

# Home Literacy Environments and Foundational Literacy Skills for Struggling and Nonstruggling Readers in Rural Early Elementary Schools

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Factors such as weak early literacy skills and living in poverty may put young students at risk for reading disabilities. While home literacy activities and access to literacy materials have been associated with positive reading outcomes for urban and suburban students, little is known about home literacy environments of rural early elementary school students living in poverty and their relationship to foundational reading skills for struggling and nonstruggling readers. This study examined how home literacy environments might relate to rural kindergarten and first grade students' reading performance. Parents of 1,108 kindergarten and first grade students in the rural Southeast completed questionnaires on the frequency of home literacy activities and access to literacy materials. Multilevel model analyses revealed that home literacy activities and access to literacy materials were positively related to basic word reading skills, passage comprehension, and spelling. Implications for families and educators are discussed.

## INTRODUCTION

Research has found that factors such as weak early literacy skills (Smith, Scott, Roberts, & Locke, 2008) and living in poverty may put young students at risk for reading disabilities (Blair & Scott, 2002). Good early reading instruction by the classroom teacher in early elementary school can be critical to helping many children learn how to read (Dickinson & Tabors, 2001; Dickson & Bursuck, 1999; Snow, Burns & Griffin, 1998; van den Broek & Espin, 2012), especially for children living in poverty (Vernon-Feagans, Gallagher, & Kainz, 2010). Although good reading instruction in the classroom is essential, another important influence on children's early literacy ability is their home literacy environments, which have been associated with children's emergent literacy skills and later reading achievement (Haager, Dimino, & Windmueller, 2006; Payne, Whitehurst, & Angell, 1994; Rashid, Morris, & Sevcik, 2005; Sénéchal & LeFevre, 2002). Whitehurst and Lonigan (1998) conceptualized foundational reading skills that affect children's later reading development as two domains: (1) *outside-in* skills associated with reading comprehension, such as language, vocabulary, content, and narrative understanding; and (2) *inside-out* skills focused on symbol/sound correspondences within words, such as word decoding, the alphabetic principle, and phonemic awareness. Children's home literacy environments have been found to influence both outside-in and inside-out language and literacy skills associated with later reading success (Skibbe, Justice, Zucker, & McGinty, 2008; Storch & Whitehurst, 2001; Washington, 2001).

## Poverty and Risk for Reading Disabilities

The largest group of children shown to struggle with outside-in and inside-out early reading skills is children who live in poverty (Foorman & Torgesen, 2001; Snow et al., 1998). Poverty has been investigated as a possible contributor to young children's early struggles with literacy skills (see Bhattacharya, 2010 for a review), as well as the development of learning disabilities (see Bigelow, 2006 for a review). Many children in poverty come to school with fewer emergent literacy experiences at home that often prevent them from profiting from traditional literacy instruction in school (Morrison, Bachman, & Connor, 2005). Poverty is the best predictor of children's academic performance in school, including literacy development (Cunningham, 2006; Duncan, Brooks-Gunn & Klebanov, 1994; Duncan, Yeung, Brooks-Gunn & Smith, 1998), and has been associated with weaker reading readiness in kindergarten and first grade (Ortiz et al., 2012). In fact, children living in poverty are 1.3–3.4 times more at risk for identification with a learning disability (Blair & Scott, 2002).

Intervention with readers as early as kindergarten and first grade can help set students at risk for a learning disability identification on a positive academic trajectory (Catts, Nielsen, Bridges, Liu, & Bontempo, 2015; Compton, Fuchs, Fuchs, & Bryant, 2006; Dion, Brodeur, Gosselin, & Campeua, 2010; McNamara, Scissons, & Gutknecht, 2011; McAlenney & Coyne, 2015; Smith et al., 2008; Speece et al., 2011; Vellutino, Scanlon, Zhang, & Schatschneider, 2008; Wanzek, Roberts, Al Otaiba, & Kent, 2014). Though some have suggested identification for special education should begin as early as kindergarten (Litty & Hatch, 2006), the early elementary school years are typically considered pre-identification, as practitioners seek to guard against the over-referral of relatively young children for special education

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evaluation (Dhuey & Lipscomb, 2010). Identification for special education related to learning and reading disabilities is typically delayed until the upper elementary grades (Lerner & Kline, 2006). However, to better inform prevention and remediation efforts, learning disability specialists should be aware of the early literacy experiences of at-risk students from the time they enter school.

While there has been a call for a stronger focus on the early literacy development of young children in low-resourced schools and those from low-income families (Apel & Diehm, 2013; Huang, Moon & Boren, 2014; Li, 2010), most studies of poverty and literacy have been conducted in urban and suburban areas of the United States (e.g., Baker & Scher, 2002; Burgess, Hecht, & Lonigan, 2002; Purcell-Gates, 1996; Sénéchal & LeFevre, 2002), even though rural children spend longer time living in poverty and experience deeper levels of poverty than children in more urban areas (O'Hare, 2009; Vernon-Feagans et al., 2010). Especially lacking is information about the home literacy environments of children in rural low-wealth homes and how home experiences may be related to their emerging literacy abilities in early elementary school. The present study examines children who live in a rural low-wealth area of the United States to understand the relationship between home literacy environments (tapping both early "outside-in" and "inside-out" literacy) and children's kindergarten and first grade literacy skills.

## Rural Context

Rural students, who account for approximately 20 percent of the school-age population in the United States (O'Hare, 2009), are situated in unique contexts that may lead to increased risk for reading difficulties as compared to their urban and suburban counterparts (Beaulieu, Israel, & Wimberly, 2003; Froiland, 2011). First, rural areas have become increasingly economically depressed due to out-migration of talented young adults as a result of economic restructuring and a lack of high-paying jobs and employment opportunities (Peaslee & Hahn, 2011; Vernon-Feagans, Burchinal, & Mokrova, 2015). The shift from an agrarian to an urban economy in rural locales has left parents facing longer commutes to nonlocal jobs or the need to access employment with nonstandard work hours and, often, low pay (Beaulieu et al., 2003; Vernon-Feagans et al., 2010). These factors are related to high levels of poverty in the rural United States, with 41 percent of the 9.6 million rural students in the United States living in poverty (Strange, Johnson, Showalter, & Klein, 2012). These developments may put rural students at risk for reading difficulties, as poverty is often a strong predictor of early reading achievement (Cunningham, 2006; Foorman & Torgesen, 2001; Lee & Burkham, 2002).

Second, due in large part to a lower economic base resulting from high poverty, rural communities often lack access to social supports and infrastructure such as child care and youth development programs (Peaslee & Hahn, 2011; Vernon-Feagans, Garrett-Peters, De Marco, & Bratsch-Hines, 2012). As such, rural children are exposed to many reading risk factors associated with geographic isolation, including limited access to libraries and other educational resources; lower

availability of high-quality preschool education; and teachers who have fewer professional development opportunities, including less access to advanced degrees (Vernon-Feagans et al., 2010). Combined with a lack of access to child care and youth services, students whose parents work nonstandard hours are more likely to return from school to unsupervised homes and have fewer child-adult interactions (MacTavish & Salamon, 2003), which can aid in language and literacy development. Due to these various home and community factors, rural students may enter elementary school struggling in early literacy development (Curenton & Justice, 2008; Lee & Burkham, 2002; Provasnik et al., 2007).

