The Relation Between the Type and Amount of Instruction and Growth in Children's Reading Competencies

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A latent growth model was used to investigate the longer term efficacy of phonics and integrated language arts instruction as well as amount of such instruction on children's reading development, using the nationally representative Early Childhood Longitudinal Study data set (kindergarten through fifth grade). Type and amount of instruction were derived from teachers' ratings. Children's entry-level skills and ethnicity were predictors of children's reading scores at the end of kindergarten. Ethnicity and parents' education level predicted rate of growth. Type and amount of reading instruction predicted children's reading scores. However, effects for type of instruction were time-sensitive, occurring only in kindergarten and first grade. Although children benefit from instruction in decoding and comprehension skills, instruction may not be optimally tailored to children most at risk.

KEYWORDS: achievement, at-risk students, child development, instructional practices, literacy

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Despite the emphasis given by schools to children's reading development, a third of the fourth graders in the United States did not demonstrate basic reading skills on the 2007 National Assessment of Educational Progress (Lee, Grigg, & Donahue, 2007). Children from low-income or African American and Hispanic American backgrounds earned lower scores on these assessments than their middle-income or European American counterparts, although the gap has decreased slightly in recent years.

The first few years of elementary school are considered by many to be the most important for modifying the trajectory of children's reading development (see Pianta, Belsky, Vandergrift, Houts, & Morrison, 2008). Children who do not become competent readers during the first few years of school often will have difficulty in subsequent years (Torgesen & Burgess, 1998). For example, Juel (1988), in a longitudinal study of 54 low-income children, found a .88 probability that a child who was a poor reader at the end of first grade would remain such at the end of fourth grade. Similarly, Pianta et al. (2008) found that most of the change in reading trajectory in their longitudinal sample of children from 54 months to fifth grade took place by first grade with almost none taking place after third grade. Francis, Shaywitz, Stuebing, Shaywitz, and Fletcher (1996) found that 74% of children in the Connecticut Longitudinal Study who were poor readers in fourth grade continued to be poor readers in ninth grade.

Although many studies find that the gap between poor and better readers in first grade is maintained in later years, not all do. For example, longitudinal research by Parrila, Aunola, Leskinen, Nurmi, and Kirby (2005) with elementary school students in Canada and Finland and by Phillips, Norris, Osmond, and Maynard (2002) with such students in Canada found that individual differences between students' reading abilities decreased over time. Such findings highlight the importance of investigating classroom instructional practices.

This article investigates the relation between normative classroom instructional practices and children's reading competencies from kindergarten through fifth grade. We compare two instructional approaches, one emphasizing phonics and one emphasizing meaning (called *integrated language arts approach*). Although our primary questions of interest focus on the type and amount of classroom instruction, the experiences children have at home prior to school entry and afterwards also predict their literacy skills (Morrison, Connor, & Bachman, 2006). Accordingly, optimal understanding of the efficacy of instructional practices should include some consideration of relevant home-based factors. Therefore, we also consider the reading skills children exhibit at the start of kindergarten as well as various demographic factors (e.g., income, ethnicity, parent's education) known to be related to children's reading development (Kaplan & Walpole, 2005; Serpell, Baker, & Sonnenschein, 2005). In addition, we consider teachers'

background characteristics because these can correlate with their instructional approaches and, therefore, children's reading development.

The data reported in this article come from the Early Childhood Longitudinal Study–Kindergarten cohort (ECLS-K), a nationally representative longitudinal study of over 17,000 children who were in kindergarten in the United States in fall 1998 (Tourangeau, Nord, Pollack, & Atkins-Burnett, 2006). Data are available from when the children were in kindergarten, first, third, and fifth grade. In addition to child assessments at each time point, data are available from children's parents and teachers.

In what follows, we summarize research showing the importance of children's home environment, types of instruction, time spent on task, and teachers' background for children's reading development. We begin our literature review with a brief synopsis of theories of reading development.

Reading Development

Reading involves appropriating meaning from printed matter. It requires decoding as well as comprehension skills and, according to many, also involves other cognitive, motivational, and sociocultural factors. The interrelation between these components, a subject of some debate, is relevant for understanding the development of children's reading competencies and has pedagogical implications. Although formal instruction in reading does not begin until kindergarten or first grade, children develop early literacy skills prior to the start of formal schooling through engaging and seeing others engage with print, talking with others, listening to and telling stories, and other similar activities. Through these interactions, children develop phonological awareness, knowledge of what print is and how it is used, knowledge of story structure, and an interest in reading (Snow, Burns, & Griffin, 1998).

Theories of reading development have included stage theories of acquisition (Chall, 1983; Ehri & Roberts, 2006), simple models that view reading as the interaction between decoding and listening comprehension (Gough & Tunmer, 1986), inside-out versus outside-in theories that distinguish between code-related skills and meaning-related skills (Whitehurst & Lonigan, 1998), and so on. These theories agree that reading consists of components that follow developmental patterns of acquisition. Most of the theories stress the importance of early literacy skills for subsequent reading development. However, the theories differ in conceptualizations of the nature of the interrelations between factors. For example, Gough and Tunmer (1986) argued that decoding skills drive reading comprehension skills, whereas others believe the relation between these skills is not necessarily a linear or monotonic relation (Hoffman, 2008; Paris & Hamilton, 2008) but may vary across contexts and development. Other theorists discuss the relation between vocabulary and the development of both decoding and

comprehension skills (Biermiller, 2006). And others depict bidirectional relations between language development and components of reading (Storch & Whitehurst, 2002).

Although a detailed comparison of the various theories is beyond the scope of this article, there are pertinent instructional implications. For example, although all theories would agree on the importance of acquiring phonics skills, they would disagree on how much emphasis should be given to other factors. Before considering instructional issues, however, we briefly summarize research showing group-related differences in children's reading competencies when they enter school and in later years. Such differences may be relevant for understanding the role instruction should play.

Income and Sociocultural-Related Differences in Children's Reading Competencies

There is a large body of research documenting ethnic- and income-related differences in children's early reading skills and subsequent reading development (Britto, Fuligni, & Brooks-Gunn, 2006; Denton & West, 2002; Snow et al., 1998; West, Denton, & Reaney, 2001). Children from low-income families and ethnic minority backgrounds are generally less likely to have experiences at home consistent with those expected by their teachers and therefore are less likely to arrive at school with the necessary competencies (Chatterji, 2006; Dearing, Kreider, Simpkins, & Weiss, 2006; McCoach, O'Connell, Reis, & Levitt, 2006, Serpell et al., 2005). These children may have less exposure at home and in their neighborhoods to printed matter, less frequent verbal interactions with adults, and less observation of people who model positive engagement with print (Neuman, 2006). Thus, these children may arrive at school with less knowledge about reading and less interest in becoming a reader (Snow et al., 1998). The children typically continue to struggle and lag behind their middle-income peers as they proceed through school.

Kaplan and Walpole (2005) considered the relation between income and growth in children's reading competencies from kindergarten through first grade using data from the ECLS-K cohort. Children's reading competencies were assessed at the beginning and end of kindergarten and first grade. Reading competencies were categorized into five stages: alphabet knowledge, early phonological processing (distinguishing initial phonemes), advanced phonological processing (distinguishing final phonemes), recognizing common sight words, and recognizing words in context. Children who came from families living below the poverty line were less likely to make transitions to higher reading levels than their nonpoor counterparts. However, poor children who entered kindergarten with at least early phonological processing skills showed progress similar to their nonpoor counterparts. More poor children entered kindergarten displaying only low

alphabet knowledge; they then were less likely to transition successfully through the five levels.

