Published in final edited form as:
School Psych Rev. 2011 March 1; 40(1): 140–148.

Prereading Deficits in Children in Foster Care

Katherine C. Pears
Oregon Social Learning Center

Cynthia V. Heywood and **Hyoun K. Kim**
Oregon Social Learning Center

Philip A. Fisher
University of Oregon

Abstract

Reading skills are core competencies in children's readiness to learn and may be particularly important for children in foster care, who are at risk for academic difficulties and higher rates of special education placement. In this study, prereading skills (phonological awareness, alphabetic knowledge, and oral language ability) and kindergarten performance of 63 children in foster care were examined just prior to and during the fall of kindergarten. The children exhibited prereading deficits with average prereading scores that fell at the 30th to 40th percentile. Variations in prereading skills (particularly phonological awareness) predicted kindergarten teacher ratings of early literacy skills in a multivariate path analysis. These findings highlight the need for interventions focused on prereading skills for children in foster care.

Keywords

foster care; reading; early literacy; school readiness; kindergarten

Children in foster care fare worse than their peers on many indicators of academic adjustment, exhibiting high rates of special education placement, discipline referrals, and school dropout (e.g., Scherr, 2007; Zima et al., 2000). Children in foster care also lag significantly behind their peers in reading, writing, numeracy, and language (Mitic & Rimer, 2002) and perform significantly worse on measures of academic and socioemotional adjustment compared to children from low socioeconomic backgrounds (Pears, Fisher, Bruce, Kim, & Yoerger, in press). This poor performance does not appear to be solely attributable to unique risk factors often found in children in foster care. For example, Fantuzzo and Perlman (2007) found that, even when other risk factors (e.g., birth and poverty risks) were controlled, being in out-of-home care significantly and independently predicted poor academic and behavioral adjustment for children in second grade.

Given the elevated risks for poor school adjustment among children in foster care, there is a need for research on the potential early precursors of school difficulties with this population. Additional knowledge about the reading development of children at risk for academic failure because of foster care placements could expand the scientific knowledge base about academic skill development in general, and could also allow service providers to tailor preventive intervention services to the needs of such populations (Justice, Invernizzi, Geller, Sullivan, & Welsch, 2005). Because child welfare agencies often have limited resources for

Correspondence concerning this article should be addressed to Katherine C. Pears, Oregon Social Learning Center, 10 Shelton McMurphey Boulevard, Eugene, OR 97401. katherinep@oslc.org.

screening and intervention services for children in foster care (Zima et al., 2000), such targeted interventions could aid agencies in maximizing resources to increase the chances of better school outcomes for these children.

Early reading skills are an important predictor of later academic and behavioral adjustment in the general population. Children who struggle with reading in the first and second grades are likely to exhibit difficulties into middle and high school (e.g., Cunningham & Stanovich, 1998). Poor reading skills have also been linked to behavioral difficulties at school, which may increase the likelihood of problems such as antisocial behavior and juvenile delinquency (Halonen, Aunola, Ahonen, & Nurmi, 2006). In one of the few studies to examine reading skills in school-aged children in foster care, Fantuzzo and Perlman (2007) suggested that children in out-of-home placements show markedly poorer reading skills than their peers as early as second grade. Reading difficulties may already be well-established by the second grade (Al Otaiba & Fuchs, 2006); thus, identifying risk factors for poor reading prior to school entry might help in preventing later problems.

To date, there are no published studies on prereading skills in children in foster care prior to school entry, and research regarding early screening could aid intervention efforts to prevent subsequent difficulties in this population. The prereading skills considered in this study have been linked to later reading abilities in the general population. In kindergarten, phonological awareness (i.e., the ability to distinguish sounds in words) predicts better reading outcomes across the early school years, and alphabetic understanding (i.e., the ability to recognize letters) is linked to well developed or deficit reading skills (National Institute for Literacy, 2009). General language skills also appear to be important to later reading abilities, particularly reading comprehension (e.g., Catts, Fey, Zhang, & Tomblin, 1999). Based on the deficits observed in the later academic functioning of children in foster care (Mitic & Rimer, 2002), we hypothesize that the children in our study would perform more poorly on measures of prereading skills as compared to the general population.