## The Home Literacy Environment and Reading Outcomes

Home literacy environments consist of multifaceted and interlinked literacy activities, materials, and attitudes that help children learn the value and uses of literacy (Philips & Lonigan, 2009; Yeo, Ong, & Ng, 2014). Various literacy activities and literacy materials in the home include the frequency of reading to the child, teaching of letters, shared trips to the library, and the number of books in the home (Burgess et al., 2002; Hammer, Farkas, & Maczuga, 2010; Payne et al., 1994; Roberts, Jurgens, & Burchinal, 2005). Decades of research have found positive associations between the literacy activities occurring in children's home environments and the development of foundational reading skills such as oral vocabulary, phonological awareness, and reading comprehension (Dickinson & McCabe, 2001; Mol & Bus, 2011; Niklas & Schneider, 2013; Purcell-Gates, 1996; Sénéchal & LeFevre, 2002; Scarborough & Dobrich, 1994; Snow et al., 1998; Vernon-Feagans, Cox, & the Family Life Key Investigators, 2013; Whitehurst & Lonigan, 1998; Zadeh, Farnia, & Ungerleider, 2010).

Composites or indices of various home literacy activities and materials mentioned above have been significant predictors of vocabulary (Froiland, Powell & Diamond, 2014; Hammer et al., 2010; Roberts et al., 2005), letter-name knowledge and decoding skills (Burgess et al., 2002), early language skills such as expressive and receptive language (Payne et al., 1994; Roberts et al., 2005; Vernon-Feagans, 1996), and overall reading scores (Aikens & Barbarin, 2008). Other studies have found that different aspects of the home literacy environment affect different components of reading development (Hindman & Morrison, 2012; Hood, Conlon, & Andrews, 2008; Sénéchal & LeFevre, 2002; Storch & Whitehurst, 2001). For example, Sénéchal and LeFevre (2002) posited that informal literacy experiences (e.g., reading a bedtime story) were associated with outside-in skills while formal literacy activities (e.g., direct parent instruction) were associated with inside-out skills. As such, we focus on the effects of two specific aspects of reading in rural homes, *home literacy activities* and *access to literacy materials*.

## Home Literacy Activities

Home literacy activities, in which a child interacts with someone in the home around reading and text, may include time

involved in shared book reading, helping teach the child to learn to read, and helping the child with homework. The frequency of parents explicitly teaching their children reading and writing skills through activities such as doing homework and reading storybooks tends to increase once children begin their formal literacy instruction in elementary school (Hood et al., 2008; Purcell-Gates, 1996); therefore, these activities constitute an important home literacy construct to explore in association with children's reading achievement. Epstein (2011) described these as "school-like" home literacy activities, as they utilize similar structures and processes that may be emphasized at school, such as reading print, using workbooks, and explicitly teaching literacy concepts. Further, a vast majority of elementary school teachers report that they encourage parents to engage in these activities (Baker, 2003). A national survey of elementary school teachers found that over 90 percent of prekindergarten to fifth teachers reported that they encouraged parents to read to their child and listen to their child read (Baumann, Hoffman, Duffy-Hester, & Ro, 2000). We discuss below the literacy activities likely encouraged by schools and/or undertaken by parents in the home.

### *Shared Book Reading*

Considered "the hallmark of family literacy" (Roskos & Twardosz, 2004, p. 288), parent-child shared book reading has been the home literacy activity that has received the most attention in relationship to children's literacy performance in school (Lonigan, 2004). Researchers have found that the frequency of parent-child shared reading in the home has been related to students' emergent literacy outcomes associated with outside-in skills (Bus, van Ijzendoorn, & Pellegrini, 1995; Huebner, 2000; Jacobs, 2004; Iruka, Gardner-Neblett, Matthews, & Winn, 2014; Mol & Bus, 2011; Scarborough & Dobrich, 1994; Stephenson, Parrila, Georgiou, & Kirby, 2008). Shared book reading has been found to help children understand left to right and top to bottom orientation of reading in English and the canonical form of stories and narratives in written English (Snow et al., 1998), language development (Hood et al., 2008; Iruka et al., 2014; Mol & Bus, 2011; Mol, Bus, & de Jong, 2009; Sénéchal, 2006), vocabulary (Hood et al., 2008; Morrison & Hindman, 2012; Roberts et al., 2005; Sénéchal, 2006), and reading comprehension (Sénéchal, 2006; Yeo et al., 2014). In one of the few studies that examined home literacy activities in the rural context, Curenton and Justice (2008) found that lower- and higher-SES mothers of preschool children engaged in shared book reading activities with similar frequency as one another; yet, frequency of shared book reading was not predictive of children's understanding of reading conventions, after controlling for maternal education.

### *Supporting the Child in Learning to Read*

Explicit teaching of letter sounds, letter names, and word reading may contribute to children's inside-out skills, such as understanding the alphabetic principle and general

decoding skills (Hindman & Morrison, 2012; Hood et al., 2008; Sénéchal, 2006; Stephenson, et al., 2008). For example, using data from a longitudinal study of 110 predominantly White urban students aged 4–5, Sénéchal and LeFevre (2002) reported that parental involvement in teaching children about reading and writing words was related to the development of early literacy skills, which directly predicted word reading at the end of first grade. Similarly, Sénéchal (2006) found that parents teaching literacy skills directly predicted their children's inside-out skills in kindergarten (alphabetic knowledge) and fourth grade (reading fluency).

### *Help on Homework*

One way in which parents can help children learn to read is through helping on homework. This can take multiple forms, including engaging in homework tasks with children, structuring the homework environment in the home, or helping children develop strategies for managing learning tasks (Hoover-Dempsey et al., 2001). Studies have found that parental homework assistance has had mixed results on student outcomes (Hoover-Dempsey et al., 2001; Patall, Cooper, & Robinson, 2008). Parental involvement with homework can have positive indirect effects on achievement by improving homework completion and performance, promoting a positive affect around schoolwork, facilitating parent-teacher communication, and improving study skills (Hoover-Dempsey et al., 2001; Patall et al., 2008). However, these effects may vary depending on how parents help. For example, a meta-analysis of parental involvement for elementary school students revealed that simply checking on students' homework was not significantly correlated with academic achievement (Jeynes, 2005). Parent involvement might also have detrimental effects if parents engage in "inappropriate involvement behaviors," such as giving children the right answer or completing the assignment without the child's involvement (Patall et al., 2008, p. 1043).

### *Access to Literacy Materials*

While the literacy activities mentioned above incorporate activities in which parents and children participate together, children's access to literacy materials influences the extent to which they are able to engage in print-related activities. The rural context is unique in that the geographic isolation that families face may lead to reduced access to literacy materials. As prior studies have found, access to literacy materials can remain a problem for low-income and under-resourced families even after students enter school (Baker, 2003; Baumann et al., 2000). Traditionally, access to literacy materials has been measured as books in the home (Bradley, Corwyn, McAdoo, & Coll, 2001; Payne et al., 1994) or trips to the library (Huebner, 2000; Slates, Alexander, Entwisle, & Olson, 2012). In the current study, we measured access to literacy materials as number of books in the home, checking out books from the library, and, given the growing role of technology use as a learning tool, having a computer in the home.