One implication of Kaplan and Walpole's (2005) findings is that instructional emphasis needs to be geared to the competencies displayed by the child. Children growing up in low-income families are more likely to need instruction aimed at helping them acquire phonological and decoding skills (Serpell et al., 2005). Foorman and her colleagues (e.g., Forman, Francis, Fletcher, Schatschneider, & Mehta, 1998) have stressed that the type of instruction is particularly important for children entering school with limited prior literacy experiences. Such children need to receive instruction that addresses the alphabetic principle, that is, helps them understand the relation between letters and sounds. Children with limited literacy-relevant experiences may be more sensitive to or in need of such instruction than children entering with a greater foundation of prior experiences.

Instructional Emphases in Reading

Although some children may become good readers in any environment, many become such only if they receive good quality instruction (Slavin, 1998). How best to teach children to read has been a matter of long-standing debate among those advocating a phonics approach and those advocating a more meaning-oriented approach (Adams, 1990; Chall, 1983; Stahl, McKenna, & Pagnucco, 1994). Thus, the crux of the debate is not so much the nature and interrelation of reading components but, rather, the focus of instruction. Advocates of what is known as the *phonics* approach view learning to read as a bottom-up process. Children need to be directly taught phonics. Instructional emphasis is placed on phonics because phonics predicts word recognition skills, which, in turn, are necessary for comprehension (e.g., Gough & Tunmer, 1986). In contrast, advocates of the *meaning* approach (referred to as *integrated language arts* in this study) emphasize the need to immerse children in authentic reading and writing tasks (Goodman & Goodman, 2008). Children are active participants in constructing their own knowledge. Reading involves constructing meaning from text. Although children can receive guidance in phonics as part of an attempt to understand material, phonics should not be taught in isolation. Some have noted that using authentic texts may increase a child's engagement in reading (Stahl et al., 1994). This approach may facilitate children's concept of print knowledge and therefore be more beneficial for younger than older children (Stahl et al., 1994).

Although many teachers report using a combination of approaches (Pressley, Rankin, & Yokoi, 1996), there have been relatively few, if any, studies that have directly compared the efficacy of the two general approaches using a longitudinal data set. Such comparisons would allow

one to determine the relative efficacy of the two approaches for different groups of children across grades.

Research reviewed by the National Reading Panel (National Institute of Child Health and Human Development [NICHD], 2000) and the National Reading Council (Snow et al., 1998) expands upon debates about phonics versus meaning by showing the importance of children receiving reading instruction in five core areas: phonemic awareness, phonics, vocabulary, fluency, and comprehension. The exact nature of the instruction for different groups of children, however, is not fully specified. Note that many, but not all, children acquire basic competence in phonemic awareness at home through everyday activities. Phonemic awareness, understanding the relation between letters and sounds, is considered a prerequisite for mastering the alphabetic principle, which, in turn, underlies learning to decode. The study by Juel (1988), mentioned in a prior section, showed that children who left kindergarten with poor phonemic awareness skills displayed poor decoding skills in first grade and again at the end of fourth grade.

That the development of certain reading-related competencies may precede the development of others has implications for instruction in reading. The National Reading Panel concluded that instruction in phonemic awareness was beneficial to children of all ages and backgrounds but particularly beneficial for preschoolers and kindergartners. The main issue to consider in determining the impact of instruction on phonemic awareness is the child's initial skill. More instructional time needs to be spent with a young child who displays more limited phonemic awareness skills. Similar to the age effect found for instruction in phonemic awareness, instruction in phonics, according to the review by the National Reading Panel, was more effective when introduced in kindergarten or first grade than later.

Much of the debate on instruction since the release of the National Reading Panel report has focused on how best to teach phonics (Stuebing, Barth, Cirino, Francis, & Fletcher, 2008). In part, this reflects a continuation of the historical debate about whether explicit instruction in phonics is needed or whether children can infer rules of phonics through an instructional approach that focuses on meaning of text (Xue & Meisels, 2004). More recently, however, researchers have stressed the need to consider combinations of different types of instruction and interactions between instructional practices and a child's skills. As suggested by Morrison et al. (2006), "It is important to consider the type and amount of instruction children receive and child by instruction interactions" (p. 387; see also Foorman, 2007; Morrison & Connor, 2002).

Juel and Minden-Cupp (2000) showed the importance of phonics instruction for children with limited reading skills in their investigation of instructional practices in four first-grade classrooms. Of those children who scored below grade level at the start of the school year, the only

children who displayed grade-level skills at the end of the year were those who received significant amounts of phonics instruction.

Xue and Meisels (2004) investigated the relation between phonics and what they called integrated language arts, a focus on vocabulary and meaning of the text, and kindergartners' growth in reading using kindergarten data from the ECLS-K cohort. In contrast to Juel and Minden-Cupp's (2000) findings, Xue and Meisels found that children with limited skills at the beginning of kindergarten were not *more* sensitive to certain forms of instruction but *benefited less* from certain forms of instruction. There was a positive relation between growth in kindergarten and phonics instruction. However, children with more limited initial literacy competencies did not benefit as much from the integrated language arts approach as those with higher initial literacy competencies. Although Xue and Meisel endorsed the importance of children receiving phonics-oriented *and* meaning-oriented instruction, they concluded that the individual child's skills might interact with the efficacy of a focus on meaning. They noted the need to investigate these instructional approaches beyond kindergarten to determine whether their efficacy changed across grade.

Research by Morrison, Connor, and their associates also emphasizes the need to consider interactions between children's skills and the type of instruction (Morrison et al., 2006). They have investigated the relative efficacy of code- (phonics) and meaning-focused instruction, whether instruction is teacher- or child-directed, explicit or implicit, and changes in instruction throughout the school year. There was a negative relation between children's decoding skills at the start of the school year and an explicit teacher-managed focus on decoding. First graders with weaker decoding skills at the start of the school year generally benefited more from such a focus (Connor, Morrison, & Katch, 2004). Children with higher decoding skills benefited more from a child-initiated focus. Children with below average vocabulary skills at the start of the school year benefited more when they received teacher-managed decoding instruction with increasing amounts of child-initiated, meaning-focused instruction added as the year progressed (see also Connor, Morrison, Fishman, Schatschneider, & Underwood, 2007). Third graders whose initial reading comprehension scores were low showed more growth with teacher-managed explicit instruction than third graders with higher initial scores who showed more improvement with child-managed reading activities (where the instruction was more implicit) (Connor, Morrison, & Petrella, 2004).

Summarizing across this brief review of studies suggests that there is an interaction between instructional practices and children's skill levels. However, there is a need for additional longitudinal research considering the relative strength of phonics and meaning-focused instruction for children with different entry skills. As noted by Pianta et al. (2008), there is a need for more large-scale research studies to document children's reading trajectories through elementary school. Of particular interest is whether children's

reading trajectories are equally susceptible to change across elementary school or whether the effect is more time-sensitive.

This study considers the longer term efficacy of the two instructional approaches, phonics and integrated language arts, discussed by Xue and Meisels (2004). Whereas they limited their study to growth in reading skills from the beginning to the end of kindergarten, we considered growth throughout elementary school.

Amount of Time Spent in Instructional Activities

For a program to be effective, it must be of sufficient intensity (Rangel, 2007); however, the amount of reading instruction that can be considered sufficient has not yet been firmly established. Converging evidence from several sources shows the relation between time spent in school engaged in reading activities and student learning. Two studies using scores from kindergartners in the ECLS-K data set found a positive but weak relation between time spent engaged in reading and growth in children's reading scores (Guarino, Hamilton, Lockwood, & Rathbun, 2006; Xue & Meisels, 2004). Downer and Pianta (2006), using data from the NICHD Study of Early Child Care, showed that after controlling for early home factors and child care factors, time spent in first grade on literacy and language was positively associated with concurrent reading achievement scores. This study includes amount of reading instruction as a predictor of children's reading competencies.

