects of child-care quality on young children's development. *Psychological Science, 13*(2), 199–206.

National Institute for Child Health and Human Development–Early Child Care Research Network (NICHD–ECCRN). (2004). Multiple pathways to early academic achievement. *Harvard Educational Review, 74*(1), 1–29.

O'Connor, R., Fulmer, D., Harry, K. R., & Bell, K. M. (2005). Layers of reading intervention in kindergarten through third grade: Changes in teaching and student outcomes. *Journal of Learning Disabilities, 39*(5), 440–456.

Palincsar, A. S., & Brown, A. L. (1984). Reciprocal teaching of comprehension-fostering and monitoring activities. *Cognition and Instruction, 1,* 117–175.

Palincsar, A. S., Collins, K. M., Marano, N. L., & Magnusson, S. J. (2000). Investigating the engagement and learning of students with learning disabilities in guided inquiry science teaching. *Speech, Language, and Hearing Services in Schools, 31*(3), 240–251.

Pearson, B. D., & Gallagher, M. C. (1983). The instruction of reading comprehension. *Contemporary Educational Psychology, 8,* 317–344.

Phillips, L. M., Norris, S. P., Osmond, W. C., & Maynard, A. M. (2002). Relative reading achievement: A longitudinal study of 187 children from first through sixth grades. *Journal of Educational Psychology, 94*(1), 3–13.

Pressley, M. (1998). *Reading instruction that works: The case for balanced teaching*. New York: Guilford.

Pressley, M., & Wharton-McDonald, R. (1997). Skilled comprehension and its development through instruction. *School Psychology Review, 26*(3), 448–466.

Raskind, M. H., Goldberg, R. J., Higgis, E. L., & Herman, K. L. (1999). Patterns of change and predictors of success in individuals with learning disabilities: Results from a twenty-year longitudinal study. *Learning Disabilities Research and Practice, 14*(1), 35–49.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (2nd ed.). Thousand Oaks, CA: Sage.

Raudenbush, S. W., Bryk, A., Cheong, Y. F., Congdon, R., & du Toit, M. (2004). *HLM6: Hierarchical linear and nonlinear modeling*. Lincolnwood, IL: Scientific Software International.

Ravitch, D. (2001). It is time to stop the war. In T. Loveless (Ed.), *The great curriculum debate: How should we teach reading and math?* (pp. 210–228). Washington, DC: Brookings Institute.

Rayner, K., Foorman, B. R., Perfetti, C. A., Pesetsky, D., & Seidenberg, M. S. (2001). How psychological science informs the teaching of reading. *Psychological Science in the Public Interest, 2*(2), 31–74.Ross, S. M., & Smith, L. J. (1994). Effects of the success for all models on kindergarten through second-grade reading achievement, teachers' adjustment, and classroom-school climate at an inner city school. *Elementary School Journal, 95*(2), 121–138.

Sanders, W. L., & Horn, S. P. (1998). Research findings from the Tennessee value-added assessment system (TVAAS) database: Implications for educational evaluation and research. *Journal of Personnel Evaluation in Education, 12*(3), 247–256.

Scarborough, H. S. (2001). Connecting early language and literacy to later reading (dis)abilities: Evidence, theory, and practice. In S. B. Neuman & D. K. Dickinson (Eds.), *Handbook of early literacy research* (pp. 97–110). New York: Guilford.

Senechal, M., & LeFevre, J.-A. (2001). On refining theoretical models of emergent literacy: The role of empirical evidence. *Journal of School Psychology, 39*(5), 439–460.

Snow, C. E. (2001). *Reading for understanding*. Santa Monica, CA: RAND Education and the Science and Technology Policy Institute.

Snow, C. E., Burns, M. S., & Griffin, P. (Eds.). (1998). *Preventing reading difficulties in young children*. Washington, DC: National Academy Press.

Spira, E. G., Bracken, S. S., & Fischel, J. E. (2005). Predicting improvement after first-grade reading difficulties: The effects of oral language, emergent literacy, and behavior skills. *Developmental Psychology, 41*(1), 225–234.

Storch, 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.

Taylor, B. M., Pearson, D. P., Clark, K., & Walpole, S. (2000). Effective schools and accomplished teachers: Lessons about primary-grade reading instruction in low-income schools. *The Elementary School Journal, 101*(2), 121–165.

