Preschool Predictors of Narrative Writing Skills in Elementary School Children

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This study examined the preschool predictors of elementary school narrative writing skills. The sample included 65 typically developing African American children, ranging in age from 5.0 to 5.5 years, and was 44.6% male. Targeted preschool predictors included measures of phonological processing, core language abilities, prereading skills, and early writing concepts assessed during the spring or summer, just before beginning kindergarten. Using hierarchical linear modeling, findings showed that core language abilities, prereading skills, and maternal education at preschool significantly predicted the level of writing in Grades 3–5, but only core language abilities and prereading skills significantly predicted the rate of growth in writing. When kindergartners were separated into low and high readers, and low and high core language abilities, a significant pattern of widening differences emerged between the groups over time. These findings point to core language abilities, prereading skills, and maternal education assessed at kindergarten entry as critical predictors of later narrative writing skills, and they suggest the importance of including such measures when screening for written language problems in early kindergarten and early elementary school.

Keywords: early literacy, narrative writing, preschool predictors of written language, kindergarten skills, language abilities

Findings from studies of emergent reading, also known as "emergent literacy," "prereading," and "reading readiness," have been published in recent years noting the importance of

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specific, early skills to the development of later reading. More generally, letter knowledge skills have been identified as robust markers for the later development of reading (Adams, 1990) in both English and non-English speaking children (Lyytinen et al., 2004; Muter & Diethelm, 2001). This procedural knowledge in the domain of letter skills during the kindergarten years (i.e., children's knowledge about the mechanics of reading such as letter naming and sound-symbol associations) has been related to later reading skills in the early elementary school years, more so than to conceptual knowledge (i.e., children's knowledge about the functions of print, knowing that it is the words that are being read and not the pictures, book conventions; Lonigan, Burgess, & Anthony, 2000).

For example, Denton and colleagues (Denton & West, 2002; West, Denton, & Germino-Hausken, 2000) examined selected aspects of procedural knowledge in the area of reading and discovered that children who were proficient in identifying letters (e.g., naming upper- and lowercase letters, recognizing beginning and ending word sounds) at entry to kindergarten showed stronger reading skills at the end of kindergarten

and in first grade on measures of phonological processing and word reading compared with children who were not proficient. Schatschneider, Fletcher, Francis, Carlson, and Foorman (2004) and others (Dickinson, McCabe, Anastasopoulos, Peisner-Feinberg, & Poe, 2003; Storch & Whitehurst, 2002; Whitehurst & Lonigan, 1998) noted that code-related skills, such as phonological awareness, knowledge of sound-symbol associations, and naming speed, were more important to the development of reading at the end of first and second grade than were measures of perceptual skills, oral language, and vocabulary. In her review of studies exploring preschool predictors of later reading skills, Scarborough (1998) reported that variables of letter identification, concepts of print, picture naming, sentence recall, phonological awareness, rapid automatized naming, receptive and expressive language, and verbal memory were related to later reading outcomes. Similarly, Storch and Whitehurst (2002), using structural equation modeling in a sample of children from the low socioeconomic strata, found that variables of phonological awareness and print knowledge were the best predictors of reading achievement in Grades 1 and 2, whereas in later grades reading accuracy and comprehension were predicted best by measures of oral language. The National Institute of Child Health and Human Development (NICHD) Early Child Care Research Network (2005) used a longitudinal design and structural equation modeling to examine the best language predictors of word recognition. With a sample of 1,137 children followed up from age 3 through the third grade, this group reported that early oral language contributed directly and indirectly to word recognition during the transition to school, and actually predicted later reading skills better than did vocabulary.