Teachers' Background

The important role played by a child's teacher is well known and is reflected in the No Child Left Behind (NCLB) requirement of having qualified teachers in the classroom (NCLB, PL 107-110; Darling-Hammond, 2000). However, despite what intuitively seems like a logical relation between teachers' knowledge (indexed by educational level and courses taken) and student learning, many studies have failed to find such a relation. For example, Xue and Meisels (2004) found no relation between selected characteristics of teachers (number of courses in reading, early and elementary education, and child development; educational level; and years experience teaching) and children's reading scores. On the other hand, Guarino et al. (2006) found that kindergarten teachers who self-reported taking courses in methods of teaching reading reported spending more time engaged in phonics instruction and other methods generally thought to predict student achievement, which, in turn, predicted growth from fall to spring in this cohort of kindergarten children.

It may be that the impact of teachers' background on children's reading development is indirect. That is, a teacher's background may predict the type of content she or he emphasizes or the amount of time she or he has the

class spend on tasks that, in turn, will predict children's development. Most investigators have considered only direct effects between teachers' background and children's learning.

In this article, we consider the number of reading courses teachers have taken and their years of teaching experience. Both metrics are consistent with qualifications cited by NCLB as indices of teacher knowledge. In keeping with the findings of Guarino et al. (2006), we hypothesized that teacher background factors would act indirectly on student achievement through instructional practices (see also Morrison et al., 2006). That is, we expected teachers' background would be related to instructional practices and time spent in reading activities, both of which would predict reading achievement.

The Present Study

This article investigated the relation between classroom instructional practices and children's reading skills from kindergarten through fifth grade using a longitudinal, nationally representative data set, the ECLS-K cohort. After considering the reading skills children exhibit at the start of kindergarten and various demographic factors (e.g., income, ethnicity, parent's education), we asked the following questions: What additional variance in children's reading competencies is accounted for by instruction that focuses on phonics versus the meaning of the text (an integrated language arts approach)? Do children's skill levels moderate the relation between instruction and growth? What unique variance is explained by the amount of reading instruction?

Of secondary interest is the relation between teachers' educational background (number of years of teaching experience, number of reading methods courses taken), and their reported instructional practices. We expected teacher's background would indirectly predict growth through the emphasis given to the type or amount of reading instruction.

We adapted Xue and Meisels's (2004) categorization of instructional emphases into what they called phonics and integrated language arts approach. The *phonics* category included attention to phonemic awareness, phonics, and decoding skills. The *integrated language arts* category included a focus on comprehension and on activities thought to increase students' motivation or interest in the task. Time on task was based on teachers' ratings of the frequency with which activities occur in the classroom.

Method

Participants

Participants were selected from those children in the ECLS-K cohort, a nationally representative data set of children who were in kindergarten

in 1998 in the United States. Of the 17,565 students who were part of the initial ECLS-K cohort, we examined the panel of 10,673 students who were followed through fifth grade and had estimates of reading ability at all five time points of interest to us—fall and spring of kindergarten, first, third, and fifth grades. We further limited the sample to public school students who were in kindergarten for the first time and who were not in year-round schools, resulting in a sample of 6,381 students. We limited the sample to students in public school because the student and teacher populations as well as classroom characteristics may be different in private schools.

Information about children's ethnicity and parents' education level and income came from telephone interviews with the parents, typically the mothers, during the fall of kindergarten. The majority of children in our sample were White, non-Hispanic[1] (61%). Seventeen percent were African American, 16% were Hispanic, and 2% were Asian. The remaining children were reported to be of two or more racial/ethnic backgrounds or of a background not included in the four categories listed above. The sample was approximately evenly divided between boys and girls. Most of the children (93%) came from English-speaking households. The variable, male, was coded 1 for males and 0 for females; LEP (limited English proficiency) was coded 1 for LEP and 0 for non-LEP; and race/ethnicity categories were dummy coded with White, non-Hispanic serving as the referent category.

Parents' education level, assessed when children in the data set were in kindergarten, was based on the highest amount of education reported for either parent. Values ranged from 1 to 9: a value of 1 reflected *8th grade or below* and 2 reflected *9th through 12th (without HS diploma)*; while at the other end, 8 reflected *master's degree* and 9 *doctorate or professional degree.* Mean education was 4.90 (*SD* = 1.80) and can be interpreted as "some college" (4 = *Voc/Tech program*, 5 = *some college*, and 6 = *bachelor's degree*).

The mean income reported by families was $47,778 (*SD* = $45,510). This information came from responses to the question asked in kindergarten, "What was the total income of all persons in your household over the past year, including salaries or other earnings, interest, retirement, and so on for all household members?"

Measures

Instructional approaches. Measures of the two instructional approaches, phonics and integrated language arts, were based on ratings made by the focal children's teachers, collected during the spring of the year the children were in that grade, of how often their class spent time engaged in various language arts activities. We therefore have measures of instructional focus for each child during kindergarten, first, third, and fifth grades (however, ratings on phonics items were only assessed at the first two grade levels).

Table 1
Wording of Items Used in the Phonics Scale Score—Kindergarten and First Grade

Question
Set A: How often do children in this class work on each of the following reading and language arts activities?[a]
1. Work on learning the names of the letters
2. Practice writing the letters of the alphabet
3. Work on phonics
Set B: For this school year as a whole, please indicate how often each of the following reading and language arts skills is taught in your class(es).[b]
4. Conventions of print (left to right orientation, book holding)
5. Alphabet and letter recognition
6. Matching letters to sounds
7. Writing own name (first and last)
8. Rhyming words and word families
9. Reading multi-syllable words, like adventure
10. Alphabetize
11. Reading aloud fluently

[a]Set A response options: *never, once a month or less, two or three times a month, once or twice a week, three or four times a week, daily.*
[b]Set B response options: *taught at a higher grade level, children should already know, once a month or less, 2–3 times a month, 1–2 times a week, 3–4 times a week, daily.*

Consistent with the approach used by Xue and Meisels (2004) in their study of kindergartners, we grouped the rated activities into phonics and integrated language arts scales. We used the same variables used by Xue and Meisels with kindergartners and adapted the measures for use with the older children to reflect changing competencies of the students and emphases by the teachers as well as specific questions asked in the survey. For creation of scale values, any missing item responses by teachers were singly imputed with the expectation maximization algorithm (Graham & Hofer, 2000) within measurement occasion. If no item responses for a particular scale were available within a measurement occasion then scale values were treated as missing in the analysis.

The *phonics* scale was created as the average of responses to 11 items focusing on phonemic awareness, phonics, and decoding skills. The specific items are shown in Table 1. The same 11 items were used in the creation of the kindergarten and first-grade phonics scales, the only times these questions were asked of teachers. Teachers were asked about the frequency with which their class engaged in activities such as "work on learning the names of letters" using two types of questions: "How often do children in this class do each of the following Reading and Language Arts activities?"