### *Number of Books in the Home*

Access to children's books has been correlated with reading achievement (Aikens & Barbarin, 2008; Bhattacharya, 2010; Epstein, 2011; Zadeh et al., 2010). When included in composite scores or indices of home literacy environments, having more books significantly predicted reading outcomes such as preschool children's language scores (e.g., Payne et al., 1994). However, not all studies paint a consistent picture of this association. In a nationally representative sample of elementary school students ( $N = 17,401$ ), Aikens and Barbarin (2008) found the number of books in the home significantly predicted higher reading outcomes in children's first four years of school. However, Stephenson and colleagues (2008) found that in their study of 77 suburban kindergarten students, the number of books in the home did not predict letter knowledge or word reading in kindergarten or first grade. Together, results from these studies suggest that access to books in the home may have differential effects depending on the context.

### *Library Visits*

Due to geographic isolation, rural families may have reduced access to libraries as compared to their urban and suburban counterparts. In a study of a dialogic book-reading intervention for parents of two- to three-year-olds ( $N = 61$ ), Huebner (2000) found that, before the start of the project, only 38 percent of rural parents had ever taken their child to a public library. As with the number of books in the home, trips to the library have been included in the composite scores of home literacy environments found to significantly contribute to preschool children's language scores (e.g., Payne et al., 1994). Yet, on its own, library access may not uniquely contribute to reading outcomes. A study of preschool children in Singapore ( $N = 193$ ) found that children going to the library did not predict reading competence (Yeo et al., 2014).

### *Having a Computer in the Home*

Young children today are exposed to literacy through digital means, such as television, computers, tablets, and mobile devices (Calvert et al., 2005; Lee & Burkham, 2002). Studies have found that having a computer in the home may help students learn to read (Calvert et al., 2005) and contribute to higher reading achievement (Jackson et al., 2006; Lee & Burkham, 2002). However, differences exist between high-income and low-income households in the availability of computers, Internet access, and digital reading resources (Judge, Puckett, & Bell, 2006; Lee & Burkham, 2002). Low-income residents of rural areas in particular have often been referred to as the technological have-nots (McCollom, 2011). A digital divide exists in rural America, measured by lower rates of telephone and Internet usage, as well as personal computer ownership (Katsinas & Moeck, 2002). While rural areas have made significant gains in terms of Internet access in the early part of the twenty-first century (Malecki, 2003), it appears the use of technology has not increased

at the same rate (Whitacre & Mills, 2010). Differences in the digital divide are strongly related to family income and education, both of which are lowest in rural areas (Malecki, 2003). Further, rural schools have limited access to broadband Internet and the cost is highly variable (Reeves, 2003).

### *This Study*

Few studies published in the past 20 years (Curenton & Justice, 2008; Froiland, 2011; Huebner, 2000) have examined the home literacy environments of young children living in rural households, which tend to have higher concentrations of poverty, lower levels of educational attainment among adults, and less access to social and educational support infrastructures as compared to urban and suburban families (Beaulieu et al., 2003). Previous literature has documented a connection between home literacy variables and reading skills in urban or suburban contexts (e.g., Purcell-Gates, 1996; Sénéchal & LeFevre, 2002; Whitehurst & Lonigan, 1998); whether this pattern holds true for struggling and nonstruggling readers in rural contexts, where geographic isolation impacts the resources families can easily access (McCollom, 2011; Vernon-Feagans et al., 2010), has yet to be explored.

Furthermore, while many studies have examined the home literacy environments of families of preschool-aged children in relation to school readiness (e.g., Huebner, 2000; Payne et al., 1994; Whitehurst & Lonigan, 1998; Zadeh et al., 2010), far fewer have examined how activities and access in the home environments during students' early elementary school years are associated with literacy development. Once children enter elementary school, they have direct reading instruction and hours of exposure to literacy throughout the school day; therefore, the role of families and home caregivers change in helping children develop foundational literacy skills is shared with and shaped by the school. Understanding which aspects of home literacy that take place *during* the early elementary school years predict reading outcomes may benefit school practitioners as they work with rural families in recommending evidence-based reading activities at home that may prevent later reading disability diagnoses.

In the current study, we sought to fill these gaps in the literature by investigating the types and frequency of literacy-related activities in the homes of rural kindergarten and first grade students and the extent to which home literacy activities and access to literacy materials contributed to children's outside-in and inside-out literacy skills. Specifically, we sought to answer the following questions:

1. To what extent do rural families with children in kindergarten and first grade engage in literacy activities in their homes? Do differences exist between children who were identified as struggling and nonstruggling readers?
2. How do home literacy activities and access to literacy materials uniquely contribute to basic word reading, reading comprehension, and spelling scores of all students (the combined sample of both struggling and nonstruggling readers) at the beginning



of kindergarten or first grade, after controlling for demographic characteristics?

As our first research question was exploratory, we offer no hypotheses. Regarding the second research question, we hypothesized that more home literacy activities and greater access to literacy materials would be associated with higher scores for outside-in skills (e.g., reading comprehension) and inside-out skills (e.g., basic word reading, spelling). We further examined exploratory income level, maternal education, race, gender, and grade interactions to take advantage of the diversity of our sample and to follow prior research suggesting the possible moderating effects of these demographic characteristics.

## METHODS

### Design and Sample

The data used in this study were drawn from a randomized controlled trial prior to intervention implementation. The intervention examined the effectiveness of a teacher-implemented literacy intervention for struggling readers in the rural southeastern United States, the Targeted Reading Intervention (TRI; Vernon-Feagans, Kainz, Hedrick, Ginsberg, & Amendum, 2013). *Rural* was defined as mid-sized or small towns not near an urban center and with populations below 50,000 people (Butler & Beale, 1994). The TRI was developed to help kindergarten and first-grade struggling readers and their teachers in rural low-wealth schools by providing teachers with a weekly literacy coach who used webcam technology to watch the teacher work with a struggling reader and give her real time feedback. Findings from previous TRI studies have indicated effect sizes of .30 to .70 for struggling readers; in addition, nonstruggling readers in TRI classrooms have also profited from the TRI, signifying that TRI teachers were able to generalize TRI practices to benefit all children in their classrooms (Vernon-Feagans, Kainz, Amendum, Ginsberg, Wood, & Bock, 2012; Vernon-Feagans et al., 2013).

The current study includes kindergarten and first grade students from the larger TRI study who had fall pretest data, before the intervention was implemented. Reading achievement data were available for the fall of the 2011, 2012, and 2013 academic years ( $N = 1,108$ ). Students were in 118 classrooms, 10 Title 1 schools, and 3 rural school districts. All students in each classroom were screened to determine struggling status. Students in the current study were included if they were determined to be a *struggling reader* ( $n = 556$ ) or *nonstruggling reader* ( $n = 552$ ) according to grade-appropriate screening subtests from AimsWeb (Shinn & Shinn, 2002) and the Dynamic Indicators of Basic Early Literacy Skills (DIBELS; Good & Kaminski, 2002). For kindergarten students, screening subtests included AimsWeb Letter Sound Fluency (LSF) and DIBELS First Sound Fluency (FSF). For first grade students, screening subtests included DIBELS Phoneme Segmentation Fluency (PSF) and Nonsense Word Fluency (NWF). Aimsweb/DIBELS benchmarks, based on grade and fall time point, were used to

categorize all students as at *high risk*, *some risk*, or *low risk* for reading problems. TRI created within-classroom comparisons to determine if students who struggled with reading and received the intervention could “catch up” to their nonstruggling peers. Thus, students from both the *high-risk* and *low-risk* groups were randomly ordered onto a list to receive additional assessment on two subtests, Letter-Word Identification and Word Attack, of the Woodcock Johnson Diagnostic Reading Battery, III (WJ; Woodcock, Mather, & Schrank, 2004).