In contrast to the literature identifying predictors of the development of early reading skills, empirical studies examining the early predictors of written language skills are few. Given the purported relationship between reading and writing (Berninger, Cartwright, Yates, Swanson, & Abbott, 1994; Shanahan, 2006), theoretically, many of the same variables that are tied to reading may also be associated with written language skills. Although some data suggest that early drawing skills represent the beginning of emergent writing skills (Levin &

Bus, 2003), indeed, the modest existing literature base does point to many of the same variables that have been found to predict later reading skills. For example, Sulzby and colleagues (Bus, Both-de Vries, de Jong, Sulzby, de Jong, & de Jong, 2001; Sulzby, de Jong, de Jong, & Visser, 1989) reported a strong correlation between the concurrent measures of invented spelling and knowledge of letter names and letter writing in their 4- to 5-year-old children. Sulzby, Biernhart & Hieshima (1989) examined the roles that various types of knowledge played when children were instructed to compose written stories. Using multiple baseline design strategies across individuals, two series of case studies were conducted: the first series included 4- to 5-year-old Dutch kindergarten children, and the second series examined 5- to 6-yearolds. The results indicated that even when children understood the alphabetic principle, they were not inclined to abandon pseudocursive scribble or random letter strings (i.e., invented spelling). They did find that invented spelling gradually increased over time, but only among the group of older kindergartners.

More recent research efforts have continued to examine possible early predictors of later written language skills. Molfese, Beswick, Molnar, and Jacobi-Vessels (2006), using a sample of kindergarten children from impoverished homes, demonstrated a strong concurrent relationship between letter-naming skills and skills in writing letters of their first names, writing dictated and copied letters, and writing dictated and copied numbers. Using a large sample of first-grade children (n = 309) in a longitudinal design, Coker (2006) examined specific predictors of the growth of narrative writing skills. Specifically, Coker (2006) found that the quality and quantity of writing in Grades 1 through 3 were significantly predicted by lower (not higher) socioeconomic status (SES); first-grade teacher interactions with gender, ethnicity, and English as a second language; and the quality of the first-grade classroom literacy environment (e.g., range of books in the classroom). Of note, literacy skills, as defined by receptive vocabulary and beginning letter/word reading, were related to writing concurrently in the first grade, but not to writing growth over time.

From a theoretical perspective, the available body of work points to the importance of core language functions and basic understanding of the alphabetic principle in the emergence of both reading and written language skills. Indeed, this linkage has been documented in case study efforts in adults (Jefferies, Sage, & Ralph, 2006), and a growing body of evidence has indicated that reading and writing share a reciprocal and beneficial relationship in literacy development in children (Harrison, 2005). This reciprocal relationship includes the awareness about the phonological and orthographic structures of words. Cross-sectional, longitudinal, and instructional studies support reading, writing, and spelling as integrated processes (Bear, Ivernizzi, Templeton, & Johnston, 2004; Moats, 2000), although their functional systems are deemed to be separate (Berninger & Richards, 2002). Snow, Burns, and Griffin (1998), the National Reading Panel (2000), and others (Mermelstein, 2006; Vellutino, Scanlon, & Jaccard, 2003) support the notion that successful reading requires skills in phonological awareness, phonics, fluency, vocabulary, and comprehension, in conjunction with stimulating authentic and meaningful reading and writing experiences, and that many of the requisite early skills certainly appear to overlap with those necessary for writing development.

The development of writing skills in students presents a significant challenge for educators, particularly in this day of high-stakes testing, heightened accountability, and apparent prevalence rates once children enter formal schooling (Katusic, Colligan, Weaver, & Barbaresi, 2009; National Council for Educational Statistics. 2003). Furthermore, early identification efforts in written language would also be consistent with national trends imploring school psychologists and other educators to identify learning problems early and to engage in early intervention in an effort to lessen the educational morbidity once children move into the formal school setting. The identification of early predictors might lessen the downstream problems that exist in written expression as children age and provide initial clues as to the beginning of the reading-writing connection and how these areas might converge or diverge over time.

Given the relative dearth of research examining preschool predictors of children's later written language skills, we examined the relationship between targeted language-based variables obtained in the spring or summer just prior to kindergarten and narrative writing in

Grades 3 through 5. It was hypothesized that variables related to early alphabetic principles and phonological processing, core language abilities, prereading skills, and early writing concepts would be key predictors of children's narrative writing capabilities during the later elementary school years, as well as predictors of the rate of growth in written language. Findings will be important for understanding early contributors to later narrative writing skills, will aid in determining which prekindergarten children may be at risk for later writing difficulties, and should inform early literacy efforts in written expression more generally.