Schatschneider, Fletcher, Francis, Carlson, and Foorman (2004) noted that there was little agreement in the literature on the relative importance of specific prereading skills in predicting later reading abilities. Additionally, different prereading skills may be differentially important for specific populations to outcomes, and could be effective targets for intervention (Al Otaiba & Fuchs, 2006). We can best pinpoint those targets by testing such associations within particular populations such as children in foster care. In this study, we examined associations between prereading skills in children in foster care and teacher-rated early literacy skills in kindergarten, while controlling for the other prereading skills and an estimate of general intelligence. The following research questions guided the study:

- How do the prereading skills of children in foster care compare to those of general population children?
- To what extent are particular prereading skills more important than others in predicting teacher-rated early literacy skills in kindergarten for children in foster care?

Methods

Participants

The participants in this study were 63 (36 females; 57%) children in foster care. To be eligible for the study, each child had to be in nonrelative or relative foster care at recruitment, entering kindergarten in the fall, and a monolingual or bilingual English speaker. The children and their foster families were recruited from two counties in the Pacific Northwest of the United States, each with a midsized metropolitan area. Our staff

members first contacted each child's caseworker to request consent for the child to participate and then contacted the foster caregiver(s) to invite them to participate. Both the caseworker and foster caregiver(s) had to consent to participate. The mean age of the children was 5.46 years (*SD* = .36). Fifty-nine percent of the children were in nonrelative foster care. The children had experienced an average of 3 unique foster placements (*SD* = 1) and an average of 558 days in care (*SD* = 397). The ethnicity breakdown of the sample was as follows: 59% European American, 27% Latino, and 14% mixed race. The children in this study were part of a larger sample of children participating in an efficacy trial of a school readiness intervention for children in foster care. However, all of the children in the current study were randomly assigned to the control group.

Measures

Phonological and phonemic awareness—Phonological awareness was assessed using the Phonological Awareness Composite scale score from the Comprehensive Test of Phonological Processing (CTOPP; Wagner, Torgesen, & Rashotte, 1999). This score is a composite of the scale scores from the Elision, Blending Words, and Sound Matching subtests. Reliability estimates for 5-and 6-year-olds were α = .95 and .96 respectively (Wagner et al., 1999). Percentile rankings of the children's scores were used to compare the performance of children in foster care to that of children in the general population.

Additionally, raw scores on the Initial Sound Fluency (ISF) measure from the Dynamic Indicators of Basic Early Literacy Skills (DIBELS; Good & Kaminski, 2002) were used to assess phonemic awareness. The DIBELS are designed to assess reading development of students from kindergarten through sixth grade. In the ISF measure, the child is asked to orally produce the initial sound of a word that corresponds to a stimulus picture. The total score is the number of correct initial sounds produced in 1 min. Alternate-form reliability for ISF data is high (*r* = .72; Good et al., 2003). The percentile ranks of the children's raw ISF scores were based on the norms for general population children tested in the fall of their kindergarten year. As the children in this study were about to enter kindergarten, this was felt to be an appropriate comparison sample.

Alphabetic understanding—Each child's raw score on the Letter Naming Fluency (LNF) measure from the DIBELS was used to assess alphabetic understanding. The children are asked to identify as many upper- and lower-case letters as possible from a randomly ordered array. The score is the number of correct letters identified in 1 min. Alternate-form, 1-month reliability for LNF data is high (*r* = .88; Good et al., 2003). As with the ISF scores, percentile ranks for the raw LNF scores were based on the norms for general population children in the fall of kindergarten.