Table 2
Wording of Items Used in the Integrated Language Scale Score—Kindergarten and First Grade

Question
Set A: How often do children in this class work on each of the following reading and language arts activities?[a]
1. Discuss new or difficult vocabulary
2. Dictate stories to a teacher, aide or volunteer
3. Listen to you read stories where they see the print (e.g. big books)
4. Retell stories
5. Read aloud
6. Write with encouragement to use invented spellings, if needed
7. Read books they have chosen for themselves
8. Compose and write stories or reports
9. Do an activity or project related to a book or story
10. Publish their own writing
11. Perform plays and skits
Set B: For this school year as a whole, please indicate how often each of the following reading and language arts skills is taught in your class(es).[b]
12. Identifying the main idea and parts of a story
13. Making predictions based on text
14. Using context cues for comprehension
15. Communicate ideas orally
16. Remembering and following directions that include a series of actions
17. Composing and writing stories with an understandable beginning, middle, and end
18. Vocabulary

[a]Set A response options: *never, once a month or less, two or three times a month, once or twice a week, three or four times a week, daily.*
[b]Set B response options: *taught at a higher grade level, children should already know, once a month or less, 2–3 times a month, 1–2 times a week, 3–4 times a week, daily.*

and "In this school year as a whole, please indicate how often each of the following Reading and Language Arts skills is taught in your class?" Regardless of the form of the question stem, the six response options were *never, once a month or less, two or three times a month, once or twice a week, three or four times a week*, and *daily*. Two other response options, *taught at a higher grade* and *children should already know*, were recoded for this study as *never*. Scale scores were created based on the standardized 11 items, with higher scores representing greater frequency of phonics-related activities. Cronbach's alpha estimates of internal consistency were .73 in kindergarten and .77 in first grade.

The *integrated language arts* scale was created as the average of responses to items asked about comprehension, fluency, and activities thought to increase students' motivation or interest in the task. In kindergarten and

Table 3
Wording of Items Used in the Integrated Language Scale Score—Third and Fifth Grade

Question
How often do children in this class work on each of the following reading and language arts activities?[a]
1. Discuss new or difficult vocabulary
2. Read aloud
3. Talk with each other about what they have read
4. Write about something they have read
5. Read books they have chosen for themselves
6. Do a group activity or project about what they have read
7. Discuss different interpretations of what they have read
8. Explain or support their understanding of what they have read

[a]Response options: *never or hardly ever, once or twice a month, once or twice a week, almost every day*.

first grade, the scores were the average of 18 items asked of teachers about the frequency of engagement in various activities, such as "How often do children in this class discuss new or difficult vocabulary?" The items asked of the kindergarten and first-grade teachers were identical (the specific items are presented in Table 2). In third and fifth grade, only 8 items were available to form an integrated language scale score (see Table 3). The six response options presented to teachers in kindergarten and first grade were *never, once a month or less, two or three times a month, once or twice a week, three or four times a week*, and *daily*. In third and fifth grade, four response options were presented to teachers: *never or hardly ever, once or twice a month, once or twice a week*, and *almost every day*. The items asked of the third and fifth grade teachers were identical. In both cases (kindergarten/first and third/fifth), scale scores were created using an average of the standardized item responses such that higher scores represented greater frequency of integrated language activities. Cronbach's alpha estimates of internal consistency were .86, .83, .70, and .74, respectively, for kindergarten, first, third, and fifth grades.

Amount of time spent in language arts instruction. Time spent engaged in reading and language arts was measured with the question, "How often and how much time do children in your class(es) usually work on lessons or projects in reading and language arts whether as a whole class, in small groups, or in individualized arrangements?" Response options were: *1–30 minutes a day*, *31–60 minutes a day*, *61–90 minutes a day*, *more than 90 minutes a day*, and *not applicable*. Not applicable responses were considered missing for this analysis; the other responses were coded 1 to 4,

respectively. Higher scores represented more time spent in the activity. The same question and response scale were used at each grade.

Teachers' background. We included two characteristics of teachers—the number of courses in reading methods they had taken and the number of years they had been teaching. Number of courses in reading methods was based on teachers' responses to the question, "How many college courses have you completed in methods of teaching reading?"

Teaching experience was measured as the number of years spent teaching. For the kindergarten and first-grade teachers, we summed responses to individual questions about the number of years teaching pre-K, kindergarten, first grade, second to fifth grade, and sixth grade and beyond. Third- and fifth-grade teachers were asked just one question about their number of years teaching (at any grade level).

Children's reading skill. Item response theory trait scores were used to represent children's reading assessment. These scores were derived based on responses to linked reading assessments at each grade level. The reading assessment emphasized reading mechanics in kindergarten and first grade and comprehension in third and fifth grade. More specifically, items in the assessment could be categorized into nine content areas. In order of ascending difficulty, they are as follows: identifying uppercase and lowercase letters, associating letters with sounds at the beginning of words, associating letters with sounds at the ends of words, recognizing common sight words, reading words in context, making literal inferences, identifying clues to make inferences, evaluating narrative text, and evaluating nonfiction text. The kindergarten and first-grade assessment targeted the first five content areas. The third-grade assessment targeted content areas four and five as well as six through eight. The fifth-grade assessment also included the ninth content.

Although the assessments targeted different abilities, they were created to allow performance across assessments to be linked. They therefore measure a single continuum of reading ability across kindergarten through fifth grade. The domains assessed and the specific items within a domain were based on consultation with experts in educational curricula. In the fall and spring of kindergarten, and spring of first, third, and fifth grades, these latent scores had estimated reliabilities of .91, .93, .96, .93, and .93, respectively (Tourgangeau et al., 2006).

The assessment was administered individually at each child's school by trained evaluators (Tourangeau et al., 2006). Each child was first given a 12–20 item routing test that was used to determine the appropriate difficulty level of the remainder of the test. Assessments were administered in the fall of kindergarten and again in the spring of kindergarten, first, third, and fifth grades. In our analyses, *entering ability* refers to the item response theory

Table 4
Unweighted Descriptive Statistics for Study Variables (*N* = 6,381)

Variable	*M*	*SD*	Skew	Kurtosis	% Missing
Child-level variables					
Fall ability	0.00	0.00	2.72	14.57	4.2
Parent education	5.05	1.86	0.24	–0.42	8.1
Income (in $10,000s)	5.28	4.99	4.93	48.86	0
Time-varying variables					
Int.Lang. K	0.00	0.52	–0.26	–0.20	5.6
Int.Lang. 1st	0.00	0.49	–0.51	0.77	18.1
Int.Lang. 3rd	0.00	0.57	–0.35	–0.09	23.9
Int.Lang. 5th	0.00	0.59	–0.55	0.71	7.7
Phonics K	0.00	0.52	–1.50	5.20	5.6
Phonics 1st	0.00	0.55	–0.32	–0.48	18.0
Time in reading K	2.63	0.93	0.01	–0.93	8.0
Time in reading 1st	3.52	0.68	–1.25	0.80	24.3
Time in reading 3rd	3.22	0.79	–0.65	–0.42	26.6
Time in reading 5th	2.87	0.81	–0.03	–0.93	10.3
Years teaching K	14.41	9.36	0.39	–0.61	9.4
Years teaching 1st	13.61	9.49	0.53	–0.67	18.5
Years teaching 3rd	15.49	10.33	0.27	–1.23	2.6
Years teaching 5th	14.57	10.28	0.51	–1.00	7.7
Reading courses K	3.43	1.79	0.26	–1.32	9.4
Reading courses 1st	3.85	1.85	–0.09	–1.47	24.8
Reading courses 3rd	3.55	1.84	0.19	–1.43	29.4
Reading courses 5th	3.43	1.79	0.29	–1.32	15.8
Outcomes: Spring reading scores					
Kindergarten	40.99	13.09	2.06	7.35	0
1st grade	72.74	21.30	0.61	0.24	0
3rd grade	119.67	24.20	–0.31	–0.35	0
5th grade	140.48	22.05	–0.58	0.02	0

Note. Integrated language (Int.Lang.) was the score derived from standardized ratings by teachers of frequency of engagement in activities focusing on meaning of text; phonics was the score derived from standardized ratings by teachers of frequency of engagement in activities focusing on phonics; time in reading was the rating of the amount of time teachers reported that class spent in reading activities; reading courses was the number of reading courses teachers took; years teaching was how many years teachers reported they had taught.

(IRT) reading score from the fall of kindergarten; the score was standardized across all kindergarteners' fall scores to have a mean = 0 and *SD* = 1.

