

The home-literacy environment of young children with disabilities[☆]



Laura M. Justice^{a,*}, Jessica A.R. Logan^a, Sonnur Işitan^b, Mesut Saçkes^b

^a The Ohio State University, United States

^b Balıkesir University, Turkey

ARTICLE INFO

Article history:

Received 8 October 2015

Received in revised form 23 May 2016

Accepted 25 May 2016

Available online 20 July 2016

Keywords:

Disabilities

Early literacy

Home literacy environment

ABSTRACT

Some studies have reported that young children with disabilities have qualitatively distinct home-literacy environments and interests than young children without disabilities. Such differences may contribute to differences in the early-literacy skills of children with and without disabilities. This study was designed to measure three distinct features of the home-literacy environment for children with and without disabilities (frequency of storybook reading, literacy teaching during book reading, children's print interest; hereafter frequency, teaching, and interest) and determine the extent to which these may vary for the two groups of children. Parents of 692 preschool-aged children (57% with disabilities), all enrolled in inclusive early children special education classrooms, completed a comprehensive assessment of the home-literacy environment in fall of the academic year. Children's teachers completed an assessment for each child on their early-literacy skills. The home-literacy environments of children with and without disabilities was distinguishable only for children's interest; frequency and teaching were comparable. Importantly, children's interest was positively associated, concurrently, with early-literacy skills. This study helps to pinpoint which aspect of the home-literacy environment distinguishes between children with and without disabilities. Findings also suggest the potential importance of identifying avenues to improve the print interest of young children with disabilities.

© 2016 Elsevier Inc. All rights reserved.

The literacy skills that preschool-aged children exhibit before entering formal schooling and beginning to learn to read, usually at age 5 or 6 years, provide an important foundation for reading achievement (Catts, Fey, Zhang, & Tomblin, 2001; Connor, Morrison, & Slominski, 2006; Justice, Bowles, & Skibbe, 2006; Storch & Whitehurst, 2002). Several early-literacy skills found to be consistently strong predictors of future reading achievement in word recognition and/or reading comprehension include print knowledge, emergent writing, and phonological awareness (Lonigan & Shanahan, 2009). Print knowledge refers to children's emerging knowledge of the forms and functions of print, including the distinguishing features and names of the individual alphabet letters (Justice & Ezell, 2001). Emergent writing refers to children's developing understanding of the orthographic and compositional aspects of written language (Cabell, Justice, Zucker, & McGinty, 2009). Phonological awareness refers to children's developing sensitivity to the sound structure of spoken language (Storch &

Whitehurst, 2002). Convincing evidence shows that preschool-aged children with well-developed print knowledge, emergent writing, and phonological awareness are likely to be better readers in their future than children with under-developed skills (Lonigan & Shanahan, 2009).

With the importance of early-literacy skills to future reading achievement well-established in the developmental literature, there is increased attention directed toward identifying children who exhibit difficulties in developing early-literacy skills in a timely manner. The rationale for doing so is that interventions can be introduced that serve to enhance these skills, so as to potentially reduce a child's risk for future reading problems (Wilson & Lonigan, 2009). For instance, parents can receive training on how to read books with their children in ways that improve specific early-literacy skills, such as print knowledge (Justice & Ezell, 2000). Some work suggests that early interventions delivered to children with lags in early-literacy development can significantly improve their future reading abilities (Gillon, 2002; Piasta, Justice, McGinty, & Kaderavek, 2012).

One population of children considered to be at elevated risk for exhibiting lags in early-literacy development is children with developmental disabilities. This is particularly true for children with language impairment, in which children's language skills lag seriously behind same-age peers. The majority of children with

[☆] This research was supported by Grant # R324A080037 from the Institute of Education Sciences to the first author. The authors are grateful to the teachers, families, and children who participated in this research.

* Corresponding author at: Crane Center for Early Childhood Research and Policy, 356 Arps Hall, Ohio State University, Columbus, OH 43210, United States.

E-mail address: justice.57@osu.edu (L.M. Justice).

developmental disabilities exhibit language impairment, either as a primary etiology (primary language impairment) or secondary to other conditions, such as autism spectrum disorder, intellectual disability, or hearing loss. A number of studies have shown that children with impaired language skills perform relatively poorly on measures of early-literacy skill, especially as compared to non-impaired peers (Boudreau & Hedberg, 1999; Cabell, Justice, Zucker, & McGinty, 2009). Further, a recent investigation sought to determine the percentage of children with language impairment who exhibited an at-risk profile of early-literacy skill that signified heightened risk for future reading problems, using latent class analysis (Justice, Logan, Kaderavek, Schmitt, Tompkins et al., 2015). Children considered to have at-risk profile were those who exhibited significantly depressed early-literacy skills across multiple domains (e.g., print knowledge, emergent writing, phonological awareness) relative to other children with impaired language. Of the 218 preschoolers in the study, nearly 70% were in at-risk profiles, exhibiting significantly depressed skills across multiple domains of early-literacy skill. Profile membership was associated with the severity of children's language impairment: children with more severely affected language skills were more likely to be placed in an at-risk profile.

There have been some efforts to determine why so many children with disabilities are susceptible for lags in early-literacy skill as compared to typically developing children. It is possible that these children's literacy difficulties simply reflect an additional "symptom" of an underlying language disability (Scarborough, Fletcher-Campbell, Soler, & Reid, 2009); however, some research has suggested that the literacy problems observed among children with disabilities can also be environmentally based, resulting from impoverished literacy experiences provided by caregivers in the home environment (Light & Smith, 1993; Marvin, 1994; Marvin & Mirenda, 1993; Scarborough, 1991). For instance, parents of children with disabilities have been reported to read less often with their children and to have relatively low priorities for their children's literacy growth as compared to parents of children who are typically developing (Light & Smith, 1993). Such work has contributed to the perspective that the literacy difficulties of children with disabilities may stem from limitations in the home-literacy environment. Nonetheless, it is important to point out that this literature has several salient shortcomings. First, many of the studies of the home literacy environment of children with disabilities have involved very small numbers of children (Fitzgerald, Roberts, Pierce, & Schuele, 1995), thus it is difficult to know how well any results can generalize broadly to children with disabilities and their families. Second, many of these studies have not included comparison samples of children who are typically developing (Al Otaiba, Lewis, Whalon, Dyrland, & McKenzie, 2009; Skibbe, Moody, Justice, & McGinty, 2010), thus limiting any conclusions that can be made about the distinctiveness of the home literacy environment for children with disabilities.

One study sought to overcome these limitations by conducting secondary analysis of a survey administered to a nationally representative sample of households across the United States. Specifically, Breit-Smith, Cabell, and Justice (2010) used data from the National Household Education Survey administered by phone to more than 25,000 heads of households in the U.S. in 2005. The survey content included information about children living in the home as well as the frequency of three specific home-literacy experiences (e.g., How often they tell stories to their children; How many minutes per day they read to their children; How often they visit the library with their children). Responses to these items for 478 caregivers with children (<6 years of age) with disabilities were compared to a randomly selected subset of parents with typically developing children ($n=478$). Among this large, nationally representative sample, there were no significant differences in the

home-literacy activities experienced by children with disabilities as compared to those without. Given the nature of the sample, being both large and representative, such findings raise questions about whether the home-literacy environment experienced by children with disabilities is, in fact, different from that of their typically developing peers.