Oral language ability—Oral language ability was assessed using each child's scaled core language score (Sentence Structure, Word Structure, and Expressive Vocabulary subscales; *M* = 100, *SD* = 15) of the Clinical Evaluation of Language Fundamentals Preschool–Second Edition (CELF-P; Wiig, Secord, & Semel, 2004). Internal consistency coefficients for data from this scale are high (for ages 4 to 5 years, α exceeded .92). Percentile ranks of the core language score were used in analyses comparing the scores of children in foster care to those of general population children.

Estimated general cognitive ability—The scaled score from the Block Design subscale of the Wechsler Preschool and Primary Scales of Intelligence-Third Edition (WPPSI-III; Wechsler, 2002) was used to estimate general cognitive ability. Data from this subscale are strongly correlated with the Full Scale IQ (*r* = .72; Wechsler, 2002).

Teacher-rated early literacy—Each child's kindergarten teacher completed the 26-item Pre-Literacy Rating Scale (PLRS) from the CELF-P during the fall of kindergarten. The PLRS, shows good internal consistency ($\alpha = .95$) and is designed to measure the frequency with which children display a number of critical emergent reading and writing skills. Although there was some overlap with the measures used to assess prereading skills prior to kindergarten entry (e.g., "the child identifies and names 5 or more letters of the alphabet"), the PLRS items assess a broader range of skills that are specific to reading and writing abilities (e.g., "The child holds a book right side up" and "The child copies and/or writes own name accurately"). The teachers were asked to rate the frequency with which each child displayed the behaviors on a 4-point scale: 1 (*never*) to 4 (*always*) or N/A. A mean PRLS score (range = 1–4) was computed for each child. This was used in the correlational and path analyses described below.

Early intervention services—To account for any early intervention services received, the foster caregivers were interviewed about the type and duration of such services. The caregivers indicated the duration of services received on a 5-point scale: 1 (less that 1 school year) to 5 (more than 2 school years).

Procedure

The children's prereading skills were assessed twice during the summer before kindergarten entry: at the beginning and the end of the summer just before the start of school. The 1.5 h assessments were conducted at the research center. Because general cognitive ability is assumed to be a fairly stable trait (Wechsler, 2002), the Block Design subscale was measured only at the beginning of the summer. Early intervention services were assessed only at the beginning of the summer. The CTOPP, DIBELS, and CELF scores used in the current study were taken from the assessments conducted at the end of the summer. This was done to ensure that the measures used were the closest to the start of school. Information was only available from the assessments conducted at the beginning of the summer for eight of the students, but their scores were used in the analyses to increase statistical power. The PLRS scores were taken from teacher interviews in the fall of kindergarten an average of 2.93 months ($SD = 1.00$) after the start of school. The mean length of time between the end-of-summer child assessment and the teacher interview was 3.51 months ($SD = 1.17$).

All assessments were conducted by undergraduate- and graduate-level assessors trained by supervisors experienced in standardized test administration. The assessors were trained to reliability with their supervisors while assessing practice participants who were not part of the study sample. Periodic checks of their reliability were also conducted as they assessed the study participants.

Data Analysis Plan

The children's percentile rankings on each of the prereading measures were used to analyze the first research question (How do the prereading skills of children in foster care compare to those of general population children?). Chi-square analyses were used to determine if the percentages of children in foster care falling below the 25^{th} and 50^{th} percentile ranks for each prereading skill measure were significantly different than those of the general population. Additionally, the percentage of children in foster care falling below the critical score for each measure was examined using chi-square analyses. Path modeling was conducted using Mplus (Muthén & Muthén, 2007) to answer our second research question (To what extent are particular prereading skills more important than others in predicting teacher-rated early literacy skills in kindergarten for children in foster care?). We chose to use path analysis because it allows for the estimation of missing data using full information

likelihood estimation and accounts for correlated measurement error. An alpha level of $p < .05$ was used to determine statistical significance in all analyses reported below.