Analysis Plan

All analyses (except the data provided in Tables 4 and 5 of descriptives of analysis variables) utilized the spring kindergarten to fifth-grade panel

Table 5
Unweighted Frequencies for Study Variables (*N* = 6,381)

Child-Level Variable	Level	Frequency	Percentage
Gender	Female	3,244	50.8
	Male	3,137	49.2
LEP (limited English proficiency) status	Non-LEP	5,741	90.0
	LEP	636	10.0
	Missing	4	0.0
Race/ethnicity	White, non-Hispanic	3,930	61.6
	Black, non-Hispanic	833	13.1
	Hispanic	906	14.2
	Asian	342	5.4
	Other (including multiracial)	366	5.7
	Missing	4	0.0

sampling weight. Additionally, in computing scale scores, single imputation using the expectation maximization algorithm was used to impute item-level missing data with SAS PROC MI (version 9.1). Scale-level or manifest variable missing data were accommodated by the use of full information maximum likelihood (FIML) within the latent growth models. FIML allows for use of all observations (unlike listwise deletion), and model parameters are estimated to maximize the likelihood of obtaining the observed data. Parameter estimation related to the missing components is not informed by the observations with the missing data.

Preliminary analyses of bivariate relations between study variables were conducted using SAS version 9.1, using linearized estimates of sampling variability (standard errors) to adjust for the dependencies among responses due to the multistage sampling design used in data collection.

The latent growth analysis was run in Mplus, version 5.1, using TYPE=COMPLEX with sample design weights as well as primary sampling unit (PSU) and stratum identifiers to adjust the standard errors and χ^2 statistics for the multistage sampling design. The (conceptual) growth model shown in Figure 1 was investigated. Specifically, the four spring reading IRT scores were modeled to be a function of an intercept and slope, with fall kindergarten variables (such as demographics and entering ability) predicting both intercept and slope. Additionally, time-varying covariates (related to instructional practices, teacher characteristics, and the interactions of these practices with entering child ability) were modeled to predict scores at each measurement occasion (above and beyond the general growth trajectory). Prior to estimating the full model with all predictors, the shape of the growth was determined using only the four IRT reading scores.

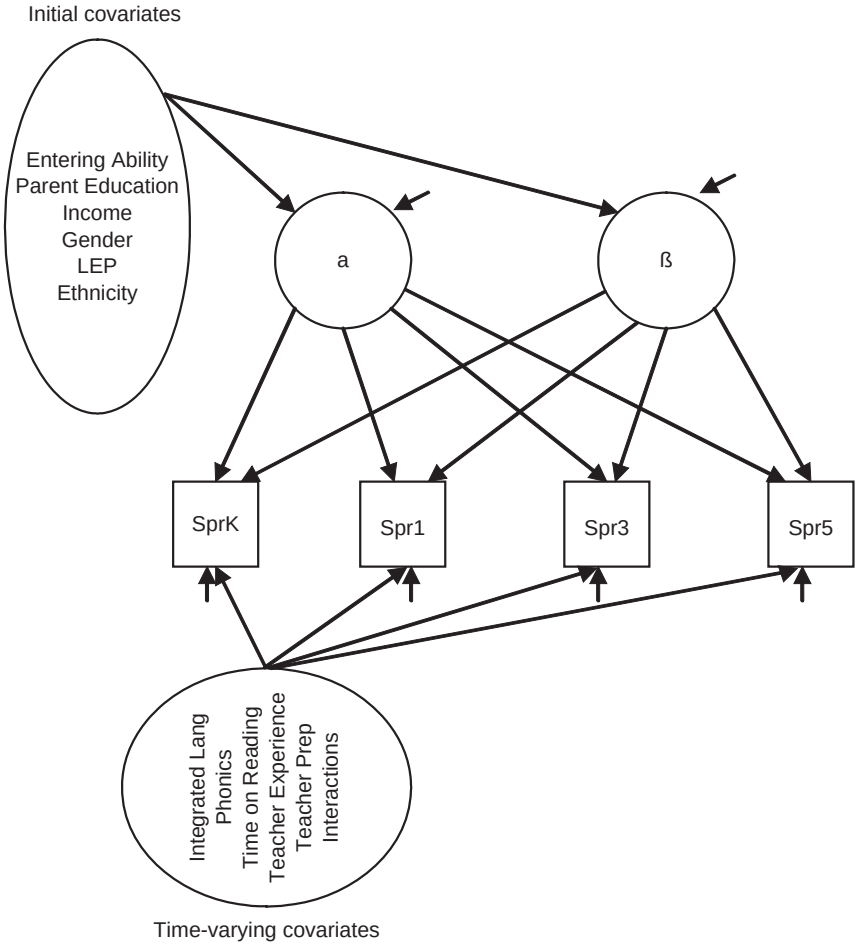

Figure 1. **Conceptual diagram of the overall latent growth model.**
Note. LEP = limited English proficiency; SprK = spring kindergarten; Spr1 = spring first grade, etc.

Specifically, two growth models were compared: linear and nonlinear with freely estimated growth slopes. After determining the model that best fit the growth shape, a third model was run with fall kindergarten predictors of the intercept and slope. This third model was trimmed to remove predictors with no unique relation to the outcomes. The fourth model built on the trimmed third model and contained additional time-varying covariates at each measurement occasion and, again, this fourth model was trimmed to

Table 6
Mean Amount of Time Spent in Reading (Standard Errors in Parentheses), by Grade and Teacher Background

	Kindergarten (n = 6,012)	First Grade (n = 5,337)	Third Grade (n = 5,182)	Fifth Grade (n = 5,981)
Overall	2.64 (.04)[a]	3.51 (.02)	3.21 (.03)	2.88 (.03)
Teacher years of experience				
≤3 years	2.60 (.09)	3.48 (.05)	3.08 (.07)[b]	2.83 (.06)
4 years+	2.65 (.04)	3.52 (.03)	3.24 (.03)[b]	2.88 (.03)
Teacher number of reading courses				
1–3	2.60 (.06)	3.47 (.04)	3.17 (.04)[c]	2.86 (.04)
4 or more	2.67 (.05)	3.54 (.04)	3.28 (.04)[c]	2.90 (.04)

Note. A value of 2 on the amount of time spent in reading instruction refers to 31–60 minutes; a value of 3 refers to 61–90 minutes.
[a]The kindergarten and fifth-grade means were significantly lower than the means for first and third grade (p = .05).
[b,c]Statistically different means (p = .05).

remove time-varying predictors with no unique relation to the outcomes (e.g., teacher background variables). Values of the predictors at each measurement occasion were centered. Fit of each model was evaluated in terms of the χ^2 test of exact fit as well as the Akaike information criterion (AIC), comparative fit index (CFI), square root mean of residual (SRMR), and root mean square error of approximation (RMSEA) fit indices. Hu and Bentler (1999) suggested that researchers consider several fit indices when determining the fit of their models, given that indices are sensitive to model complexity and sample size.

Results

The first part of the Results section presents descriptive data on how much time children reportedly spent in reading instruction. Also included in this section are estimates of the relations between the type and amount of reading instruction and characteristics of teachers. The second part presents data related to the hypothesized growth model for children's reading skills. Tables 4 and 5 show the unweighted descriptives of the analysis variables.