Therrien, W. J. (2004). Fluency and comprehension gains as a result of repeated reading: A meta-analysis. *Remedial and Special Education, 25*(4), 252–261.

Thorndike, R. L., Hagen, E. P., & Sattler, J. M. (1986). *Stanford–Binet Intelligence Scale* (4th ed.). Chicago: Riverside.

Torgesen, J. K. (2000). Individual differences in response to early intervention in reading: The lingering problem of treatment resisters. *Learning Disabilities Research and Practice, 15,* 55–64.

Torgesen, J. K., Alexander, A. W., Wagner, R. K., Rashotte, C. A., Voelier, K. K. S., & Conway, T. (2001). Intensive remedial instruction for children with severe reading disabilities: Immediate and long-term outcomes from two instructional approaches. *Journal of Learning Disabilities, 34*(1), 33–58.

Torgesen, J. K., Wagner, R. K., Rashotte, C. A., Rose, E., Lindamood, P., Conway, T., et al. (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., & Fuchs, L. S. (2003). Redefining learning disabilities as inadequate response to instruction: The promise and potential problems. *Learning Disabilities Research and Practice, 18*(3), 137–146.

Vellutino, F. R., Scanlon, D. M., Sipay, E. R., Small, S. G., Pratt, A., Chen, R., et al. (1996). 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, 88*(4), 601–638.

Wharton-McDonald, R., Pressley, M., & Hampston, J. M. (1998). Literacy instruction in nine first-grade classrooms: Teacher characteristics and student achievement. *The Elementary School Journal, 99*(2), 101–128.

APPENDIX A

Coding Scheme for Classroom Observations—Language Arts Subactivities (see also Connor, Morrison, & Katch, 2004)

Language Arts: This is the time spent (number of minutes) engaged in activities that require reading, writing, or reading/writing-related things but that are *not* focused on gaining information about another content area (science, social studies, math, drama, etc.).

a. Teacher read aloud: The teacher reads from a picture book, a chapter book, magazine, and so on; provides a book-on-tape for the children to listen to; or shows a video wherein a story is presented.

b. Student read aloud, individual: A single child reads aloud, in a small group or with the whole class, from a picture book, chapter book, magazine, or his or her own writing.

c. Student read aloud, choral: More than one child reads aloud from picture book, chapter book, magazine, poster, and so on.

d. *SSR (silent sustained reading):* Children sit quietly and read to themselves.

e. Teacher-managed group writing: The teacher is at blackboard/easel, working with children on a group writing activity. Children may offer the content of the written piece, but the teacher puts the ideas into complete sentences, with appropriate punctuation, and so on.

f. Writing instruction: The teacher tells the children how to do things that will help them to become independent writers, such as how to engage in advanced organizing (e.g., webbing, outlining), how to move from outline to written product, and how to proofread and edit. This also includes instruction in the different forms of writing (expository vs. demonstration, etc.).

g. Teacher model writing: The teacher, without input from the children, stands at the blackboard/easel and produces some sort of written product (depending on the level of the students, it could be as small as a sentence). The intent of the writing must be to model the act of writing and an appropriate product.

h. Student group writing: The children are working in pairs or small groups to produce a written product (such as a story). Not all of the children will actually be doing the writing but should be engaged in discussions about what will be written.

i. Student independent writing: Children are quietly writing a story, poem, or journal entry by themselves.

j. Spelling: Children are taking a spelling test or copying or practicing spelling words.

k. Discussion: Children are reviewing a storyline from a book that the teacher has been reading aloud (just prior to the teacher continuing with her reading) or are previewing a book the teacher is about to read.

l. Reading comprehension activity: Children are completing worksheets related to material they have read, or they are writing in response to something they have read. There is no substantial teacher involvement.