Consented students who were identified as *high risk* on screening subtests were required to score below 35 percent on the grade percentile score for one or both WJ subtests to be selected as a *struggling reader*. Consented students who were identified as *low risk* on screening subtests were required to have an average grade percentile score on or both subtests greater than 50 percent, with neither subtest falling below 35 percent to be selected as a *nonstruggling reader*. For classrooms without sufficient numbers of consented *low-risk* and/or *high-risk* students, or when students’ screening and WJ scores failed to match, consented students from the *some-risk* group received additional testing and were classified as struggling or nonstruggling based on their WJ scores, as described above. Three struggling readers and three nonstruggling readers were selected from each classroom.

### Procedures

In the fall of the school year, research assistants delivered blank parent permission forms and family demographic questionnaires to teachers along with a list of children selected to participate in the study. Teachers then sent permission packets home with the children to be read and signed by parents or caregivers (termed *parents* in this study) and returned to the classroom teacher. Parent questionnaires were obtained for all selected struggling and nonstruggling students in treatment and control classrooms. In order to conduct high-quality student assessments, research assistants completed a two-day training period focused on the administration of all instruments used to measure students’ early literacy skills. All research assistants demonstrated their proficiency by video-recording themselves delivering the full battery of tests to a child who was not involved in the larger study. Once deemed proficient, research assistants assessed all struggling and nonstruggling readers in the fall of the school year.

## MEASURES

### Home Literacy Activities

Questions regarding the home literacy environment were adapted from the Families Activities Questionnaire (Vernon-Feagans, Odom, & Pancsofar, 2006), which included Likert-type scale items (i.e., 0 = *never*, 1 = *once a month*, 2 = *2–3 days per week*, 3 = *once a week*, 4 = *2–4 days per week*, and 5 = *5–7 days per week*) asking the frequency that someone in the home engaged in the following activities: (a) *reading to the child*, (b) *helping the child learn to read*, and (c) *helping*

*the child with homework*. We took the average of these three variables to form an index of *home literacy activities*.

### Access to Literacy Materials

The family questionnaire also included questions about the number of children's books in the home (a narrative response we dichotomized as 0 = *≤ 50*, 1 = *over 51*), whether or not someone checked out library books for the child (0 = *no*, 1 = *yes*), and whether or not there was a computer in the home (0 = *no*, 1 = *yes*). We took the average of these three variables to form an index of *access of literacy materials*.

### Students' Literacy Achievement

Standardized Woodcock Johnson (WJ) assessments were used to measure students' baseline literacy performance in the fall of the school year. *W*-scores were used in multi-level regression analyses. An equal interval scale, the *W*-score is the metric from which all standardized scores, percentile ranks, and grade-equivalent scores on the WJ tests are derived, and is particularly useful for measuring individual growth in an assessed skill (Jaffe, 2009).

The *Letter-Word Identification* (LW) subtest measured word identification skills. Students were required to name letters and read high-frequency words aloud with accurate pronunciation. Students were given full credit for correctly identifying a letter and reading a word with fluency. The median reliability for the LW subtest is .91 (Woodcock et al., 2004). On the *Word Attack* (WA) subtest, students were asked to pronounce the sounds of single letters and read aloud nonsense words to assess phonics and structural analysis skills. Students had to read words completely and fluently to earn credit as a correct response. The median reliability for the WA subtest is .87 (Woodcock et al., 2004). For *Passage Comprehension* (PC), students were required to match a pictographic representation of a word with a picture, point to pictures represented by a phrase, and supply missing key words to make sense of a passage of text. The median reliability for the PC subtest is .83 (Woodcock et al., 2004). For all three subtests, mispronunciations resulting from articulation errors, dialect variations, or regional speech patterns were not penalized. Finally, in the *Spelling of Sounds* (SS) subtest, which measures orthographical and phonological coding skills, students were asked to write the letters that corresponded with a single sound and spell letter combinations of nonsense words or low-frequency words. The median reliability for the SS subtest is .74 (Woodcock et al., 2004).

### Control Variables

A host of demographic characteristics have been found to contribute to students' reading outcomes and influence the extent to which children participate in literacy-related activities in the home, including poverty status (Aikens & Barbarin, 2008; Bradley et al., 2001; Froiland et al., 2014; Iruka et al., 2014; Lee & Burkham, 2002; Niklas & Schnieder, 2013;

Philips & Lonigan, 2009; Washington, 2001), race/ethnicity (Bradley et al., 2001; Li, 2010; Washington, 2001), maternal education (Curenton & Justice, 2008; Dickinson & McCabe, 2001; Payne et al., 1994; Skibbe et al., 2008; Washington, 2001; Zadeh et al., 2010), and gender (Chatterji, 2006; 2010; Epstein, 2011; Lee, Grigg, & Donahue, 2007; Logan & Johnston, 2009; Matthews, Kizzie, Rowley, & Cortina, 2010; Mullis, Martin, Kennedy, & Foy, 2007; Wang, Algozzine, Ma, & Porfeli, 2011).

Therefore, in our final analyses, we controlled for several variables, including the following: *grade* (0 = kindergarten, 1 = first grade), *gender* (0 = male, 1 = female), *race* (1 = African American, 2 = White, 3 = Hispanic, 4 = Other), *maternal education*, and *family income*. *Maternal education* was measured as the number of years the child's mother attended school according to the following scale: 8 = eighth grade or less, 10 = some high school, 12 = high school graduate, 13 = some college, 14 = two-year degree, 16 = Bachelor's degree, and 18 = Master's or Doctoral degree. *Family income* was also treated as a continuous variable, with scores ranging from 1 to 9 according to the intervals in Table 1 (e.g., 1 = *≤ \$10,000*, 2 = *\$10,001-\$20,000* . . . , 9 = *> \$80,000*). In the full sample, half of the children were male (49.82 percent) and 52.88 percent were in kindergarten. Regarding race, 53.16 percent of the children were African American, while 25.09 percent were White, 11.62 percent Hispanic, and 10.13 percent multiracial, American Indian, or Asian. In addition to mothers with limited education ( $M = 12.55$ ,  $SD = 2.24$ ), 33.96 percent of students, representing the largest group in this study, were from homes with an annual family income of \$10,000 or less. Furthermore, 55.94 percent came from homes with an annual income of \$20,000 or less, which is the approximate poverty threshold for a family of three (United States Department of Health and Human Services, 2014). Thus, the majority of families in the study were living in poverty.

## RESULTS

### Analysis Plan

For the first research question regarding the use of home literacy activities and children's access to literacy materials, we descriptively examined the six home literacy variables separately (not as indices) and conducted a Multivariate Analysis of Covariance (MANCOVA) to determine whether home literacy environments varied as a function of students' struggling status. The six separate home literacy variables (reading to the child, supporting the child in learning to read, helping the child to homework, number of books in the home, checking out library books, and presence of a computer in the home) served as the dependent variables in the MANCOVA; struggling status as the comparison variable; and child gender, race, family income, maternal education, and grade as covariates.