Amount and Type of Reading Instruction and Characteristics of Teachers

The mean amount of time spent engaged in reading activities is shown in Table 6. The amount of reported instruction was less in kindergarten and fifth grade than in first or third grade. Mean scores ranged from 2.64 to 3.51

Table 7
Fit Statistics and Indices for Series of Latent Growth Models

Model	χ^2	*df*	*p*	AIC	CFI	SRMR	RMSEA
1. Linear	2,692.9	6	<.001	219,371	.323	.501	.265
2. Nonlinear (freely estimated)	357.4	4	<.001	207,644	.911	.189	.118
3a. Nonlinear with predictors of intercept and slope	413.3	22	<.001	285,011	.939	.071	.053
3b. Nonlinear with trimmed predictors of intercept and slope	372.2	16	<.001	241,278	.943	.090	.059
4a. Nonlinear with trimmed predictors of intercept, slope, and occasion-level outcomes	679.6	104	<.001	711,345	.918	.026	.029
4b. Nonlinear with trimmed predictors of both intercept, slope, and occasion-level outcomes	621.7	88	<.001	475,616	.921	.030	.031

Note. 90% confidence interval of RMSEA ranged from approximately ±.01 to ±.002 across the models. AIC = Akaike information criterion; CFI = comparative fit index; SRMR = square root mean of residual; RMSEA = root mean square error of approximation.

(a value of 2 on the amount of time spent in reading instruction refers to 31–60 minutes and a value of 3 refers to 61–90 minutes).

The number of years teachers taught was not related to the amount of time that their classes reportedly engaged in reading activities, except in third grade, where "new" teachers (those with 3 or fewer years of experience) had a mean of 3.08 compared to the mean of 3.24 for more experienced teachers.

The number of reading courses taken by teachers was related to the frequency with which kindergarten and first-grade teachers reported their class engaged in phonics activities: kindergarten, $t(274) = 2.32$, $p < .021$; first grade, $t(273) = 4.07$, $p < .0001$. Similarly, the number of reading courses taken was related to the frequency of reported engagement in integrated language arts activities: kindergarten, $t(274) = 2.95$, $p < .004$; first grade, $t(273) = 7.21$, $p < .0001$; third grade, $t(269) = 5.11$, $p < .0001$; fifth grade, $t(296) = 2.87$, $p < .0043$. Teachers who reported emphasizing phonics instruction also emphasized integrated language arts instruction: kindergarten, $r(6,175) = .62$; first grade, $r(5,724) = .37$, $p < .001$.

Growth in Children's Reading Skills

The fit of the two latent growth models used to determine the shape of growth are shown in Table 7. The linear model clearly did not fit the data

well, given the extremely high χ^2 value and inappropriately low CFI and high SRMR and RMSEA values. The nonlinear model fit significantly better ($\Delta\chi^2 = 2{,}335.4$, $\Delta df = 2$) with a lower AIC value; however, the SRMR and RMSEA values are still somewhat of a concern. Estimates from this nonlinear model included slope loadings of 0, 1, 2.43, and 3.07 (the first two being fixed for identification). Given that the actual time points between kindergarten, first, third, and fifth grades reflect time differences of 1 year, 2 years, and 2 years, the slope estimates for the third- and fifth-grade measurements suggest that growth in reading skills slows, on average, between first and third grade and again between third and fifth grade (had growth been linear, the loadings would have been expected to be 0, 1, 3, and 5 instead of 0, 1, 2.43, and 3.07). On average, yearly growth between first and third grade was 70% of what it was from kindergarten to first grade. And yearly growth between third and fifth grade was about 30% of what it was between kindergarten and first grade. Other estimates of interest from Model 2 include the variance of the reading skills intercept (170.19), which was significantly different from zero ($z = 16.11$, $p < .001$), and the variance of the growth rate in reading skills (37.80), which again was significantly different from zero ($z = 18.32$, $p < .001$). These significant variances in intercept and slope indicate that there is variability in the reading ability of children in the spring of kindergarten and there is variability in the growth rate of children over the four years examined. Children's intercepts and slopes were not significantly correlated ($r = .04$, $z = 1.32$, $p > .05$) in Model 2. In Models 3 and 4, we attempt to explain the variability in intercept and slope by including predictors in the model.

In Model 3a, we used information from fall of the kindergarten year to predict where students would score in the spring of kindergarten and the rate at which they would grow. The fit of this model is displayed in Table 7. With the addition of the child characteristics (specifically, incoming fall reading ability, child race/ethnicity, child gender, child LEP status, parental education, and household income), variability in the intercept was estimated to be 39.08, indicating that approximately 77% of the variance was explained in the intercept by inclusion of the predictor variables (recall that the original variability estimate was 170.19 in Model 2). Also, the variance in growth rate decreased to 29.07, indicating that the child and parent characteristics explained 23% of the variability in growth rate. Gender, LEP status, and household income were not significant unique predictors of the intercept and the slope and were thus trimmed from the model. This trimmed model is termed Model 3b.

Finally, in Model 4a, time-varying predictors of the occasion-level residuals were added to the model (specifically, teacher years of experience, teacher number of reading courses taken, time spent in reading, focus on integrated language, and focus on phonics [in kindergarten and first grade only]). Additionally, cross-level interactions of child entering ability and

Table 8
Unstandardized and Standardized Regression Coefficients of the Intercept and Slope of the Final Growth Model (4b)

	Slope		Intercept	
	Unstandardized	Standardized	Unstandardized	Standardized
Entering ability	10.770*	.822*	–0.038	–.006
Parent education	0.198	.077	0.871*	.255*
African American	–1.578*	–.045*	–2.807*	–.172*
Hispanic	0.576	.016	–0.779*	–.046*
Asian	0.266	.012	–0.509	–.012
Other	0.902	.015	–1.289	–.044

*$p < .05$.

time spent in reading and focus on integrated language and phonics were included along with the occasion-level interaction of focus on integrated language and focus on phonics and the three-level interaction of entering ability and the two instructional foci. Neither the number years of teaching nor the number of reading courses taken were uniquely related to reading scores of children at any time point and thus these variables were removed from the model to result in the final trimmed model, 4b. The unstandardized and standardized path coefficients from this final model are provided in Tables 8 and 9. The general trajectory of growth did not change greatly with the addition of the predictors (loadings for the growth factor were 0, 1, 2.41, and 3.05 as compared to 0, 1, 2.43, and 3.07 from Model 2).

Significant predictors of a child's intercept included the entering (fall) reading skills score ($z = 36.02$, $p < .05$) and whether the child was African American compared to the White, non-Hispanic referent group ($z = –2.65$, $p < .05$). Descriptively, each standard deviation increase in the child's fall kindergarten assessment added 10.77 points to the spring kindergarten score (note that fall kindergarten ability had been standardized), and on average, African American children earned scores that were 1.6 points lower than White, non-Hispanic children on the spring kindergarten assessment.

In terms of prediction of the slope, parent's education level was positively related to the growth rate ($z = 8.69$, $p < .05$) whereas being African American or Hispanic was negatively related to the growth rate, (African American $z = –6.03$, $p < .05$; Hispanic $z = –2.27$, $p < .05$; see Table 9). For each unit of parental education, a child's growth rate increased by 0.87 points. The growth rate of African American children was 2.81 points less than that of White, non-Hispanic children. Similarly, the growth rate of Hispanic children was 0.78 points less than that of White, non-Hispanic children. To understand these differences, Figure 2 depicts the average score

Table 9

Unstandardized and Standardized Regression Coefficients for Each Measurement Occasion, for Each Time-Varying Covariate

	Spring Kindergarten		Spring First Grade		Spring Third Grade		Spring Fifth Grade	
	Unstandardized	Standardized	Unstandardized	Standardized	Unstandardized	Standardized	Unstandardized	Standardized
Integrated language	0.814	.034	1.347	.033	0.020	.000	0.765	.019
Phonics	0.996*	.038*	–0.923	–.026	—[a]	—	—	—
Time in reading	0.527*	.038*	0.048	.002	–0.425	–.014	0.597	.021
Ability × Integrated Language	1.049*	.044*	2.749*	.069*	0.228	.006	–0.002	–.003
Ability × Phonics	–1.105	–.049	–0.022	.001	—[a]	—	—	—
Ability × Time in Reading	–0.187	.014	2.422*	.068*	2.317*	.083*	–0.153*	–.062*
Integrated Language × Phonics	0.066	.002	–1.611	–.153	—[a]	—	—	—
Ability × Integrated Language × Phonics	–1.364	–.041	0.449	.011	—[a]	—	—	—

Note. Integrated language was the score derived from ratings by teachers of frequency of engagement in activities focusing on meaning of text; phonics was the score derived from ratings by teachers of frequency of engagement in activities focusing on phonics; time in reading was the amount of time teachers reported that class spent in reading activities; ability was the child's reading score on the most recent prior assessment.
[a]Ratings for phonics activities were done only in kindergarten and first grade.
*$p < .05$.