m. Reading comprehension strategies: Children respond to questions about material that the teacher is reading to them presently, such as who might be the main character or what just happened. Teacher is explaining or encouraging the students to use strategies such as inferring, predicting, summarizing, and other comprehension strategies. This code includes teacher scaffolding of these skills. (Note that in previous versions, this code was labeled *listening comprehension*).
n. Alphabet activity: Children are engaged in work that focuses their attention on a particular letter of the alphabet. For example, they might have to make a letter out of clay, color a paper that shows a particular letter and items that begin with that letter, or put their body in the shape of a letter. This also includes dictionary and other activities where students are specifically focused on letters by, for example, alphabetizing words (see the example in Appendix B).
o. Letter sight/sound: Children are engaged in activities that focus their attention on the relationship between written form of *individual* letters and the sound those letters represent. Included here are activities such as "signs for sounds" wherein the teacher orally produces a single letter sound and the children circle the letter (from an array of letters on a prepared paper) that represents that sound. This subactivity must combine the written form and oral sounds that represent the written form. If no written form is used, then the activity is more appropriately coded as initial consonant stripping or word segmentation.
p. Initial consonant stripping: Children are identifying the beginning (initial) consonant sound of words, aurally and not visually. If the activity is visual and aural, then code the activity as letter sight/sound. In addition, if the initial sound is a vowel and only orally presented, then code the activity as word segmentation.
q. Word segmentation: Children are engaged in activities wherein they break words into subcomponents (syllables, subsyllables, or phonemes), orally, or they are charged with constructing whole words from orally presented word segments. Included here are activities such as learning word families (children are presented with a rime and must find onsets that make real words; this is often an oral/written activity, but the initial response is oral). For an activity to be coded as word segmentation rather than letter sight/sound, the intent of the activity should be at the word level and not the letter level. This would include, for example, identifying homophones or the roots of words (nature, natural, naturalist).
r. Vocabulary: The teacher and children are discussing the meaning of a word or a phrase. In Appendix B, the observer wrote "Teacher asks if there were any words students didn't know…T writes them on the board. … Asks if anyone knows what these words mean." which was subsequently coded as *vocabulary.*
s. Conventions of text: The children are engaged in activities focused on grammar or punctuation. Included here are activities such as "Daily Oral Language" wherein children have to correct the errors in a sentence that the teacher has written on the blackboard.

APPENDIX B
Experts From Classroom Observation Field Narrative

Time	*Activity*	*Teacher Behavior*	*Student Behavior*	*Materials*
Date: 5/15/1998	School: D	Grade: 2nd	Teacher: Good (pseudonym)	Observer: Megan
10:12	LA sustained silent reading		Reading at desks	
10:35	NI transition	Directs children to clear desks		
10:39	Orient Organize	*When you get your LA books, turn to page 121.* Calls two children to pass out books. Tells children to stand up and they will pantomime running into water. Now pretend you are diving into waves … now looking for stones … now skipping stones … building a sand castle	Kids pantomime	
10:40		Tells them to sit, look at page 121	Sit, look at book	
10:41		What do you see in picture?	Kids tell what they see in picture	
10:42 (7–10 sec)		Calls on child to read directions (10 sec)	Child reads directions	
10:42	LA teacher read aloud	Teacher reads the story aloud	Listen	
10:44	LA vocabulary	Teacher asks if there were any words students didn't know … Teacher writes them on the board … Asks if anyone knows what these words mean	Children tell words, other children tell what words mean	
10:47	LA student read aloud	Tells child to read about dictionary in textbook	Child reads aloud in book—it is telling about dictionary uses	
10:49	LA alphabet activity	Quizzes child … what letter after P, what letter after U, etc.		
10:50	Orient organize	You will do exercise—list words in ABC order; reminds child how to do ABC order when first letter is the same	Listen	

10:51	LA alphabet activity	Quizzes children calls on individuals *Are plant, sand and water in ABC order? Are __, __ and __ in ABC order? For many children*	Answer when called	
1:14	Orient/Organize			
1:15	LA discussion	Introduces new book called *Mandy* by Julie Edwards (aka Julie Andrews—also wrote *The Last of the Really Great Wangdoodles*)		*Mandy* by Julie Edwards
1:17	LA teacher read aloud	Reads *Mandy*	Listen to story (at their desks)	

Date: 5/4/1998 School: K.L. Grade: 1st Teacher: Samuels(pseudonym) Observer: Elizabeth

1:09	LA letter sight/sound and word segmentation	*Okay, circle the /r/ on the next line, /r/.*	
		What letter, r or m.	Children say 'r'
		Writes these on the board	
		Good, so we have r-i-d	
		Circles the "id"	
		We have rid. Write rid on your paper.	Children write
		Repeats with /k/	
		/k/ 't' or 'k'	Children say 'k'
		k-i-d to 'kid'	
		Repeats whole thing with /h/ to 'hid'	

Note. The term *children* refers to students. Verbatim quotes are in italics. Letters between // are pronounced as their sound. LA = language arts.