Results

Preliminary Analyses

Our preliminary analyses indicated that there were no differences in the prereading and PRLS scores on the basis of foster care type (relative vs. nonrelative), county of residence, or gender ($t = -1.58$ to 1.92, $p = .96$ to .06). The only significant difference was that children of Latino ethnicity had lower core language scores on the CELF-P ($M = 86.19$, $SD = 15.26$) than children of non-Latino ethnicity ($M = 98.00$, $SD = 14.12$), $t(58) = -2.80$, $p < .05$. This may have been due to the possibility that the biological families of some of the children of Latino ethnicity used Spanish or a mixture of English and Spanish in the home. Given that the sample was recruited after entering foster care, it was not possible to gather this information. Latino ethnicity was included as a control variable in preliminary path analyses. The path model that included Latino ethnicity was not significantly different than the model reported below (χ^2 difference = 5.68, $p = .34$). Thus, Latino ethnicity was not included in further analyses.

An alternative path analysis was conducted excluding from the sample the eight children who only had CTOPP, DIBELS, and CELF scores from the beginning of the summer. The path model without these children did not significantly differ from the path model with these children (χ^2 difference = 1.04, $p = .95$). Thus, the results from the path model that included all of the children are presented below.

Descriptive Analyses

The children's mean scores on the measures are presented in Table 1. Also shown in Table 1 are the percentages of children at or below the 25th and 50th percentiles for each prereading skill measure. Chi-square tests were used to determine if the percentages of children at or below the 25th and 50th percentiles differed significantly from what would be expected by chance. This was the case for all of the measures. Additionally, we examined the percentages of children at or below the critical scores for each prereading skill measure. Children scoring below the critical scores are considered to be at-risk for reading or language difficulties. Scores at or below the 23rd percentile on the CTOPP are considered to be below average to very poor (Wagner et al., 1999). Children who score at or below the 16th percentile (i.e., one standard deviation or more below the mean) on the CELF are considered to be at risk for language difficulties (Wiig et al., 2004). For the DIBELS, children who score below the 20th percentile on the ISF or LNF measure are considered to be at risk for later reading difficulties (Good et al., 2003). Chi-square analyses (see Table 1) indicated that the proportion of children in foster care scoring below the critical scores on each of these measures was significantly greater than what would be expected by chance. Thirty-nine percent of the children had received early intervention services: 19% for less than 1 school year, 18% for 1 to 2 school years, and 2% for more than 2 school years.

Multivariate Path Model

Prior to the path analysis, the associations between the children's scores on the prereading measures, the mean of the PLRS, and the control variables were examined. The positive correlations among the prereading skill measures and between the prereading skill measures and the PLRS mean score were significant ($r = .27$ to .68 and .33 to .59, $p < .05$). The children's phonological awareness scores demonstrated a particularly strong association with their core language scores ($r = .68$), raising the possibility of multicollinearity. However, the two skills may be differentially associated with later reading abilities; thus, we decided to

keep these two scores separate in the path analysis and to undertake additional testing to ensure that the strong association did not change results. When the control variables were examined, the WPPSI Block Design scale scores were significantly positively associated with the prereading skill and teacher measures (r = .33 to .43, $p < .05$), with the exception of initial sound fluency (r = .22, p = *ns*). The length of time for early intervention services was not significantly associated with any measure ($r = -.19$ to $-.02$, p = *ns*). Thus, this variable was not included in the path analysis.

The path model (see Figure 1) showed acceptable fit, $\chi^2(5) = 4.95$, p = .42, CFI = 1.00, TLI = 1.00, RMSEA = .00. When all of the prereading measures were included in the model, only phonological awareness was a unique significant predictor of teacher-rated early literacy skills. All of the prereading skill measures significantly covaried with one another. As a group, they accounted for a significant amount of the variance in the teacher ratings (R^2 = .42, $p < .05$).