Before proceeding, it is important to further clarify what is meant by the home-literacy environment. The home-literacy environment, as informed by a large body of quantitative and qualitative work, serves to represent the literacy-related resources and models available to young children, as well as the ways in which and frequency with which children engage with these resources alongside others and on their own (Van Steensel, 2006), which some researchers call the "active HLE" (Burgess, Hecht, & Lonigan, 2002). Although a number of studies have focused exclusively on the frequency with which parents read to children and explicitly teach their children about reading and writing (Scarborough & Dobrich, 1994; Scarborough, Dobrich, & Hager, 1991; Sénéchal, 2006; Sénéchal, Lefevre, Thomas, & Daley, 1998), including those studies referenced in the preceding paragraphs, Van Steensel has argued that a broadened conceptualization of the home-literacy environment that captures the child's interests as an active part of this environment is needed to advance the field.

Thus, an additional limitation of the literature concerning the home-literacy experiences of young children with disabilities is that it has not considered children's interest toward print, or motivation to engage in interactive reading activities, as a salient aspect of this environment; this is the aspect of the environment that researchers refer to as the "active HLE" (Burgess et al., 2002). Rather, much of the prior research on home-literacy experiences for children with disabilities has focused on how often their parents engage in certain literacy-related activities, such as parent-child storybook reading, or the number of literacy-focused materials in the home, such as storybooks. For young children, engagement with others is a central mechanism through which they learn, as emphasized by several prominent developmental theories (Bronfenbrenner, 1986; Sy, Gottfried, & Gottfried, 2013). With respect to early-literacy development, experts have suggested that children internalize knowledge about written language that is shared within the context of literacy-based interactions with others (Kaderavek & Sulzby, 1998). Children's interest toward engaging with others in such events, such as soliciting help to read words in their environment or asking for help to write their ideas, can be conceptualized as a unique feature of the home-literacy environment that should be represented distinctly from other aspects of the environment, which often represent how often parents initiate literacy-focused activities, such as reading to their children. Work by Fritjers et al. (2000) found a very small correlation (-0.13) between children's literacy interest and parent-initiated aspects of the home-literacy environment, such as the frequency of library visits and parent-child book reading (Fritjers, Barron, & Brunello, 2000). Further, their work showed that both children's print interest and parent-initiated literacy activities were unique, positive, and significant predictors of children's early-literacy skills. This study suggests that the home-literacy environment includes both parent-initiated and child-initiated literacy activities, representing both as potentially influential to understanding individual differences in the home-literacy environment and children's literacy development.

In the present study, we contribute to this literature and seek to address the unresolved question as to whether the home-literacy environment of children with disabilities can be distinguished from that experienced by children who do not have disabilities. Children in the present study were drawn from inclusive early childhood special education (ECSE) classrooms that served approximately equal numbers of children with disabilities and typically develop-

ing peers. Thus, the early-educational experiences of the children with disabilities and their typically developing peers were in at some important ways comparable; for instance, the children all attended preschool programs that were of similar duration, and shared the same peers within these learning environments. Their caregivers completed a comprehensive questionnaire regarding the frequency and nature of literacy experiences in the home, and children's teachers also completed an assessment of children's early-literacy skills in the fall of the academic year. These procedures allowed us to address two research questions: (1) To what extent are there differences in the home-literacy environment experienced by children with disabilities as compared to typical peers; and, (2) To what extent is the home-literacy environment related to children's early-literacy skills?

In addressing these questions, we examined the home-literacy environment of a heterogeneous group of children with disabilities, and did not seek to examine learning environments for specific subgroups of children, such as children with autism spectrum disorder or children with intellectual disability. While there is value in examining learning environments for subgroups of children with disabilities, as some studies have done (Dydia, Lawton, Logan, & Justice, 2014; Marvin, 1994; Sawyer et al., 2014), we elected in this study to focus on these children as a larger intact group, as have others (Breit-Smith et al., 2010). Within the ECSE context, a non-categorical approach is typically used to qualify children for disability services, without reference to a specific diagnostic category. The commonality among these youngsters is that all were participating in early childhood special education, all were receiving specialized services within public schooling, and all had IEPs.

1. Method

1.1. Participants

Participants were 692 preschool children enrolled in 83 public ECSE classrooms in one Midwestern state. ECSE classrooms in this state typically enroll between 6 and 10 children with disabilities and up to six children who are typically developing, often striving for a 1:1 (50/50) ratio with maximum classroom enrollment of 12 children. The 50/50 ratio is legislated by the state to create the least restrictive environment for young children with disabilities. In this state, there are relatively few 'self-contained' ECSE classrooms due to statutory provisions.

All of the children in the classrooms, both those with disabilities and those who are typically developing, participated free-of-charge. The children with disabilities are invited to participate as a result of their eligibility due to receipt of an Individualized Education Plan (IEP) and referral to the closest school providing ECSE services. Therefore, the children in this study are not necessarily only those who have mild/moderate disabilities, as most children with IEPs are referred to inclusive ECSE programs. For the typically developing children, programs advertise widely the available of free early childhood programming and there are no restrictions to applications among typically developing children. The children were entered into the study as a function of their teachers' consent to participate in a randomized controlled trial (RCT) investigating effects of an experimental early-literacy curriculum. Details concerning the RCT are available under separate cover (Justice, Logan, Kaderavek, & Dydia, 2015). As ECSE teachers, all of the involved teachers had at least a Bachelor's degree, with 78% having additional educational qualifications (e.g., master's degree). On average, the teachers had 12 years of experience ($SD=9$).

All of the children in each teachers' classroom were subsequently recruited to participate via provision of information and

informed-consent agreements to the caregivers of all children within a classroom. Specifically, the caregivers of all children in each classroom received a packet via 'backpack mail' in the first two weeks of the academic year that included a consent form, general study information, and a brief screener. Caregiver consent rates per classrooms averaged about 85%. Approximately two weeks later, caregivers who had consented into the study received a questionnaire, again via backpack mail, that included a number of items to capture demographic information about the household and the family, the child's health history, and parents' reading history, and the home-literacy environment. The caregivers received a small gift-card along with the questionnaire as an incentive to complete it and return it to study staff.

The 692 children included in the present study were a subset of a larger number of consented children ($n=741$). Of the originally enrolled students, 49 withdrew from the study (parents withdrew, families moved, children did not assent to participate, or teachers withdrew from the study), and were removed from analyses. Upon further analysis, 73 parents did not complete a questionnaire at study entry that examined the home literacy environment. To address missing data in this study, we compared the 618 children for whom the questionnaire was completed to the larger sample of 692 children on all relevant background variables (including parent education, child age, student race/ethnicity, and emergent literacy assessment data), and found no systematic differences. Then, we ran a missing data analysis on all variables included in study and determined that the data were missing completely at random (Cui square = 89.53, $DF=84$, sig 0.319). This result suggests that we can use an imputation method to retain as much data as possible to inform our questions; thus, we use maximum likelihood estimation and retain 692 children in all inferential analyses.

Missing data analyses were conducted using all variables included in the present study, and results showed that data were missing completely at random, $\chi^2=89.53$, $p=0.319$; therefore, the missing home literacy environment scores were estimated using full information maximum likelihood estimation in Mplus.