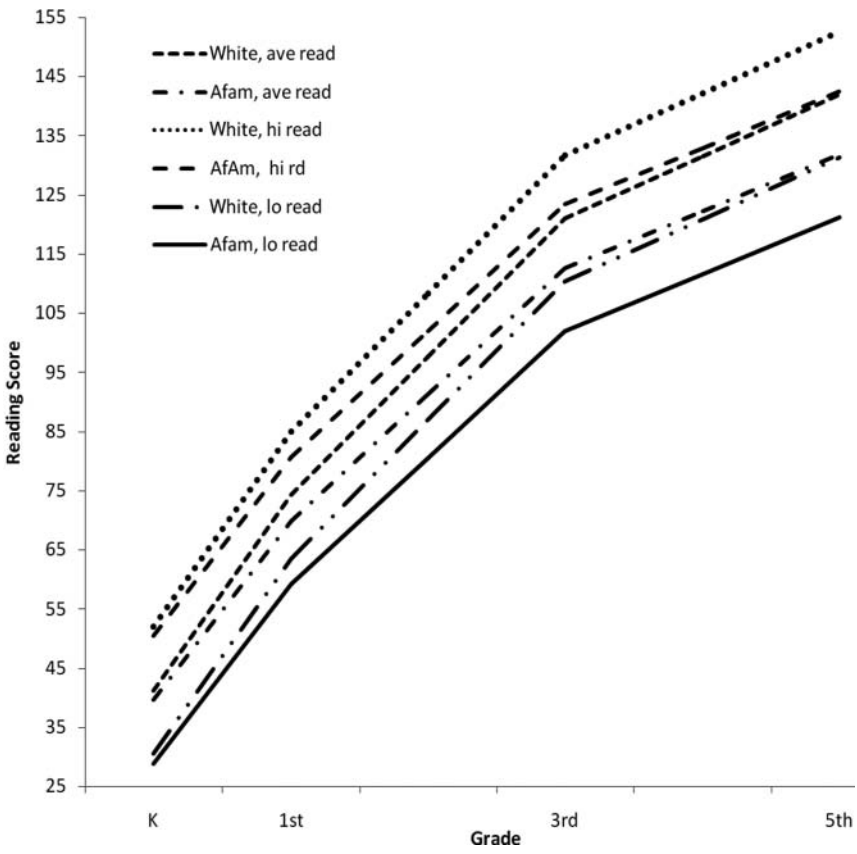

Figure 2. **Average reading scores at the end of kindergarten, first, third, and fifth grades for African American and White, non-Hispanic children whose scores at the start of kindergarten were at the mean, one *SD* below the mean, or one *SD* above the mean.**

trajectories across the spring of kindergarten, first, third, and fifth grades for African American and White, non-Hispanic children who started at the mean entering ability level, one standard deviation below it, or one standard deviation above it in the fall of kindergarten.

At the measurement occasion level, in kindergarten, the focus on phonics was positively related to a child's performance on the spring kindergarten assessment, controlling for the child's background characteristics and general growth rate ($z = 2.11$, $p < .05$). Each additional unit of phonics-related instruction was associated with an average increase in scores of 1.00 point. Time spent on reading also was significant ($z = 2.09$, $p < .05$).

Each increase in unit of time spent reading was associated with an average increase of 0.58 in the spring kindergarten score.

The interaction of ability and a focus on integrated language arts ($z = 2.33$, $p < .05$) also was a significant predictor of score. Children who started kindergarten with scores one standard deviation above the mean added 1.06 points to their spring scores for each unit of integrated language arts instruction they received. In first grade, interactions of the child's previous year's spring score with both a current classroom emphasis on integrated language arts and time spent reading were significant ($z = 3.19$, $p < .05$; and $z = 2.50$, $p < .05$, respectively). The interaction effects were positive, suggesting that children who entered with reading scores one standard deviation above the mean benefited from a classroom focus on integrated language arts (0.04 points per unit of instruction) and more time spent reading (0.04 points per unit of time).

In third grade, the positive interaction of time spent reading with the child's reading ability from the prior assessment remained ($z = 5.42$, $p < .05$), but no other predictors were significant. Consistent with findings in first grade, time spent reading was more beneficial (2.32 points per unit of time) for those children whose entry scores were one standard deviation above the mean.

In fifth grade, there was a negative interaction between the prior reading score and amount of reading instruction ($z = –8.87$, $p < .05$). In contrast to earlier grades, children with lower reading scores benefited more than those with higher scores from time spent reading in class. For example, children whose reading scores were one standard deviation below the mean at the end of third grade and spent one additional unit in time reading in class earned scores 0.15 points higher than children who spent the same time reading but scored at the mean at the end of third grade.

In sum, children's reading-related skills when they enter kindergarten and their demographic background predict their reading development as they go through elementary school. Children's reading skills at the start of kindergarten predicted their scores at the end of kindergarten. The standardized regression coefficient for fall entering ability on the intercept was .82, a large effect. Ethnicity (African American) negatively predicted children's reading scores at the end of kindergarten, although the standardized effect was small (.05). Parents' education was a moderate-sized predictor (standardized regression coefficient of .26) of growth in reading skills. Ethnicity (African American and Hispanic) also negatively predicted the rate of growth (–.17 and –.05, respectively). The amount of time spent engaged in reading activities and an emphasis on phonics during kindergarten each independently predicted children's scores after controlling for entry-level skills and other background characteristics. The effects were small (standardized regression coefficients .04 for each).

There also were several significant interactions. Children who entered kindergarten with higher reading scores benefited more than those with lower reading scores from a classroom focus on integrated language arts (standardized regression coefficient of .04). Similarly, children who entered first grade with higher reading scores benefited more than those with lower reading scores from a class room focus on integrated language arts (standardized regression coefficient of .07). A similar pattern of interactions occurred between children's scores at the start of first and third grade and the amount of time they spent reading in class. Children with higher scores at the start of the grade benefited more from time spent reading (standardized reading coefficients first grade: .07; third grade: .08). In fifth grade, the direction of the interaction was reversed so that children with lower scores at entry showed more benefit from more time spent reading (standardized regression coefficient: –.06).

Discussion

This study used data from a longitudinal, nationally representative data set, the ECLS-K, to consider the relation between the type and amount of reading instruction and growth in children's reading skills in elementary school. After accounting for children's literacy-related skills at the start of kindergarten as well as other, pertinent demographic factors, what additional variance in children's reading competencies was accounted for by instruction that focused on phonics versus integrated language arts? Did children's skill level moderate the relation between instruction and growth, as suggested by Morrison and colleagues (e.g., Morrison et al., 2006)? Such findings could have implications for improving the educational outcomes of those children traditionally most at risk for poor academic outcomes. Discussion of the findings begins with a section about the demographic predictors and then turns to the relation between type and amount of instruction and children's reading skills.