Two alternate models were conducted to examine the potential effects of the high correlation between phonological awareness and oral language ability. The first analysis included all of the prereading measures except oral language ability and the second included all of the measures except phonological awareness. Neither alternate model significantly differed from the model that included all of the measures (χ^2 difference = 2.30 and 3.93, p = .32 and .34, respectively). Core language was not a significant predictor of PRLS scores in the alternate model. Given these results, we concluded that the results of the full model did not seem to be overly influenced by the strong association between phonological awareness and oral language ability.

Discussion

Data regarding our first research question were consistent with a worrisome observation reported previously in the literature, up to 50% of children in foster care entering kindergarten are at risk for later reading difficulties. On phonological awareness, one of the most predictive prereading skills (Schatschneider et al., 2004), 54% of the children in this study scored below the 23rd percentile. Further, most of the children scored below the 50th percentile on all prereading skill measures. This is consistent with the high rates of developmental delays found in children in foster care (e.g., Klee, Kronstadt, & Zlotnick, 1997) and builds upon past studies by focusing on the prereading skills essential for the development of reading ability.

Our findings for our second research question were consistent with research with the general population (e.g., Schatschneider et al., 2004); phonological awareness was the strongest predictor of teacher-rated early literacy skills in kindergarten. This was true even when estimated general cognitive ability was controlled and in the presence of other prereading skill measures. The association between phonological awareness and future teacher ratings suggested a potentially important target for intervention with children in foster care. A number of studies have demonstrated that it is possible to bolster future reading abilities and prevent reading difficulties by improving phonological awareness (e.g., Bus & Van IJzendoorn, 1999). Additionally, such interventions may increase the effectiveness of future reading interventions, as strong phonological awareness skills appear to predict better response to literacy interventions (Al Otaiba & Fuchs, 2006). Ideally, all children at risk for reading difficulties, including children in foster care, would receive early intervention in a range of prereading abilities. However, given the often limited resources within the child welfare system, specifying the targets that have the most influence on reading outcomes might help to identify services that have the greatest impact. Our results suggest that all preschool-aged children in foster care should receive phonological awareness screening and

that those with deficits should receive early intervention services. However, additional research is needed before recommendations for practice or policy can be confidently made.

It was somewhat surprising that the length of time that the children had received early intervention services was not associated with any of the prereading skill measures. However, such services typically focus on specific disabilities (e.g., providing articulation therapy or occupational therapy) and might not be specific to prereading skills. Further, the caregivers might have underestimated the length of early intervention services due to a lack of knowledge of the children's care histories.

Limitations and Future Directions

Although this study is one of the first to examine specific prereading skills in children in foster care at kindergarten entry, a number of caveats should be mentioned. First, the sample size was small compared to other studies of early literacy skills in the general population. Although this limitation is understandable given the difficulties involved in longitudinal data collection in this population, the results should be interpreted with caution and replicated within a larger sample. To ensure that the significant effect of phonological awareness on teacher reports of early literacy was robust, we conducted a Monte Carlo analysis. Such analyses help to determine whether there is enough power with a given sample size to detect an effect of a given magnitude across multiple samples (Muthén & Muthén, 2002). Maximum power (i.e., > .99) was obtained with 1000 random samples, suggesting that the effect was robust despite the small sample size.

Because of the small sample size, it was beyond the scope of this study to specify the precursors of the prereading skill deficits documented here. Future researchers should more finely detail the early factors that may affect the prereading skills of children in foster care (e.g., type of maltreatment or time spent in foster care). Although we focused on the association between prereading skills and teacher-rated early literacy, there are likely many other factors that affect school outcomes for children in foster care. For example, attention might be important to early school performance (Pears et al., in press). Finally, as is noted above, children in foster care perform more poorly on measures of development and academic performance than children from at-risk, low SES backgrounds (Pears et al., in press). In future work, it would be useful to compare the scores of children in foster care on the specific prereading skill measures in this study with the scores of children from low SES backgrounds.