The 692 children included in this study ranged in age from 36 to 69 months ($M=52$ months). Slightly more than one-half (57%; $n=350$) of the children had disabilities and were receiving services for these within their ECSE classrooms. The majority of these children had a general, non-specific disability, whereas 99 had an identified disability, such as autism spectrum disorder ($n=34$), cerebral palsy ($n=7$), and Down syndrome ($n=7$). Boys were slightly over-represented in the sample (65%), which is not surprising given that the sample included children with disabilities and males are over-represented in this population (Oswald, Best, Coutinho, & Nagle, 2003). The majority (77%) of children were Caucasian, while 11% were Black/African-American and the remainder (12%) were other race/ethnicities or multi-racial; 98% of children spoke English as their first language. The children were diverse with respect to socioeconomic status (SES); caregiver-reported annual household income ranged from \$10,000 or less annually (10%) to greater than \$85,000 (26%), with the median household income in the range of \$55,000 to \$60,000 annually. Table 1 provides descriptive statistics regarding the overall sample as well as the two subsets of children (i.e., children with and without disabilities).

1.2. Procedure

Children were enrolled in the study in the fall of the academic year, subsequent to their teacher enrolling in the study and their caregivers providing informed consent. Upon enrollment, caregivers completed a set of questionnaires examining the home-literacy environment. About six weeks into the academic year, teachers completed a questionnaire examining children's early-literacy skills. As these questionnaires were collected prior to the

Table 1
Descriptive statistics for participating children.

	All Children (<i>n</i> = 692)		Children without Disabilities (<i>n</i> = 306)		Children with Disabilities (<i>n</i> = 386)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Maternal Ed	6.05	2.47	6.38	2.38	5.80	2.51
Age	51.73	2.20	51.82	6.56	51.67	7.68
PLRS	2.20	0.68	2.51	0.65	1.97	0.60

Note: *Maternal education* represents the highest level of education achieved based on the following scale: 1 = 8th grade; 2 = some high school; 3 = high school; 4 = technical training; 5 = 2-year degree; 6 = 4-year degree/Bachelor's degree; 7 = Bachelor's degree + 1 year; 8 = Master's degree; 9 = Education Specialist; 10 = doctorate. Age represents child's age in months. *PLRS* = mean rating (4-point scale) on the Preschool Literacy Rating Scale. Note that there was considerable missing data for mother's education (*n* = 255 and 331 for children with and without disabilities). This was corrected for in future models using maximum likelihood estimation.

larger RCT in which teachers and children were enrolled, the experimental procedures would not have influenced these data and we, therefore, do not account for the specific conditions to which teachers (and children) were assigned in our analyses.

1.3. Home-literacy environment questionnaire

Caregivers completed a comprehensive questionnaire in the fall of the year providing information about their children and their family (e.g., race, household income, family size) as well as the home-literacy environment. In total, 37 questions were included on the questionnaire in an effort to broadly describe the home-literacy environment and which were derived from various instruments described in the extant literature (DeBaryshe & Binder, 1994; Griffin & Morrison, 1997). For instance, parents were asked about their beliefs regarding reading with their children (e.g., "Reading together helps my child learn language skills," 0 = strongly disagree, 4 = strongly agree) and their own leisure-reading activities (e.g., "How often do you read to yourself?" 0 = I do not read, 3 = daily).

Given the number of items available to describe the home-literacy environment for each child, we reduced the set of items to three variables based on prior research by Sawyer et al. (2014) that investigated the home-literacy environment of a subset of a 119 children in the RCT from which the present sample was derived (Sawyer et al., 2014). That study focused specifically on children with language impairment and the interplay between child-level characteristics and the home-literacy environment. Theoretical and empirical processes (e.g., exploratory principal component analysis) were used to represent three features of the home-literacy environment using select items from the questionnaire: (1) frequency of storybook reading ("frequency," 2 items), (2) literacy teaching ("teaching," 2 items), and (3) children's print interest ("interest," 2 items). *Frequency* captured the volume of reading activities children experienced in the home environment; *teaching* captured the extent to which parents explicitly taught their children early-literacy skills and concepts; and *interest* represented the child's motivation toward literacy-related activities in the home environment.

For the present purposes, we used confirmatory factor analysis (CFA) to derive measures of frequency, teaching, and interest based on the items included in each of these by Sawyer et al. (2014). Because two of Sawyer et al. (2014)'s factors included only two items (frequency, interest), we added additional items to represent these factors in the present study, and assessed their (and all of the other items') fit to the factor to which they were ascribed. For frequency, two additional items were included (four items total), no changes were made to teaching (two items total), and one additional item was added to interest (three items total).

The CFA was fit in Mplus v6.0 using the regression method and maximum likelihood estimation. The final CFA model is presented in Fig. 1. All error variances between observed scores were constrained to be independent, and this decision was confirmed by

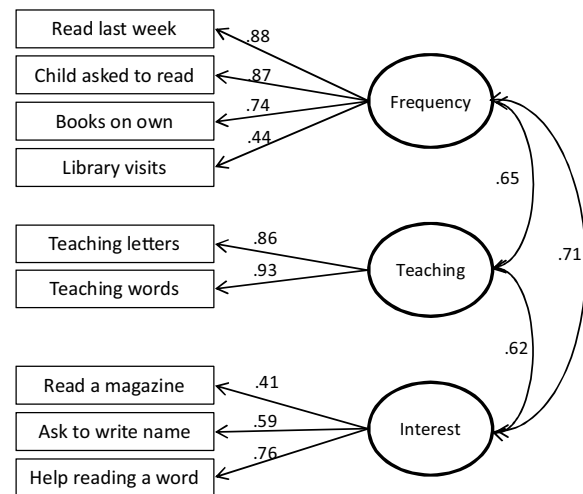


Fig. 1. CFA model of the home literacy environment questionnaire.

checking modification indices. The model fit well, with a CFI and TLI both well above the suggested 0.90 cut-point indicating good model fit (at 0.98 and 0.96 respectively). The RMSEA (0.06) and SRMR (0.04) were also both within good model fit criteria (Kline, 2015). In addition, all factor score determinacies were high, both frequency and teaching had estimated factor determinacies of 0.95, and interest was slightly lower at 0.87, indicating that there is high correlation between the estimated factor scores and true factor scores. All factor loadings were larger than 0.4, another indication that items were loaded onto the correct factors (See Fig. 1, Kline, 2015).

1.3.1. Frequency of storybook reading (frequency)

This factor was based on caregiver responses to four items concerning the frequency with which children (a) are read to on a weekly basis (factor loading of 0.88), (b) ask to be read to on a weekly basis (factor loading of 0.87), (c) look at books on their own on a weekly basis (factor loading of 0.74), and (d) visit the library or bookstores on a monthly basis (factor loading of 0.44). The exact questionnaire items to represent frequency of storybook reading and the other factors appear in the Online Supplementary Material.

1.3.2. Literacy teaching during book reading (teaching)

This factor was based on caregiver responses to two items concerning the frequency with which caregivers teach children during shared reading about (a) alphabet letters (factor loading of 0.86) and (b) individual words (factor loading of 0.93).