For the second research question regarding the extent to which the two home literacy indices (home literacy activities, access to literacy materials) contributed to students' baseline literacy performance, we conducted multilevel model

TABLE 1  
Demographic Data for Struggling Readers, Nonstruggling Readers, and the Whole Sample

	<i>n</i>	<i>S (percent)</i>	<i>n</i>	<i>NS (percent)</i>	<i>n</i>	<i>WS (percent)</i>
Gender						
Male	307	55.22	246	44.40***	553	49.82
Female	249	44.78	308	55.60	557	50.18
Race						
African American	294	54.95	278	51.39	572	53.16
White	121	22.62	149	27.54	270	25.09
Hispanic	82	15.33	43	7.95***	125	11.62
Other	38	7.10	71	13.12**	109	10.13
Grade						
Kindergarten	293	52.70	294	53.07	587	52.88
1 <sup>st</sup> Grade	263	47.30	260	46.93	523	47.12
Income ( <i>M, SD</i> )	543	2.70 (2.27)	553	3.33 (2.32)***	1019	3.02 (2.31)
</ = \$10,000	213	42.35	133	25.78	346	33.96
\$10,001–\$20,000	107	21.27	117	22.67	224	21.98
\$20,001–\$30,000	59	11.73	73	14.15	132	12.96
\$30,001–\$40,000	44	8.75	58	11.24	102	10.01
\$40,001–\$50,000	14	2.78	38	7.36	52	5.10
\$50,001–\$60,000	17	3.38	36	6.98	53	5.20
\$60,001–\$70,000	7	1.39	19	3.68	26	2.55
\$70,001–\$80,000	19	3.78	16	3.10	35	3.43
> \$80,000	23	4.57	26	5.04	49	4.81
Maternal Education ( <i>M, SD</i> )	527	12.14 (2.25)	576	12.95 (2.16)***	1064	12.55 (2.24)
8th grade or less	58	11.01	31	5.77	89	8.36
Some high school	86	16.31	44	8.19	130	12.22
High school grad	133	25.24	114	21.23	247	23.21
Some college	148	28.08	187	34.82	335	31.48
2-year degree	50	9.49	78	14.53	128	12.03
Bachelor's degree	41	7.78	59	10.99	100	9.41
Advanced degree	11	2.09	24	4.47	35	3.29

Note. \* $p < .05$ , \*\* $p < .01$ ; \*\*\* $p < .001$ ; S = struggling reader; NS = nonstruggling reader; WS = whole sample; Other race = Asian, American Indian, and Multi-Racial.

(MLM) analyses, accounting for nesting at the classroom level. Ordinary least squares regression assumes independence of sample members (i.e., units of analysis); however, in nested designs, the units of analysis are not independent and standard errors may be correlated and/or underestimated (Raudenbush & Bryk, 2002).

Prior to MLM analyses, we accounted for missing data using multiple imputation procedures in SAS 9.2 with the PROC MI function. We had 0.05 percent missingness on predictors and 0.01 percent missingness on outcomes. Multiple imputation serves to reduce bias due to missing data in longitudinal research designs (Spratt et al, 2010). In addition to all child demographic control variables, children's fall scores on the WJ subtests, and the two home literacy indices, we also included both school and district identifiers as auxiliary variables in the multiple imputation procedure. After imputation, we mean-centered continuous variables to aid with interpretability.

Four separate MLM models were conducted using the whole sample for each of the four WJ subtests (LW, WA, PC, SS). All four MLM models included the child's gender, race, maternal education, family income, grade, and the two home literacy indices of home literacy activities and access to literacy materials. Finally, we calculated effect sizes using Cohen's  $d$  (Cohen, 1992).

## FINDINGS

### Demographic Characteristics

Table 1 presents demographic information and Table 2 provides outcome data of students classified as struggling readers and nonstruggling readers, as well as for the whole sample. A series of linear analyses with a Tukey mean differences comparisons revealed statistically significant differences between struggling and nonstruggling readers with regards to gender, race, income, and maternal education. A higher concentration of boys were found to be struggling readers,  $t(1,108) = 3.62$ ,  $p < .001$ . Regarding racial differences, African American and White students were equally distributed among both groups. Hispanic students,  $t(1,108) = -3.80$ ,  $p < .001$ , were more likely to be identified as struggling readers, while students in the Other racial group,  $t(1,108) = 3.29$ ,  $p = .001$ , were more likely to be nonstruggling readers. Struggling readers came from homes with a lower family income,  $t(1,017) = 4.37$ ,  $p < .001$ , and had mothers with fewer years of education,  $t(1,062) = 6.00$ ,  $p < .001$ . As anticipated, significant differences between struggling and nonstruggling readers existed on all four of the following WJ subtests: LW,  $t(1,108) = 21.16$ ,  $p < .001$ ; WA,  $t(1,108) = 12.37$ ,  $p < .001$ ;

TABLE 2  
Woodcock-Johnson Standard Scores and W-Scores for Struggling Readers, Non-Struggling Readers, and the Whole Sample

	<i>n</i>	<i>S M (SD)</i>	<i>n</i>	<i>NS M (SD)</i>	<i>n</i>	<i>WS M (SD)</i>
WJ <i>W</i> -Score						
Letter-Word Identification	556	362.03 (35.37)	552	405.89 (33.67)***	1,108	383.92 (40.89)
Word Attack	550	409.34 (30.85)	552	448.05 (26.64)***	1,102	428.66 (34.72)
Passage Comprehension	534	410.85 (20.50)	544	433.28 (30.00)***	1,078	422.19 (28.07)
Spelling of Sounds	545	454.21 (26.63)	548	479.56 (15.75)***	1,093	466.94 (25.26)
WJ Standard Score						
Letter-Word Identification	556	89.32 (11.42)	552	107.18 (11.11)***	1,108	98.21 (14.38)
Word Attack	550	92.92 (12.74)	552	108.93 (9.68)***	1,102	101.74 (13.71)
Passage Comprehension	534	89.44 (12.37)	544	100.54 (12.74)***	1,078	95.05 (13.73)
Spelling of Sounds	545	87.52 (17.72)	548	110.97 (12.49)***	1,093	99.28 (19.29)

Note. \*\*\* $p < .001$ ; S = struggling reader; NS = nonstruggling reader; WS = whole sample; WJ = Woodcock-Johnson.

PC,  $t(1,078) = 14.31$ ,  $p < .001$ ; and SS,  $t(1,093) = 19.18$ ,  $p < .001$ . Fall WJ differences were expected because children were identified as struggling or nonstruggling readers based in part on their performance on the WJ subtests.

Zero-order correlations among all variables of interest are presented in Table 3. All four of the WJ outcome variables were significantly and positively correlated ( $p < .001$ ) with both home literacy indices, *access to literacy materials* and *home literacy activities*, with values ranging from 0.21 to 0.27.

### Description of Literacy Activities and Materials in the Home

Our first research question asked the extent to which rural families with kindergarten and first grade children engaged in literacy activities in the home. We found that families participated in a variety of home literacy activities and provided their children with access to literacy materials.