The Relation Between Children's Entry Skills, Demographic Factors, and Reading Outcomes

Much of the variance in children's growth in reading was predicted by factors that took place before children started elementary school and was outside the direct influence of elementary schools (see Figure 2). Children's reading-related skills at the start of kindergarten were strongly related to their reading scores at the end of kindergarten and beyond. In fact, children's reading-related skills at the start of kindergarten accounted for about 70% of the variance. Children who started kindergarten with lower average reading skills than their peers continued to earn lower scores, regardless of the amount or type of instruction.

Both parent's education and ethnicity were related to growth. Parent's education was moderately and positively related to rate of growth. African American children started kindergarten with more limited reading skills and continued to progress at a slower rate than White, non-Hispanic children. Even after accounting for children's reading skills at the start of kindergarten, African American ethnicity continued to affect the average rate of growth. African American children whose reading scores at the start of kindergarten were above the mean earned scores in fifth grade that, on average, were significantly below White, non-Hispanic peers who also started kindergarten with scores above the mean. Hispanic ethnicity also was negatively related to children's average rate of growth in reading.

Another way to consider the findings is that the average difference in scores between African American and White, non-Hispanic children in kindergarten increased over grades. The gap was fairly small in kindergarten but much larger in fifth grade (Figure 2).

The Relation of Schooling Factors to Children's Reading Development

After controlling for children's entry reading skills, parent education, and ethnicity, the type and amount of instruction children received contributed a small amount of additional explained variance. Although the variance explained by school-based instruction was fairly small, it is important to consider because modifying instructional practices may be easier to accomplish than changing demographic factors. Such modification is important if we are to succeed in improving the reading skills of those children most at-risk for school failure. Teachers' knowledge of methods of teaching reading, indexed by the number of reading methods courses taken, was related to the type of instruction that children received but not directly related to children's reading scores.

The findings from this study on normative classroom practices provide information about how children learn to read. Although children need to acquire phonics and comprehension skills in order to read (Storch & Whitehurst, 2002), they did not appear to learn phonics skills from the integrated language arts approach, a meaning-oriented form of instruction. Instead, children in kindergarten benefited from a direct instructional focus on phonics acquisition. An emphasis on integrated language arts activities was differentially related to children's reading scores. That is, there was a significant interaction between entry-level skills and integrated language arts instruction in the prediction of reading scores. Children who entered kindergarten and first grade with more advanced phonics skills benefited from an instructional emphasis on the meaning of the text.

It is also important to note that the benefit of the type of instruction was limited to kindergarten and first grade. An emphasis on phonics instruction predicted children's scores only in kindergarten. An emphasis on integrated

language arts activities predicted children's scores or, to be more accurate, higher scoring children's scores, only in kindergarten and first grade. Thus, children most at risk for reading difficulties, and therefore most in need of focused instruction, did not benefit as much as those with higher skills.

The amount of time spent in reading instruction predicted kindergarten children's end-of-the-year reading scores. However, in first and third grade, time spent reading interacted with children's entry reading skills in predicting scores. The benefit was greater for children whose skills were higher. The opposite pattern occurred in fifth grade.

These findings support the need to consider the type of instruction in relation to the children's skill levels, as suggested by Connor, Morrison, and others (e.g., Connor et al., 2004). Morrison and Connor (2002) stressed the need to give explicit instruction focused on decoding skills to weaker readers and less explicit (more implicit) means of instruction focusing on comprehension to those children with stronger decoding and vocabulary skills. Similarly, Foorman and her colleagues (e.g., Foorman et al., 1998) have stressed the need to tailor what is done in the classroom to the skills displayed by the children. In particular, they emphasized phonics instruction during the early years especially for children starting school with fairly limited experience with literacy. Such a focus with at-risk readers can remove some of the differences in competencies related to children's demographic background. Thus, although young children may need instruction in both decoding skills and comprehension, the exact balance between the two should vary depending upon the child's skills.

The current findings make one question how well the type of instruction offered by teachers matches the needs of their students. Only in kindergarten was there a main effect for instruction with phonics instruction predicting children's spring reading scores. The positive interaction between integrated language arts and children's entry reading scores meant that such instruction was more beneficial for children whose skills were more developed. The notion that instruction is not well tailored to children's actual skills is consistent with findings from Morrison and Connor (2002), who found that their first-grade teachers spent very little time offering explicit instruction in decoding skills. Most of the time was spent in what they called child-managed implicit forms of instruction such as silent reading.

Limitations

Although there are many benefits to being able to explore questions from a large, nationally representative data set such as the ECLS-K cohort, there are also some significant limitations. The data in this study are based on teachers' reports of the amount of time their class engaged in reading activities and the frequency with which certain reading activities occurred. As discussed in prior sections, the measure of amount of time was

categorical and fairly crude (1–30 minutes per day, 31–60 minutes, 61–90, and >90). In addition to problems with the metric, there are potential issues with self-report data. That is, teachers may overestimate or underestimate the amount of instructional activity. It is important for researchers to engage in more direct observations of classrooms and to do so for sufficiently long periods to get a representative sample of behavior. Unfortunately, the time involved in such observations probably will preclude collecting data from such a large number of children.

Even if teachers are accurate in their estimates of how much time is spent on task, the quality of the time spent engaged in activities was not addressed. A recent study by Justice, Mashburn, Hamre, and Pianta (2008) illustrates this issue. They investigated a language and literacy curriculum being implemented in 135 preschool classrooms. Although teachers accurately implemented the components of the curriculum, the quality of their instruction was fairly low. A similar point about the quality with which educational curricula are implemented was made by O'Donnell (2008) in a recent paper that addressed defining and measuring program fidelity. In terms of the current study, just because teachers report engaging in certain activities does not mean what they do is of high quality. Again, in-class observations would be beneficial to support the information reported by the teachers.

An important caveat when working with the ECLS data is that the obtained data are correlational in nature and not part of an experimental manipulation. Information about children's reading skills and teachers' reports of activities were collected at about the same time. It is possible that children's reading skills had an impact on what the teacher chose to teach or how much time was spent on instruction. It is also possible that the reverse was true—that the instructional type and time spent in teaching had an impact on reading skills. Without undertaking an experimental study, it is not possible to define the causal direction.

Conclusions and Implications

The findings from this study suggest that children's demographic background and early experiences contribute significant explanation of the variance in the reading skills they display in the spring of kindergarten and the rate of growth during elementary school. Children whose reading skills at the start of kindergarten were high were at an advantage as were children whose parents were more educated. African American children started school with lower reading-related skills and continued to progress at a slower rate than their White, non-Hispanic peers. The type of instruction and the amount of time spent reading contributed some additional variance in kindergarten, first, third, and fifth grades. Phonics instruction predicted children's scores at the end of kindergarten. Particularly noteworthy, however, is that the level of children's reading skills interacted with the type of

instruction (kindergarten, first grade) and amount of time spent (first, third, and fifth grades). Children whose reading skills were higher at the start of kindergarten showed more benefit from the integrated language arts approach.

The findings from this study suggest a need to consider the actual skills demonstrated by different children in kindergarten and elementary school and how well instruction is targeted to those skill levels. As noted by Morrison and Connor (2002), although teachers may emphasize both phonics and meaning in their instruction, given children's skill levels, the instruction may not be appropriate for some, or possibly many, of the children in their class. Although researchers have demonstrated the efficacy of instruction targeted to specific needs of children (e.g., Juel & Minden-Cupp, 2000), the ECLS-K data set affords researchers an opportunity to consider what is normative with a large, longitudinal, nationally representative data set.

Note

Portions of this article were presented at the meetings of the American Educational Research Association in New York City in March 2008. Requests for further information should be addressed to Susan Sonnenschein.

[1]We use the terms used in the Early Childhood Longitudinal Study–Kindergarten cohort (ECLS-K) data set.

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