1.3.3. Children's print interest (interest)

This factor was based on caregiver responses to three items concerning the frequency with which children (a) look at or read children's magazines (factor loading of 0.41), ask family members

to help them write their name (factor loading of 0.59), and (c) ask family members to help them read a word (factor loading of 0.76).

Note that in the process of determining the final model used to represent these three constructs, a few alternative models were tested to explore the best fit for the “child asked to read” question, which ultimately was included with the frequency factor but seemed to fit well with the interest factor. We examined its fit to the interest factor relative to the frequency factor, and its fit was superior for the latter; in addition, we explored cross loading this item on both the interest and frequency factors, but this model was inferior to loading is singularly on the frequency factor. Therefore, the model presented in Fig. 1 was found to provide the significantly best fit.

1.4. Early-literacy skills questionnaire

About six weeks into the academic year, children’s teachers completed the Preschool Literacy Rating Scale (PLRS), which is a component of the *Clinical Evaluation of Language Fundamentals-Second Edition* (Secord, Semel, & Wiig, 2003). The PLRS is a 26-item rating scale that asks informants to respond to a series of statements regarding children’s early-literacy skills. Informants respond to statements such as “The child turns the pages in books one at a time in front-to-back order” using a rating scale that ranges from 1 (never) to 4 (always) to describe how often the child demonstrates the skill. Although commercially available, the administration manual does not provide information concerning the concurrent or predictive relations of the PLRS with other indirect or direct assessments of children’s emergent literacy skills. However, Cabell, Justice, Zucker and Kilday (2009) examined the concurrent relations between the PLRS and direct assessments of children’s early-literacy skills, reporting that there was a high level of congruence between teacher report and direct assessments; specifically, the relations between teachers’ report using the PLRS and direct assessments of children’s alphabet knowledge, name-writing skill, and print awareness ranged from 0.48 to 0.6. In addition, they examined the diagnostic utility of the tool, finding classification accuracy of about 80% for identifying children at-risk in their early-literacy skills (Cabell, Justice, Zucker, & Kilday, 2009). For the present purposes, we derived an early-literacy score for each child from the PLRS by calculating the mean rating for each item (sum of all items divided by the number of items). For this sample, the Cronbach’s alpha was high (0.96), suggesting the scale is reliable, and the mean rating was 2.23 ($SD = 0.69$), with a range of 1–4 (see Table 1).

2. Results

Research questions were addressed using hierarchical linear modeling (HLM) allowing children to be nested within teachers/classrooms. Traditionally, HLM would be used to account for potential influences of the classroom or classroom teacher on children’s skills or abilities. In this case, the variables of interest are parental home literacy practices (likely not influenced by the classroom) and children’s early-literacy skills measured when they first enter preschool (and therefore not likely to have yet been influenced by the teacher). We chose to examine the research questions using HLM in this case to account for any un-measured factors that may influence a parent or caregiver’s decision to enroll the child at that particular preschool. It is possible that parents will choose to enroll children in a preschool near their home, or that children who are enrolled in a particular classroom are more similar to one another than children in different classrooms. At the same time, the measure of children’s early-literacy skills is based on teacher report; therefore, we cannot assume independence in the observa-

Table 2

Descriptive statistics for home-literacy environment (HLE) features.

HLE Feature	Children without Disabilities ($n = 306$)		Children with Disabilities ($n = 386$)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Frequency	0.04	0.95	−0.03	0.95
Teaching	0.04	0.94	−0.03	0.96
Interest	0.13	0.88	−0.10	0.85

Note: Factor scores were extracted from Mplus confirmatory factor analyses, and are standardized to a mean of zero and standard deviation of one for the full sample.

tions of children’s skills within a classroom. HLM provides a direct measurement and estimation of the variability in children’s home-literacy environment or early literacy skills that is attributable to the preschool classroom in which they are enrolled, and also seeks to control for this variability in the analysis (Table 2).

To answer the first question, which concerns the extent to which there are differences in the home-literacy environment experienced by children with disabilities as compared to typical peers, we extracted the factors from the CFA presented in Fig. 1 and conducted three separate HLM analyses using SAS v9.0. Each analysis served to predict one of the three factors of the home literacy environment (frequency, teaching, and interest) from children’s disability status, after controlling for mother’s education and the child’s age. The analyses therefore serve to determine whether home-literacy practices are predicted by whether a child has a disability. The results of these models are reported in Table 3, and are reviewed here.

For each of the three home-literacy outcomes, the variance accounted for by classroom/teacher was non-significant, and the proportion of total variance accounted for (the intra-class correlation, or ICC) was zero for frequency and interest and only 1% for teaching. This suggests that none of the variability in caregivers’ home-literacy practices is attributable to the classrooms in which they enroll their children. With respect to whether home-literacy practices vary depending on the child’s IEP status, the results showed that of the three practices, only one practice differed for children with and without disabilities. Specifically, for frequency, we found that after controlling for parent education and child age, children without disabilities scored on average 0.12 points higher than their peers with disabilities, but this finding was not significantly different from zero ($p = 0.06$; Table 3). There were also no differences observed between the teaching practices of parents of children with disabilities and their peers. However, we did see a significant difference favoring the typically developing peers for print interest, such that children with disabilities on average received scores that were 0.31 points lower ($p < 0.001$, Table 3), or one-third of a standard deviation of the factor.

The second research question was focused on whether the home-literacy environment is related to children’s early-literacy skills, both for children with and without disabilities. This question examines concurrent relations between children’s literacy experiences at home and their skills, as reported by their caregivers and teachers, respectively. To examine these questions, we conducted four separate analyses in multilevel structural equation modeling (SEM) using Mplus v6.0. In each model, the outcome was children’s early-literacy skills measured at the beginning of preschool predicted from their home-literacy experiences (frequency, teaching, or interest depending on the model), their disability status, and controlling for maternal education and the child’s age. For these four SEMs, we also included a random variance component (τ) to account for the potential lack of independence in children’s early-literacy skills for children enrolled in a given classroom. The variance component τ includes not only the unmeasured factors that may have contributed to the similarities of children in the same classroom, but also the teacher’s potential rater bias. A con-

Table 3
Results of HLMs predicting HLE factors (frequency, teaching, and interest) from children's disability status.

Estimates	HLE: Frequency		HLE: Teaching		HLE: Interest	
	Estimate	<i>p</i>	Estimate	<i>p</i>	Estimate	<i>p</i>
Intercept	0.09	0.701	−0.40	0.166	−0.71	0.003
No Disability	0.12	0.059	0.12	0.122	0.31	<0.001
Mom's Education	0.03	0.011	−0.01	0.683	0.01	0.469
Age in Months	0.00	0.774	0.01	0.031	0.01	0.001
Variance Components						
Tau	0.00	.	0.01	0.427	0.00	.
Sigma Squared	0.56	<0.001	0.78	<0.001	0.52	<0.001
ICC	0%		1%		0%	

Note: The estimate for "No Disability" represents the mean difference in the early-literacy scores for students with and without disabilities. Variance component Tau represents the proportion of variance in the HLE factor that is attributable to the teacher, variance component sigma squared is the error variance in the model.

ceptual SEM is presented in Fig. 2. The four models sequentially tested each HLE factor as an individual predictor of children's early-literacy skills (Paths A, B, and C), followed by one model including all three as predictors.