#### Home Literacy Activities

*Helps with homework* was the most frequent literacy activity, with 74.19 percent of parents or guardians reporting helping with homework five to seven days per week and 92.86 percent at least twice per week. *Supports child in learning to read* was the second-most frequent activity in the home, with 42.98 percent of respondents reporting this happening five to seven days per week and 80.04 percent at least twice per week. Results in Table 4 suggest approximately one-third (32.80 percent) of parents reported *reading to the child* five to seven days per week, and 74.04 percent at least twice per week. Nonstruggling readers were more likely to come from homes where someone read to them five-to-seven days per week,  $t(1,065) = 2.77$ ,  $p = .006$ , and less likely to come from homes where someone never read to them,  $t(1,065) = -2.51$ ,  $p = .012$ . No significant differences were found regarding the frequency of supporting the child in learning to read or helping the child with homework.

#### Access to Literacy Materials

*Access to literacy materials*, which measured children's exposure to books, computers, and checking out books from the library, was more variable between nonstruggling and struggling readers (see Table 5). Approximately 68 percent of the children in the whole sample were living in homes that had a computer; however, this over 10 percent less than the national average of 79 percent (United States Census Bureau, 2014). Regarding the number of books in the home, 31.21 percent of parents reported more than 50 books being in the home. Nearly 14 percent more of the families of nonstruggling readers reported 51 or more books in the home and approximately 12 percent more nonstruggling readers had a computer in the home. It is likely these significant differences were somewhat related to the family's annual income. Indeed, the correlation between family income and access to literacy materials (see Table 3) was significant at  $r = 0.36$  ( $p < .001$ ). Just over 70 percent of families checked out books from the library for their child at least one time per month, with little difference between struggling and nonstruggling readers. Nonstruggling readers were found to have more books in their homes,  $t(1,052) = 4.13$ ,  $p < .001$ , and were more likely to have a computer in their home,  $t(1,040) = 3.69$ ,  $p < .001$ ; this is most likely the result of the nonstruggling students coming from homes with higher incomes, on average. There were no significant differences regarding someone in the home checking out library books for the child.

#### Home Literacy Associations with Child Reading Performance

Our second research question assessed the degree to which the two indices (*home literacy activities* and *access to literacy materials*) were uniquely associated with basic word reading (Letter-Word and Word Attack), reading comprehension (PC), and spelling performance (SS) at the beginning of kindergarten and first grade for students living in rural homes. Table 6 contains results for all four literacy outcomes.



TABLE 3  
Correlation Matrix (N = 1,108)

	1	2	3	4	5	6	7	8	9	10
1. Grade	—									
2. Gender	−0.01	—								
3. Race	−0.03	0.07*	—							
4. Maternal education	0.06	−0.05	−0.19***	—						
5. Income	0.04	−0.02	0.16***	0.51***	—					
6. Access	0.11***	0.02	−0.01	0.41***	0.36***	—				
7. Activities	0.19***	0.03	−0.14***	0.25***	0.11***	0.32***	—			
8. LW	0.69***	0.07*	−0.01	0.22***	0.19***	0.26***	0.27***	—		
9. WA	0.66***	0.06*	−0.01	0.18***	0.16***	0.21***	0.23***	0.89***	—	
10. PC	0.64***	0.07*	0.02	0.16***	0.17***	0.24***	0.24***	0.83***	0.77***	—
11. SS	0.69***	0.05	−0.01	0.20***	0.15***	0.22***	0.23***	0.87***	0.86***	0.69***

Note. \* $p < .05$ , \*\* $p < .01$ ; \*\*\* $p < .001$ ; Access = access to literacy materials; Activities = home literacy activities; LW = letter-word identification; WA = word attack; PC = passage comprehension; SS = spelling of sounds.

TABLE 4  
Home Literacy Activities for Struggling Readers, Non-Struggling Readers, and Whole Sample

	Reads to Child			Supports Reading			Helps with Homework		
	S (n = 531)	NS (n = 536)	WS (n = 1,067)	S (n = 520)	NS (n = 527)	WS (n = 1,047)	S (n = 527)	NS (n = 523)	WS (n = 1,050)
% of Time									
5–7 days/week	28.81	36.75**	32.80	42.12	43.83	42.98	72.30	76.10	74.19
2–4 days/week	42.94	39.55	41.24	36.54	37.57	37.06	18.98	18.36	18.67
1 day/week	12.62	12.50	12.56	11.54	13.66	12.61	4.55	3.82	4.19
2–3 days/month	9.23	7.09	8.15	5.96	3.42	4.48	2.09	0.76	1.43
1 day/month	3.01	2.99	3.00	2.12	0.95	1.53	0.57	0.57	0.57
Never	3.39	1.12*	2.25	1.73	0.57	1.15	1.52	0.38	0.95

Note. \* $p < .05$ , \*\* $p < .01$ ; \*\*\* $p < .001$ ; S = struggling reader; NS = nonstruggling reader; WS = whole sample. Significance tests for differences were conducted between strugglers and nonstrugglers only.

TABLE 5  
Access to Literacy Materials for Struggling Readers, Non-Struggling Readers, and Whole Sample

	Books in the Home			Check out Library Books			Computer in the Home		
	S (n = 526)	NS (n = 528)	WS (n = 1,054)	S (n = 517)	NS (n = 520)	WS (n = 1,037)	S (n = 514)	NS (n = 528)	WS (n = 1,042)
Books in the Home (percent Yes)	24.71	37.69***	31.21						
Check out Books (percent Yes)				68.47	73.65	71.07			
Computer in Home (percent Yes)							61.09	73.86***	67.56

Note. \* $p < .05$ , \*\* $p < .01$ ; \*\*\* $p < .001$ ; S = struggling reader; NS = non-struggling reader; WS = whole sample. Significance tests for differences were conducted between strugglers and nonstrugglers only.

### Letter-Word Identification

The demographic covariates *grade*, *gender*, *maternal education*, and *income* were uniquely associated with students' scores on the LW subtest. Being female, living in a family with a higher annual income, having a mother with higher educational attainment, and being in first grade was associated with significantly higher LW scores. In the presence of all covariates, our results showed that both *access to literacy materials* ( $d = 0.31$ ,  $p < .001$ ) and *home literacy activities* ( $d = 0.10$ ,  $p < .001$ ) were significantly related to students' LW scores. These results suggested students who came from homes where parents were more likely to engage

in home literacy activities and with more access to literacy materials were more likely to score higher on the LW subtest.