Despite these limitations, our results indicate that children in foster care lag far behind the general population on a number of prereading skills and suggest some targets for prevention and early intervention with these children, most notably phonological awareness. Programs that target the prereading skills of these children might help to guide them to a more positive trajectory of academic success.

Acknowledgments

This research was supported by the following grants: DA021424, NIDA, U.S. PHS; and DA023920, NIDA, U.S. PHS. The authors thank Kristen Greenley and Angie Relling for project management, Katie Lewis and Matthew Rabel for editorial assistance, and the children and families who participated in the project.

References

Al Otaiba S, Fuchs D. Who are the young children for whom best practices in reading are ineffective? An experimental and longitudinal study. Journal of Learning Disabilities. 2006; 39:414–431. [PubMed: 17004674]

Bus AG, Van IJzendoorn MH. Phonological awareness and early reading: A meta-analysis of experimental training studies. Journal of Educational Psychology. 1999; 91:403–414.

Catts HW, Fey ME, Zhang X, Tomblin JB. Language basis of reading and reading disabilities: Evidence from a longitudinal investigation. Scientific Studies of Reading. 1999; 3:331–361.

Cunningham AE, Stanovich KE. What reading does for the mind. American Educator. 1998; 22(1–2): 8–15.

Fantuzzo J, Perlman S. The unique impact of out-of-home placement and the mediating effects of child maltreatment and homelessness on early school success. Children and Youth Services Review. 2007; 29:941–960.

Good, RH.; Kaminski, RA. Dynamic Indicators of Basic Early Literacy Skills. 6th ed.. Institute for the Development of Educational Achievement; Eugene, OR: 2002.

Good, RH.; Kaminski, RA.; Smith, S.; Simmons, D.; Kame'enui, E.; Wallin, J. Reviewing outcomes: Using DIBELS to evaluate a school's core curriculum and system of additional intervention in kindergarten.. In: Vaughn, SR.; Briggs, KL., editors. Reading in the classroom: Systems for the observation of teaching and learning. Paul H. Brookes; Baltimore: 2003. p. 221-266.

Halonen A, Aunola K, Ahonen T, Nurmi J-E. The role of learning to read in the development of problem behavior: A cross-lagged longitudinal study. British Journal of Educational Psychology. 2006; 76:517–534. [PubMed: 16953960]

Justice LM, Invernizzi M, Geller K, Sullivan AK, Welsch J. Descriptive-developmental performance of at-risk preschoolers on early literacy tasks. Reading Psychology. 2005; 26:1–25.

Klee L, Kronstadt D, Zlotnick C. Foster care's youngest: A preliminary report. American Journal of Orthopsychiatry. 1997; 67:290–299. [PubMed: 9142362]

Mitic W, Rimer M. The educational attainment of children in care in British Columbia. Child and Youth Care Forum. 2002; 31:397–414.

Muthén LK, Muthén BO. How to use a Monte Carlo study to decide on sample size and determine power. Structural Equation Modeling. 2002; 4:599–620.

Muthén, LK.; Muthén, BO. Mplus User's Guide. 5th ed.. Authors; Los Angeles: 2007.

National Institute for Literacy. Developing early literacy: Report of the National Early Literacy Panel. Author; Washington, DC: 2009.

Pears KC, Fisher PA, Bruce J, Kim HK, Yoerger K. Early elementary school adjustment in maltreated children in foster care: The roles of inhibitory control and caregiver involvement. Child Development. in press.

Schatschneider C, Fletcher JM, Francis DJ, Carlson CD, Foorman BR. Kindergarten prediction of reading skills: A longitudinal comparative analysis. Journal of Educational Psychology. 2004; 96:265–282.

Scherr TG. Educational experiences of children in foster care: Meta-analyses of special education, retention and discipline rates. School Psychology International. 2007; 28:419–436.