The results of the four fitted models are reported in Table 4. For each of the four models, we found that a significant proportion of the variance in children's early-literacy skills was attributable to the classroom in which they were enrolled (variance component Tau; Table 4), with an intraclass correlation of approximately 26% in each estimated model. For the first model, predicting children's skills from the frequency factor only, we found that frequency was significantly predictive of children's early-literacy skills (estimate = 0.11, $p < 0.001$). In this model, we also found that children's early-literacy skills were predicted from whether or not they had a disability (0.50, $p < 0.0001$), and their age in months (0.04, $p < 0.001$). Note that disability status and age were found to be predictors of children's early-literacy skills in all models. The second model predicted children's skills from only the teaching factor, and we found a significant relation between frequency of parent teaching of early literacy and children's early-literacy skills (estimate = 0.03, $p = 0.006$). In the third model, predicting children's skills from the interest variable, we found home-literacy interest to significantly predict children's early literacy skills (estimate = 0.15, $p < 0.001$).

The prior three models examine the relations between each home-literacy factor (frequency, teaching, interest) and children's early-literacy skills separately. For the sake of thoroughness, we conducted one final model in which all three home-literacy factors were considered in a single model, thereby looking at their unique association with children's early-literacy skills in the context of all the home-literacy factors, thus controlling for the effects of each other. The final model is presented in Table 4. For the three predictors, we found that frequency was unrelated to children's early-literacy skills (coefficient = 0.04, $p = 0.377$); teaching was significantly related to early-literacy skills, but negatively so (−0.09, $p = 0.011$); and interest was significantly related to early-literacy skills, but positively (0.19, $p < 0.001$).

The observed pattern of results in Table 4 (the 'All' column) are important to clarify. Here, we see that one predictor, teaching, has an opposite sign in the multiple regression than it did in the single regression, and that a second predictor, interest, has a larger coefficient in the multiple regression than it did in a single regression. When this occurs, it signifies a suppression effect (MacKinnon, Krull, & Lockwood, 2000). Suppression effects indicate that some aspect of the suppressor variable, an aspect that is correlated with the suppressed variable, is unrelated or unimportant to the variance in the outcome. In this case, the identified suppressive effect of interest on teaching in the prediction of children's early-literacy skills suggests that there is an aspect of teaching that is shared with interest but that it is unrelated or negatively related to children's early-literacy skills. The aforementioned aspect must be captured in the shared variance between teaching and interest, as the effect

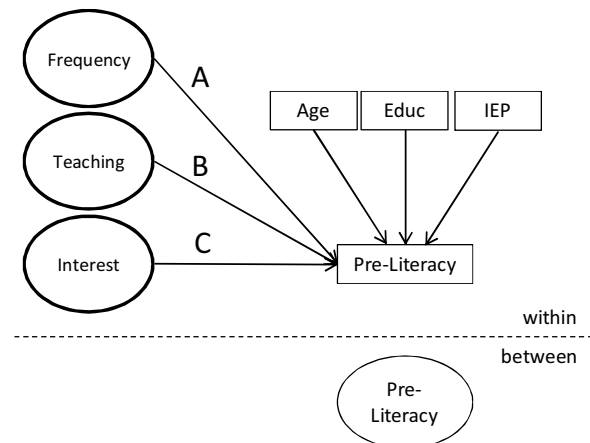


Fig. 2. Conceptual HLM model for the relations between the home literacy environment and children's pre-literacy skills. The dotted line signifies the division of within-classroom effects from between-classroom effects. Paths labeled A, B, and C were first estimated in individual models (corresponding to the Frequency, Teaching, and Interest columns of Table 4), then all estimated simultaneously.

is only present when they are both included together, controlling for one another's effects. In essence, the suppressor (interest) uses the variance associated with the suppressed variable (teaching) to improve its contribution to the prediction of children's early-literacy scores. The result is a null or negative loading from teaching to children's skills. The suppression effect can also be interpreted conceptually: In this case, the negative relation between teaching and children's early-literacy skills (estimate = −0.09; Table 4) suggests that of those parents who have children equally interested in print, those who do more teaching activities tended to have children with lower early-literacy skills.

3. Discussion

The present study involved 618 preschool-aged children with and without disabilities, all enrolled in inclusive ECSE classrooms, and was designed to examine whether and to what extent there were differences in the home-literacy experiences to which they were exposed in the home environment. Additionally, we explored whether home-literacy experiences were associated with children's skills. The present study is one of the largest investigations of the home-literacy experiences of young children with disabilities that also includes a strong comparison group of children without disabilities. The participants were drawn from inclusive ECSE classrooms, which provides a strength to this study in that it creates a commonality in the early-educational experiences for children with disabilities and their typically developing peers. Nonetheless, we must also indicate that the results may not generalize to children outside of ECSE classrooms, including children with dis-

Table 4

Results of multilevel SEM predicting relations between HLE factors (frequency, teaching, and interest) and children's early-literacy skills.

	Frequency Only		Teaching Only		Interest Only		All	
	Estimate	p	Estimate	p	Estimate	p	Estimate	p
Estimates								
HLE: Frequency	0.11	<0.001	–	–	–	–	0.04	0.377
HLE: Teaching	–	–	0.06	0.006	–	–	–0.09	0.011
HLE: Interest	–	–	–	–	0.15	<0.001	0.19	<0.001
No Disability	0.50	<0.001	0.50	<0.001	0.46	<0.001	0.45	<0.001
Age in Months	0.04	<0.001	0.03	<0.001	0.03	<0.001	0.03	<0.001
Variance Components								
Tau	0.07	<0.001	0.08	<0.001	0.07	<0.001	0.07	<0.001
Sigma Squared	0.28	<0.001	0.28	<0.001	0.27	<0.001	0.26	<0.001
ICC	20%		22%		21%		26%	

Note: The estimate for “No Disability” represents the mean difference in the early literacy scores for students with and without disabilities. Variance component Tau represents the proportion of variance in early literacy score that is attributable to the teacher, variance component sigma squared is the error variance in the model. Models were identical when estimated with or without mother's education.

abilities, and we cannot entirely ensure that the early-educational experiences of children with and without disabilities in ECSE settings are indeed similar.

Despite these caveats, this work helps to improve our understanding of the home-literacy experiences of children with disabilities, especially in relation to the experiences of their typically developing peers. Home-literacy experiences refer to the frequency and nature of children's interactions with literacy materials and activities in the home environment, often facilitated by their caregivers (DeBaryshe & Binder, 1994; Fitzgerald et al., 1995). For young children, these experiences are a primary mechanism through which they develop their early-literacy skills. For instance, research suggests that children have higher levels of early-literacy skills when their caregivers engage in more direct teaching of literacy skills to their children during reading activities (Sénéchal et al., 1998). Theoretically, children who seldom have experiences with literacy-related activities and materials in the home environment would have little opportunity to develop knowledge about literacy.