### Word Attack

The demographic covariates *grade*, *gender*, *maternal education*, and *income* were uniquely associated with students' scores on the WA subtest. Being female, living in a family with a higher annual income, having a mother with higher educational attainment, and being in first grade was associated with significantly higher WA scores. In the presence of all covariates, our results showed that both *access*

TABLE 6  
Multilevel Model Effects for Home Literacy Practices (N = 1,108)

Model	Letter-Word Identification			Word Attack		
	B	SE	d	B	SE	d
Gender	5.79***	1.69		4.74**	1.53	
Race	0.70	0.90		0.66	0.83	
Maternal Education	1.62***	0.49		1.18**	0.45	
Family Income	1.25**	0.47		0.93*	0.43	
Grade	53.80***	1.72		43.96***	1.55	
Access	12.69***	3.16	<b>0.31</b>	7.32*	2.90	<b>0.21</b>
Activities	3.97***	1.11	<b>0.10</b>	2.71**	1.00	<b>0.08</b>
Variance Components						
Level-2 Variation	14.27	12.65		14.83	9.08	
Level-1 Variation	770.81***	33.51		558.72***	21.45	
Model	Passage Comprehension			Spelling of Sounds		
	B	SE	d	B	SE	d
Gender	4.11**	1.26		2.97**	1.07	
Race	0.99	0.69		0.75	0.58	
Maternal Education	0.27	0.38		1.25***	0.31	
Family Income	1.19***	0.35		0.32	0.30	
Grade	34.66***	1.36		33.67***	1.09	
Access	8.95***	2.35	<b>0.32</b>	5.53**	2.00	<b>0.22</b>
Activities	2.76***	0.82	<b>0.10</b>	1.59*	0.71	<b>0.06</b>
Variance Components						
Level-2 Variation	6.57	7.04		3.96	2.14	
Level-1 Variation	422.49***	19.18		305.01***	12.92	

Note. \* $p < .05$ , \*\* $p < .01$ ; \*\*\* $p < .001$ ; Bolded  $d$ s are significant effect sizes; Access = access to literacy materials; Activities = home literacy activities.

to literacy materials ( $d = 0.21$ ,  $p = .013$ ) and home literacy activities ( $d = 0.08$ ,  $p = .001$ ) were significantly related to students' WA scores. These results suggested students who came from homes where parents were more likely to engage in home literacy activities and with more access to literacy materials were more likely to score higher on the WA subtest.

### Passage Comprehension

The demographic covariates *grade*, *gender*, and *income* were uniquely associated with students' scores on the PC subtest. Being female, living in a family with a higher annual income, and being in first grade was associated with significantly higher PC scores. In the presence of all covariates, our results showed that both *access to literacy materials* ( $d = 0.32$ ,  $p < .001$ ) and *home literacy activities* ( $d = 0.10$ ,  $p < .001$ ) were significantly related to students' PC scores. These results suggested students who came from homes where parents were more likely to engage in home literacy activities and with more access to literacy materials were more likely to score higher on the PC subtest.

### Spelling of Sounds

The demographic covariates *grade*, *gender*, and *maternal education* were uniquely associated with students' scores on

the SS subtest. Being female, having a mother with higher educational attainment, and being in first grade was associated with significantly higher SS scores. In the presence of all covariates, our results showed that both *access to literacy materials* ( $d = 0.22$ ,  $p = .002$ ) and *home literacy activities* ( $d = .06$ ,  $p = .013$ ) were significantly related to students' SS scores. These results suggested students who came from homes where parents were more likely to engage in home literacy activities and with more access to literacy materials were more likely to score higher on the SS subtest.

### Follow-Up Analyses

Researchers are encouraged to explore moderation in any form of multiple regression analysis (Aiken and West, 1991). Moderation analysis allows researchers to move beyond questions of whether or not an effect is present, to a deeper understanding of for whom, or under what conditions, an effect exists. Therefore, we estimated interaction effects for our variables of interest, moderating by *gender*, *race*, *family income*, *maternal education*, and *grade*. Results suggested there was no significant moderation related to any of the five variables. Nonsignificant interactions suggest the main effects of *home literacy activities* and *access to literacy materials* remain for all students regardless of demographic characteristics or grade.

## DISCUSSION

Results from the current study showed that rural families participated in a variety of literacy activities with their kindergarten and first grade children, which was positively associated with outside-in (i.e., passage comprehension) and inside-out (i.e., letter identification, phonetic spelling) skills (Whitehurst & Lonigan, 1998). While many studies have examined home literacy environments before students enter elementary school (e.g., Huebner, 2000; Payne et al., 1994; Whitehurst & Lonigan, 1998; Zadeh et al., 2010), we found that in our rural sample of struggling and nonstruggling readers, home literacy environments were related to rural students' literacy skills during early elementary school.

Home literacy activities frequently took place in our sample of rural families. More than 90 percent of families reported having someone in the home help their child on homework at least twice a week, over 80 percent reported that someone supported their child in learning to read at least twice a week, and nearly 75 percent responded that someone reads to their child at least twice a week. Considering that over half of our sample came from families with an annual income of less than \$20,000, these findings combat negative stereotypes that cast low-income parents as being uninvolved with helping their children succeed in school and debunk myths that parents with lower incomes or less education do not care about their children's education (Epstein, 2009). The finding that helping the child learn to read and complete homework were the most frequent literacy activities occurring in rural homes is consistent with previous literature in urban settings, which has found parents to engage more in intentional literacy learning once formal elementary school learning begins (Purcell-Gates, 1996).

We found that our sample of rural kindergarten and first grade students had less access to print and digital reading materials as compared to national samples. Only 31 percent of students in our sample had more than 50 books in the home, as compared to a national sample of early elementary schools students from the Early Childhood Longitudinal Study whose sample of kindergarten and first grade students had an average of 72.8 and 96.5 books in the home, respectively (Aikens & Barbarin, 2008). Consistent with prior research (e.g., Lee & Burkham, 2002), students classified as struggling readers had significantly less access to literacy materials as compared to their nonstruggling peers, particularly concerning the number of books and whether they had a computer in the home.

Literacy activities and materials in rural children's homes were also related to the developmental outcomes of interest in this study: outside-in and inside-out reading skills (Whitehurst & Lonigan, 1998). The frequency of home literacy activities was significantly associated with student literacy outcomes in the Letter-Word Identification, Word Attack, Passage Comprehension, and Spelling of Sounds subtests. This is consistent with research findings in nonrural areas that have emphasized the importance of parent-child interactions, parents' direct teaching, and shared book reading in influencing children's word reading and comprehension (e.g., Hood et al., 2008; Sénéchal & LeFevre, 2002; Stephenson et al., 2008). Access to print and digital literacy materials also

had a positive relationship with the four literacy outcomes of interest.

Furthermore, across all four WJ subsets the small-to-medium effect sizes for our *access* index (ranging from 0.21 to 0.32) were greater than the small effect sizes for *activities* (ranging from 0.06 to 0.10). Furthermore, the *access* effect sizes for LW and PC (0.31 and 0.32, respectively) are comparable to the average effect sizes reported in a meta-analysis of one-on-one reading interventions for reading comprehension (0.28; Elbaum, Vaughn, Hughes, & Moody, 2000). This suggests that, in rural communities, access to resources may be an important intervention unto itself that impacts struggling readers' performance, reinforcing the importance of providing students in geographically isolated areas with print-rich environments both in and out of school. For the rural students in this study, family members who deliberately participated in home literacy activities such as helping with homework, teaching reading, and reading books, along with providing access to literacy materials, may have provided an additional boost to outside-in and inside-out reading skills, particularly because the current findings were significant above and beyond all demographic covariates.