Wagner, RK.; Torgesen, JK.; Rashotte, CA. Comprehensive Test of Phonological Processing: Examiner's manual. PRO-ED; Austin, TX: 1999.

Wechsler, D. Wechsler Preschool and Primary Scales of Intelligence–Third Edition. PsychCorp; San Antonio, TX: 2002.

Wiig, EH.; Secord, WA.; Semel, E. Clinical Evaluation of Language Fundamentals Preschool–Second Edition. Harcourt Assessment; San Antonio, TX: 2004.

Zima BT, Bussing R, Freeman S, Yang X, Belin TR, Forness SR. Behavior problems, academic skill delays and school failure among school-aged children in foster care: Their relationship to placement characteristics. Journal of Child and Family Studies. 2000; 9:87–103.

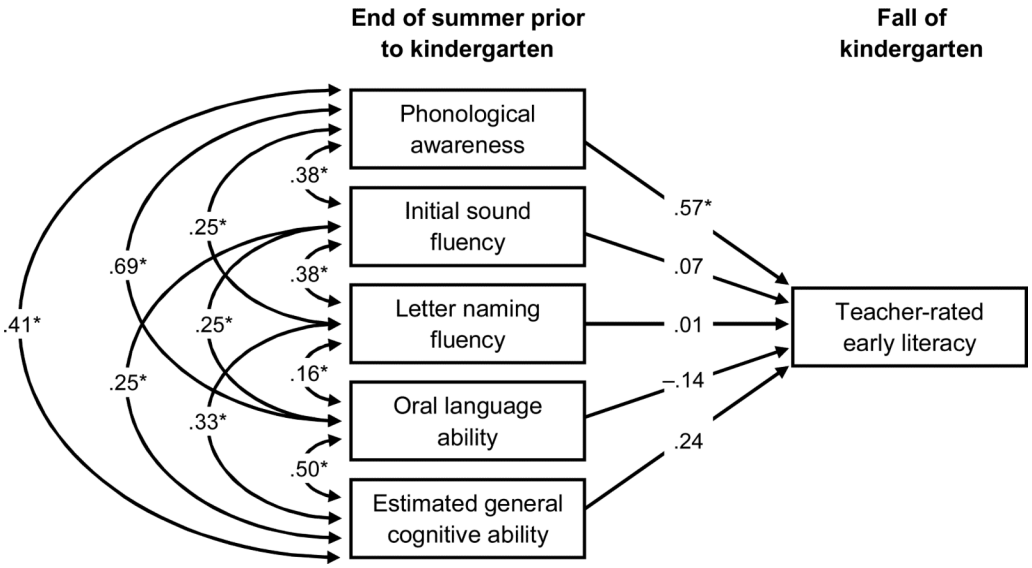

Figure 1.
Path model of prereading measures, teacher ratings, and control measures. *$p < .05$.

Table 1

Means, Standard Deviations, and Percentages of Children at or Below Critical Scores for the Prereading Measures

Measure	*M*	*SD*	Percent at/below the 25th percentile	χ^2	Percent at/below the 50th percentile	χ^2	Percent at/below the critical score	χ^2
Phonological awareness composite score	91.70	10.24	53.7	23.73*	81.5	21.41*	53.7	28.74*
Initial sound fluency raw score	7.11	7.69	44.3	12.07*	72.1	11.95*	36.1	9.84*
Letter naming fluency raw score	7.49	10.22	50.8	21.69*	78.7	20.08*	47.7	28.92*
Oral language ability scaled score	94.85	15.24	36.7	4.36*	68.3	8.07*	26.7	5.08*
Estimated general cognitive ability	8.77	3.28						
Teacher-rated early literacy	3.14	0.57						

Note. Chi-square tests were used to determine if the percentages of children in foster care at or below given percentiles or scores differed significantly from those in the general population.

* $p < .05$