Some researchers have shown that the home-literacy experiences of children with disabilities differ in fundamental ways from those who are typically developing. For instance, in an early study on this topic, Marvin and Miranda examined the home-literacy experiences of 168 children with disabilities as compared to 28 typically developing children using parent surveys; as in the present study, the children were drawn from ECSE settings (Marvin & Mirenda, 1993). The study results suggested that children with disabilities not only had far fewer literacy experiences in the home than their typical peers, but also that their parents had significantly lower priorities regarding their literacy growth as compared to parents of typically developing children. There are methodological limitations to this study, however, that raise concerns about these conclusions; for instance, no analyses controlled for significant pre-existing differences between the two groups of children and their caregivers, such as socioeconomic status and child age. It may be that the differences observed between the two groups reflected one of these variables. In a later study by Weikle and Hadadian (2003), 392 parents of preschool-aged children, 200 of whom had disabilities, completed surveys about their home-literacy experiences; the samples were shown to be similar on key sociodemographic variables (e.g., parent age, level of education). Parents reported the frequency with which they engaged in 10 literacy-promoting activities (e.g., encourages child to practice writing) based on a questionnaire developed by the study authors. The mean frequency across these activities was significantly higher for parents of typically developing children, with an effect-size contrast of about 0.3 (a small effect). Although this study suggests that parents of typically developing children do provide their children with more literacy-related activities at home, the psychometric quality of the survey

was not examined, and some items appeared to have relatively low construct validity (e.g., whether the parents varies her voice when reading to her child).

The present work represents a large-scale investigation of the home-literacy experiences of a large sample of children drawn from a single educational setting, namely early childhood special education classrooms serving both children with disabilities and typically developing peers. Studying three distinct features of the home-literacy experience of children, namely the frequency of storybook reading (frequency), caregivers' literacy teaching during book reading (teaching), and children's print interest as observed within the home environment (interest), and controlling for key socio-demographic features of children and their caregivers, we were able to pinpoint the precise factor that serves to distinguish the home-literacy experiences of children with disabilities. Specifically, we found that children's print interest was a defining feature of the home-literacy environment that served to differentiate the experiences of children with and without disabilities, with an effect size moderate in size. In practical terms, this finding shows that typically developing children engage with written materials in the home environment significantly more often than those with disabilities. Nonetheless, the findings also show that parents of children with disabilities read as often to their children and try to directly teach them about literacy during book reading as often as parents of children without disabilities.

These results converge with prior reports showing that the home-literacy experiences of children with disabilities differ in key ways from the experiences of their typical peers (Marvin & Mirenda, 1993; Weikle & Hadadian, 2003), yet serves to deepen understanding on this topic by pinpointing the specific aspects of the home-literacy experience that most differentiates the two groups of children, namely children's print interest. The inclusion of print interest as a feature of the home-literacy environment, which served to capture the extent children showed agency in facilitating literacy-related experiences in the home, distinguishes this work from other studies of the home-literacy environment that yielded different results. In particular, Breit-Smith et al. (2010) conducted secondary analysis of the home-literacy experiences of nearly 1000 preschoolers as reported by parents in the National Household Education Survey of 2009. That work found no significant differentiation of the experiences of children with and without disabilities. On closer examination of this study, however, it becomes clear why their results and the present findings differ, as their survey of home-literacy experiences focused only on the frequency of reading activities (e.g., how often the parent reads to the child, how often the parents takes the child to the library). In the present study, we too found that these activities did not differentiate the

home-literacy experiences of children with and without disabilities; rather, it was the child's print interest that did.

There has been relatively limited attention to children's print interest within the early-childhood literature to date. However, scores of studies have examined the role of interest and motivation in the reading development and achievement of older children (Pitcher et al., 2007). Such work often emphasizes the important and reciprocal relations between children's motivation to read and their development of reading skill: children who are motivated to read tend to read more often than those who are less motivated, which in turn facilitates their growth in reading skill, which then increases their motivation to read (Cunningham & Stanovich, 1997). Among school-aged children, factors that appear to facilitate motivation toward reading include one's competence and perceived efficacy as a reader; one's goals for reading, such as interest and curiosity toward a topic; and one's social reasons for reading, such as reading to meet a teachers' expectations (Baker & Wigfield, 1999). For younger children who are not yet readers, we know far less about what influences their interest in reading and reading-related activities, although work does suggest that children's print interest and reading motivation are important even at very young ages. Fritjers et al. (2000) examined the literacy interest of 5-year-old children, finding that it explained significant amounts of variance in children's concurrent language and literacy skills, even when controlling for other aspects of the home-literacy environment, such as how often parents read to their children (Fritjers et al., 2000). That study's results are comparable to those reported here, showing concurrent, predictive relations between children's motivation to read and their early literacy skills.

Given that the present study also showed that children's print interest within the home environment is significantly associated with their concurrent early-literacy skills, it is important to consider why it is that children with disabilities exhibit less print interest than other children, and why this aspect of the home-literacy environment most distinguishes children with and without disabilities. There are at least two plausible explanations. First, as noted in the introduction, many children with disabilities have impaired language skills, which transcends difficulties with both oral and written language skills (Catts et al., 2001). Because interacting with written materials may present challenges to them, they may be reluctant to seek out experiences with written language on their own, leading to low levels of print interest observed within the home environment. Second, at least a subset of the children with disabilities in this study had conditions that would directly affect their ability to engage with print in the home environment. For instance, about 10% of the children with disabilities had autism spectrum disorder, and it is possible that additional children in our sample may have this condition and not yet be identified. Children with autism spectrum disorder typically have repetitive and stereotypical interests, and may not want to interact with print materials if these do not meet these interests. This is supported by recent work showing that young children with autism spectrum disorder, as compared to typically developing children, are significantly less likely to request reading by their parents, and seem to enjoy it less (Lanter, Freeman, & Dove, 2013).

There are several practical implications suggested by the results of this work. First, it seems that parents of children with disabilities might pursue avenues toward directly enhancing their children's interest in print within the home environment. One salient approach to doing this is by reading storybooks to children that feature manipulative components, such as flaps to open. A study of parents reading with their children with hearing loss found that children were more engaged when reading manipulative books than narrative books (Kaderavek & Pakulski, 2007). Second, given the positive relations observed between children's print interest within the home environment and their early-literacy

skills, study findings also suggest the value of monitoring children's print interest carefully, especially for children with disabilities. One simple way to examine children's print interest is by observing their behaviors during a reading activity (Kaderavek, Guo, & Justice, 2014). Kaderavek et al. (2014) described a simple 4-point observational scale that can be used to quantify a child's interest in literacy-related activities; children's score on this scale were predictive of children's literacy growth over an academic year, which is not surprising given the positive relations seen in the present study between children's print interest and their early-literacy skills.

In conclusion, we point out several limitations of this work that should be kept in mind in interpreting its results. First, several aspects of our sampling approach present limitations. The children served within these inclusive ECSE settings, both the typically developing children and those with disabilities, may have different home-literacy experiences than children not enrolled in such settings. The caregivers of these children are self-selecting into these programs, and thus may have characteristics that set them apart from other caregivers who do not select into such programs. At the same time, the teachers in the involved classrooms had consented to participate in a large experimental trial; therefore, they and their classrooms might look different than teachers who would not consent to such procedures.

Second, understanding of home-literacy experiences was based on caregiver completion of a survey instrument within a cross-sectional research design. While both are common practices in studies of the home-literacy environment (Phillips & Lonigan, 2009; Sénéchal et al., 1998), these present some important limitations. For instance, caregivers may inflate their reporting of how often they engage in socially desirable practices. At the same time, it may not be possible to accurately estimate how often one uses a given practice over time. Further, the cross-sectional nature of the design indicates that we cannot understand the likely reciprocal relations between home-literacy practices and children's skills. Future studies might use direct observations of children's experiences at home to index the home-literacy environment, and incorporate longitudinal research designs.