## Implications for Reading Interventions

Our findings pointed to the benefits of parents in rural communities frequently participating in home literacy activities with school-aged children and providing access to literacy materials. The resounding frequency with which rural families engaged in home literacy activities suggests that the door is open for educators, school administrators, and community partners to work with rural parents as partners in developing young elementary school students' literacy (Epstein, 2011). As Epstein (2009) wrote, "the bridges of home, school, and community are inevitably interconnected. Students travel back and forth across these bridges for many years . . . the success or failure of all bridges – real or symbolic – is in their design" (p. 161). Rural schools are distinct entities with needs and challenges different from urban and suburban schools (Bryant, 2010); therefore, reforms introduced in rural schools must be relevant to the lived experiences and issues of rural families. Below are suggestions for designing "bridges" to sustain and support students' literacy development in order to prevent later reading disability identification for rural students as they transition back and forth between home and school.

First, educators can provide parents with information to help children develop early literacy skills, including tips for how to help children with homework and engage their child in supplemental literacy activities (Beaulieu et al., 2003). Our study supplemented previous work indicating parents in low-income urban households frequently help their children with homework (Epstein, 2011). Home-to-school dialogues concerning how to help with homework and other reading endeavors may be especially important in low-income contexts. Studies have shown that parents want to bolster the reading achievement of their children, but may lack confidence in their own reading abilities or feel as though educators do not always give clear directions on methods that parents can adapt

to benefit their children (Baker, 2003; Barnyak, 2011). Parents have also reported that they would help children more if someone showed them how to lead specific learning activities (Epstein, 2011). Teachers, for example, can provide details to parents on how to do storybook reading in ways that are aligned with school practices and build important early literacy skills (e.g., questions to ask to build comprehension, ways of pointing out aspects of the text to build print awareness, modeling fluency; Baker, 2003; Morrow & Temlock-Fields, 2004).

Second, involving parents in a child's literacy development may mean more than simply encouraging parents to read to children or help with homework assignments, but rather providing specific after-school programs to maximize the time parents spend helping students develop literacy through high-quality interactions (Heath, 1983; Pancsofar & Vernon-Feagans, 2006; Whitehurst et al., 1994). The ways that educators and parents have effectively shared specific strategies for completing homework assignments and reading books aloud have taken the form of family literacy programs. For example, early childhood programs such as Head Start Even Start and the Parent and Child Education Program (PACE) provide parent education, child programs, and spaces for adult and child to interact in targeted literacy activities (Wasik & Herrman, 2004). Parent trainings for specific literacy activities, such as book reading and writing, have also produced positive effects on targeted skills (Reese, Sparks, & Leyva, 2010). As one example, the Word Works program, an early literacy initiative for prekindergarten students found to have long-term impacts on students' reading performance, engaged parents in a variety of culturally-responsive literacy programs by introducing literacy activities and resources to parents during monthly parent meetings, tri-annual parent conferences, and multilingual newsletters (Zimmerman, Rodriquez, Rewey, & Heidemann, 2008). To aid parents who cannot attend school functions, programs that send materials home to families with instructions on shared reading, writing, and literacy activities have had significant results for students' reading and writing abilities as well (Morrow & Young, 1997; Whitehurst & Lonigan, 1998).

Third, schools can ensure that they provide literacy resources to families with limited access. In our sample of young children in the rural Southeast, the majority of families had 50 or fewer children's books in the home, and over 30 percent did not have a home computer. Because families in rural communities have fewer libraries and bookstores in close geographic proximity, and in recognition of the documented digital divide between rural and nonrural areas particularly concerning the Internet (Judge et al., 2006), schools are an important avenue for providing access to computers (e.g., computer labs) and books (e.g., increased opportunities for students to check out books from the school library, book fairs, community-based literacy initiatives). This requires that schools allocate funds for more literacy materials and provide guidance on how students and families can effectively engage in activities with the materials in the home (Baker, 2003).

Finally, bi-directional home-school partnerships are ideal. Educators can not only help parents align home literacy activities to the ways schools teach literacy, but can also work

to align school literacies with what occurs in the home. Children from low-income or racial-minority backgrounds have myriad authentic literacy experiences in their homes, which may not be validated by their schools (Heath, 1983). Schools have been remiss in capitalizing on ways older children teach younger children in African American communities, or the story-telling and cooperative tactics they use outside of the classroom, such as on the playground (Vernon-Feagans, Head-Reeves, & Kainz, 2004). Educators, therefore, can ask parents about or conduct home visits to observe the different types of literacy activities that children engage in at home, and align those home practices with those in the school. For example, Heath (1983) documented how teachers in rural North Carolina performed ethnographic research in their school's community and incorporated locally constructed forms of literacy into school lessons. Likewise, the Words Work program (Zimmerman et al., 2008) provided books and other literacy resources in parents' native languages. Such partnerships have potential to be especially fruitful in rural communities, where community ties between schools and families tend to be stronger than in urban settings (Vernon-Feagans et al., 2010).

### Limitations

The limitations of our study suggest the need for future research on rural home literacy environments. The parent questionnaire was self-reported, so respondents could have answered based upon desirability of what they believed they should do rather than what they actually did. In addition, the home literacy questions had shortcomings. First, the types of questions asked in the survey were limited to six indicators, and may not have captured all of the formal and informal literacy experiences, activities, and materials to which kindergarten and first grade readers were exposed. Second, because the scope of our study remained within the limits of children's activities and access to literacy materials at the start of kindergarten and first grade, our survey questions did not capture variables such as parent and child attitudes towards reading; parents' own literacy activities, which may indirectly influence children's own attitudes and practices; language use in the home; parent interactions with the school; preschool experience; or home literacy environments prior to elementary school (Burgess et al., 2002; Wasik & Herrmann, 2004). Finally, the specificity of the duration of the home literacy activities was limited to the number of days. We did not ask the number of minutes or hours each day the literacy-related interactions between child and parent occurred, nor did we ask for details on what the parent did with the child in activities such as helping with homework or reading. Different definitions of helping with homework (e.g., did the parent just check to make sure everything was completed or did they work through homework questions with the child?) may have provided additional information that could better explain test score variation.

### Future Directions

Future research can build upon this study in a number of ways. First, researchers can further explore our findings on



the greater effects of access to literacy materials in rural communities by examining (a) access to additional sources of digital print (e.g., tablets, smart phones) and (b) time students spend engaged with print and digital materials. Second, more research is needed on the duration and quality of interactions between parent and child as they partake in literacy-related activities in rural homes. Observations, interviews, and ethnographic studies in rural homes would provide a deeper understanding of the quality of literacy activities, and additional ways children experience literacy, such as writing out grocery lists, playing on the computer, playing board games or word games, or watching educational television. Third, the question remains of what rural schools are already doing to promote literacy practices in the home, what type of homework they assign to early elementary school students, what specific policies and programs they have in place to provide opportunities for families to practice literacy, and what knowledge they possess on local literacy practices upon which to build family-school partnerships. Finally, because our results signify that home literacy activities and access influence inside-out and outside-in skills, intervention research should consider how these elements mediate whether students are later identified as at-risk for disabilities.

## CONCLUSION

Kindergarten and first grade students in rural, largely low-income homes engaged in a variety of home literacy activities and had varied access to literacy materials. Participating in literacy activities with someone in the home and having access to literacy materials was a significant and positive predictor of children's reading and spelling scores. For parents, it was both what they *had* and also what they *did* that was related to reading outcomes. Promoting and cultivating literacy activities with parents as partners is one effective step educators and school leaders in rural districts can take to promote successful literacy development for all children.

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