Third, measurement of children's early-literacy skills relied on an indirect-report assessment rather than direct assessment of skills. The particular tool used in this study has reasonable concurrent and predictive relations with direct-assessment data (Cabell, Justice, Zucker, & Kilday, 2009), yet use of a direct assessment of children's skills likely would add precision to the models linking the home-literacy environment to children's literacy development, and further improve our understanding of this important topic. Further, the relatively small number of items used as well as the nature of the items do not lend themselves toward deep understanding of children's literacy-related experiences in the home. Future research that helps us to more carefully understand the nature of literacy experiences for children with disabilities and their typical peers will be influential. These limitations can help to pinpoint avenues for future research on this important topic.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.ecresq.2016.05.002>.

References

- Al Otaiba, S., Lewis, S., Whalon, K., Dyrland, A., & McKenzie, A. R. (2009). Home literacy environments of young children with Down syndrome: findings from a web-based survey. *Remedial and Special Education*, 30(2), 96–107. <http://dx.doi.org/10.1177/0741932508315050>
- Baker, L., & Wigfield, A. (1999). Dimensions of children's motivation for reading and their relations to reading achievement and reading activity. *Reading Research Quarterly*, 34(4), 452–477. <http://dx.doi.org/10.1598/RRQ.34.4.4>

- Boudreau, D. M., & Hedberg, N. L. (1999). A comparison of early literacy skills in children with specific language impairment and their typically developing peers. *American Journal of Speech-Language Pathology*, 8(3), 249. <http://dx.doi.org/10.1044/1058-0360.0803.249>
- Bronfenbrenner, U. (1986). Ecology of the family as a context for human development: research perspectives. *Developmental Psychology*, 22(6), 723. <http://dx.doi.org/10.1037/0012-1649.22.6.723>
- Breit-Smith, A., Cabell, S. Q., & Justice, L. M. (2010). Home literacy experiences and early childhood disability: a descriptive study using the National Household Education Surveys (NHES) program database. *Language, Speech and Hearing Services in Schools*, 41(1), 96–107.
- Burgess, S. R., Hecht, S. A., & Lonigan, C. J. (2002). Relations of the home literacy environment (HLE) to the development of reading-related abilities: a one-year longitudinal study. *Reading Research Quarterly*, 37(4), 408–426. <http://dx.doi.org/10.1598/RRQ.37.4.4>
- Cabell, S. Q., Justice, L. M., Zucker, T. A., & Kilday, C. R. (2009). Validity of teacher report for assessing the emergent literacy skills of at-risk preschoolers. *Language, Speech, and Hearing Services in Schools*, 40(2), 161–170. [http://dx.doi.org/10.1044/0161-1461\(2009\)07-0099](http://dx.doi.org/10.1044/0161-1461(2009)07-0099)
- Cabell, S. Q., Justice, L. M., Zucker, T. A., & McGinty, A. S. (2009). Emergent name-writing abilities of preschool-age children with language impairment. *Language, Speech, and Hearing Services in Schools*, 40(1), 53–65. [http://dx.doi.org/10.1044/0161-1461\(2008\)07-0052](http://dx.doi.org/10.1044/0161-1461(2008)07-0052)
- Catts, H. W., Fey, M. E., Zhang, X., & Tomblin, J. B. (2001). Estimating the risk of future reading difficulties in kindergarten children: a research-based model and its clinical implementation. *Language, Speech, and Hearing Services in Schools*, 32(1), 38–50. [http://dx.doi.org/10.1044/0161-1461\(2001\)004](http://dx.doi.org/10.1044/0161-1461(2001)004)
- Connor, C. M., Morrison, F. J., & Slominski, L. (2006). Preschool instruction and children's emergent literacy growth. *Journal of Educational Psychology*, 98(4), 665–674. <http://dx.doi.org/10.1037/0022-0663.98.4.665>
- Cunningham, A. E., & Stanovich, K. E. (1997). Early reading acquisition and its relation to reading experience and ability 10 years later. *Developmental Psychology*, 33(6), 934. <http://dx.doi.org/10.1037/0012-1649.33.6.934>
- DeBaryshe, B. D., & Binder, J. C. (1994). Development of an instrument for measuring parental beliefs about reading aloud to young children. *Perceptual and Motor Skills*, 78(3c), 1303–1311. <http://dx.doi.org/10.2466/pms.1994.78.3c.1303>
- Dynia, J. M., Lawton, K., Logan, J. A., & Justice, L. M. (2014). Comparing emergent-literacy skills and home-literacy environment of children with autism and their peers. *Topics in Early Childhood Special Education*, 34, 142–152. <http://dx.doi.org/10.1177/0271121414536784>
- Fitzgerald, J., Roberts, J., Pierce, P., & Schuele, M. (1995). Evaluation of home literacy environment: an illustration with preschool children with Down syndrome. *Reading & Writing Quarterly: Overcoming Learning Difficulties*, 11(4), 311–334. <http://dx.doi.org/10.1080/1057356950110401>
- Frijters, J. C., Barron, R., & Brunello, M. (2000). Direct and mediated influences of home literacy and literacy interest on prereaders' oral vocabulary and early written language skill. *Journal of Educational Psychology*, 92(3), 466–477. <http://dx.doi.org/10.1037/0022-0663.92.3.466>
- Gillon, G. T. (2002). Follow-up study investigating the benefits of phonological awareness intervention for children with spoken language impairment. *International Journal of Language & Communication Disorders*, 37(4), 381–400. <http://dx.doi.org/10.1080/136828202100007776>
- Griffin, E. A., & Morrison, F. J. (1997). The unique contribution of home literacy environment to differences in early literacy skills. *Early Child Development and Care*, 127(1), 233–243. <http://dx.doi.org/10.1080/0300443971270119>
- Justice, L. M., & Ezell, H. K. (2000). Enhancing children's print and word awareness through home-based parent intervention. *American Journal of Speech-Language Pathology*, 9(3), 257–269. <http://dx.doi.org/10.1044/1058-0360.0903.257>
- Justice, L. M., & Ezell, H. K. (2001). Word and print awareness in 4-year-old children. *Child Language Teaching and Therapy*, 17(3), 207–225. <http://dx.doi.org/10.1191/026565901680666527>
- Justice, L. M., Bowles, R. P., & Skibbe, L. E. (2006). Measuring preschool attainment of print-concept knowledge: a study of typical at-risk 3- to 5-year-old children using item response theory. *Language, Speech, and Hearing Services in Schools*, 37(3), 224–235. [http://dx.doi.org/10.1044/0161-1461\(2006\)024](http://dx.doi.org/10.1044/0161-1461(2006)024)
- Justice, L. M., Logan, J. A., Kaderavek, J. N., & Dynia, J. M. (2015). Print-focused read-alouds in early childhood special education programs. *Exceptional Children*, 81(3), 292–311. <http://dx.doi.org/10.1177/0014402914563693>
- Justice, L., Logan, J., Kaderavek, J., Schmitt, M. B., Tompkins, V., & Bartlett, C. (2015). Empirically based profiles of the early literacy skills of children with language impairment in early childhood special education. *Journal of Learning Disabilities*, 48(5), 482–494. <http://dx.doi.org/10.1177/0022219413510179>
- Kaderavek, J. N., & Pakulski, L. A. (2007). Mother-child story book interactions: literacy orientation of pre-schoolers with hearing impairment. *Journal of Early Childhood Literacy*, 7(1), 49–72. <http://dx.doi.org/10.1177/1468798407074835>
- Kaderavek, J. N., & Sulzby, E. (1998). Parent-child joint book reading: an observational protocol for young children. *American Journal of Speech-Language Pathology*, 7(1), 33–47. <http://dx.doi.org/10.1044/1058-0360.0701.33>
- Kaderavek, J. N., Guo, Y., & Justice, L. M. (2014). Validity of the children's orientation to book reading rating scale. *Journal of Research in Reading*, 37(2), 159–178. <http://dx.doi.org/10.1111/j.1467-9817.2012.01528.x>
- Kline, R. B. (2015). *Principles and practice of structural equation modeling*. NY: Guilford publications.
- Lanter, E., Freeman, D., & Dove, S. (2013). Procedural and conceptual print-related achievements in young children with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities*, 28, 14–24. <http://dx.doi.org/10.1177/1088357612459270>
- Light, J., & Smith, A. K. (1993). Home literacy experiences of preschoolers who use AAC systems and of their nondisabled peers. *Augmentative and Alternative Communication*, 9(1), 10–25. <http://dx.doi.org/10.1080/07434619312331276371>
- Lonigan, C. J., & Shanahan, T. (2009). *Developing early literacy: report of the national early literacy panel. Executive summary. A scientific synthesis of early literacy development and implications for intervention*. Washington, DC: National Institute for Literacy.
- MacKinnon, D. P., Krull, J. L., & Lockwood, C. M. (2000). Equivalence of the mediation, confounding and suppression effect. *Prevention Science*, 1(4), 173–181.
- Marvin, C., & Mirenda, P. (1993). Home literacy experiences of preschoolers enrolled in Head Start and special education programs. *Journal of Early Intervention*, 17(4), 351–367. <http://dx.doi.org/10.1177/105381519301700402>
- Marvin, C. (1994). Home literacy experiences of preschool children with single and multiple disabilities. *Topics in Early Childhood Special Education*, 14(4), 436–454. <http://dx.doi.org/10.1177/027112149401400405>
- Oswald, D. P., Best, A. M., Coutinho, M. J., & Nagle, H. A. (2003). Trends in the special education identification rates of boys and girls: a call for research and change. *Exceptionality*, 11(4), 223–237.
- Phillips, B. M., & Lonigan, C. J. (2009). Variations in the home literacy environment of preschool children: a cluster analytic approach. *Scientific Studies of Reading*, 13(2), 146–174. <http://dx.doi.org/10.1080/1088430902769533>
- Piasta, S. B., Justice, L. M., McGinty, A. S., & Kaderavek, J. N. (2012). Increasing young children's contact with print during shared reading: longitudinal effects on literacy achievement. *Child Development*, 83(3), 810–820. <http://dx.doi.org/10.1111/j.1467-8624.2012.01754.x>
- Pitcher, S. M., Albright, L. K., DeLaney, C. J., Walker, N. T., Seunarineasingh, K., Mogge, S., & Hunt, R. (2007). Assessing adolescents' motivation to read. *Journal of Adolescent & Adult Literacy*, 50(5), 378–396. <http://dx.doi.org/10.1598/JAAL.50.5.5>
- Sénéchal, M., Lefevre, J. A., Thomas, E. M., & Daley, K. E. (1998). Differential effects of home literacy experiences on the development of oral and written language. *Reading Research Quarterly*, 33(1), 96–116. <http://dx.doi.org/10.1598/RRQ.33.1.5>
- Sénéchal, M. (2006). Testing the home literacy model: parent involvement in kindergarten is differentially related to grade 4 reading comprehension, fluency, spelling, and reading for pleasure. *Scientific Studies of Reading*, 10(1), 59–87. <http://dx.doi.org/10.1207/s1532799xssr1001.4>
- Sawyer, B. E., Justice, L. M., Guo, Y., Logan, J. A., Petrill, S. A., Glenn-Applegate, K., & Pentimonti, J. M. (2014). Relations among home literacy environment, child characteristics and print knowledge for preschool children with language impairment. *Journal of Research in Reading*, 37(1), 65–83. <http://dx.doi.org/10.1111/jrir.12008>
- Scarborough, H. S., & Dobrich, W. (1994). On the efficacy of reading to preschoolers. *Developmental Review*, 14(3), 245–302. <http://dx.doi.org/10.1006/drev.1994.1010>
- Scarborough, H. S., Dobrich, W., & Hager, M. (1991). Preschool literacy experience and later reading achievement. *Journal of Learning Disabilities*, 24(8), 508–511. <http://dx.doi.org/10.1177/002221949102400811>
- Scarborough, H. S., Fletcher-Campbell, F., Soler, J., & Reid, G. (2009). *Connecting early language and literacy to later reading (dis) abilities: evidence, theory, and practice*. In J. Fletcher-Campbell, J. Soler, & G. Reid (Eds.), *Approaching difficulties in literacy development: assessment, pedagogy, and programmes* (pp. 23–39). London, UK: Sage.
- Scarborough, H. S. (1991). Antecedents to reading disability: preschool language development and literacy experiences of children from dyslexic families. *Reading and Writing*, 3(3), 219–233. <http://dx.doi.org/10.1007/BF00354959>
- Secord, W., Semel, E., & Wiig, E. (2003). *Clinical evaluation of language fundamentals* (2nd ed.). San Antonio: Harcourt Assessment, Inc.
- Skibbe, L. E., Moody, A. J., Justice, L. M., & McGinty, A. S. (2010). Socio-emotional climate of storybook reading interactions for mothers and preschoolers with language impairment. *Reading and Writing*, 23(1), 53–71. <http://dx.doi.org/10.1007/s11145-008-9149-3>
- Storch, S. A., & Whitehurst, G. J. (2002). Oral language and code-related precursors to reading: evidence from a longitudinal structural model. *Developmental Psychology*, 38(6), 934. <http://dx.doi.org/10.1037/0012-1649.38.6.934>
- Sy, S. R., Gottfried, A. W., & Gottfried, A. E. (2013). A transactional model of parental involvement and children's achievement from early childhood through adolescence. *Parenting*, 13(2), 133–152.
- Van Steensel, R. (2006). Relations between socio-cultural factors, the home literacy environment and children's literacy development in the first years of primary education. *Journal of Research in Reading*, 29(4), 367–382. <http://dx.doi.org/10.1111/j.1467-9817.2006.00301.x>
- Weikle, B., & Hadadian, A. (2003). Emergent literacy practices among parents of preschool children with and without disabilities. *International Journal of Special Education*, 18(1), 80–99.
- Wilson, S. B., & Lonigan, C. J. (2009). Identifying preschool children at risk of later reading difficulties: evaluation of two emergent literacy screening tools. *Journal of Learning Disabilities*, 43(1), 62–76. <http://dx.doi.org/10.1177/0022219409345007>