Method

Participants

Sixty-five typically developing African American children, 35 girls and 30 boys, were recruited from nine child care centers in North Carolina at the age of 8.1 months (range = 6–12 months) as part of a larger study examining the effects of otitis media on development. All African American infants under 12 months of age who were typically developing were entitled to enroll. At the time of enrollment into the study, 70.6% of the children's families lived below the poverty level (less than 185% of the federal poverty threshold), with the remaining 29.4% considered middle income. Sixty-five percent of the children came from single-parent homes. For the present study, the sample ranged in age from 5.0 to 5.5 years (M = 5.2 years)SD = 0.3). At kindergarten entry, the mean level of maternal education was about 13 years (M = 13.14 years, SD = 2.03), with 19% children having less than a high school degree, 16% having a high school diploma or General Educational Development diploma, 65% having some technical training or college coursework, and 14% having a college degree or higher. All participants were native English speakers. While the study ascertained 65 children at kindergarten, the sample size varied at Grades 3 (n = 58), 4 (n = 64), and 5 (n = 61) outcome time points, given that several children were unavailable at each of these annual follow-up appointments.

Measures

Predictor variables. All of the predictor variables were theoretically associated with written language development and selected to represent four key domains: global language abilities, phonological awareness, (pre)reading, and writing concepts. All predictor variables were obtained during the spring and summer months just prior to the beginning of the kindergarten year (1996–1997 school year). In addition, the background variables of maternal education during this time period and the child's gender were selected as specific variables that could affect literacy development more generally.

Global language. Receptive and expressive language abilities were measured with Clinical Evaluation of Language Fundamentals, 3rd edition (CELF-3; Semel, Wiig, & Secord, 1995). The CELF-3 is a language instrument that assesses word meanings (semantic), word and sentence structure (morphology and syntax), and recall and retrieval (memory). The standardization sample included 375 African American children (15.3% of sample). Receptive, expressive, and total scores are computed, and the total age-based standard score was employed in this study as an estimate of core language abilities. CELF-3 has been shown to have adequate levels of reliability and validity. Reliability for the CELF-3 Total Language Score was in the high .80s to low .90s, and the criterion validity with the Wechsler Intelligence Scale for Children-III was .75 (Semel et al., 1995).

Phonological processing. Phonological processing skills were assessed with the Incomplete Words Subtest of the Woodcock-Johnson Tests of Cognitive Abilities-Revised (WJ-R; Woodcock & Johnson, 1989). Incomplete Words is a test in which the child identifies a complete word after hearing a tape-recorded word with one or more phonemes missing. A standardized raw score, or W-score, is obtained and is uniquely suited for longitudinal designs. Based on Item-Response Theory and Rasch Scaling techniques, one of the main features of the W-score is that the individual's ability and item difficulty are calibrated on a common scale. This creates the opportunity to "standardize" change over time based on the individual's task performance. Reliability coefficients for the WJ-R subtest scores were in the high .80s to low .90s, and criterion validity ranged between .50 and .60 (Woodcock & Johnson, 1989). The WJ-R Incomplete Words Subtest is one of the empirically based components of the Auditory Processing Cluster of the WJ-R and has been employed in large-scale studies examining various aspects of phonological processes in learning (e.g., NICHD Early Child Care Research Network, 2005).

(Pre)Reading. The Letter–Word Identification subtest of the WJ-R (Woodcock & Johnson, 1989) was used to obtain an assessment of beginning reading skills by having the child identify isolated words and letters. The standardized raw score, or W-score, will be used here. Reliability coefficients for the WJ-R subtest scores were in the high .80s to low .90s, and criterion validity ranged between .50 and .60 (Woodcock & Johnson, 1989).

Writing concepts. Writing concepts were measured with the Writing Concepts component of the School-Home Early Language and Literacy assessment (SHELL; Snow, Tabors, Nicholson, & Kurland, 1995). For this study, Items 1 through 7 were employed. These items required the child to write their first name, describe a picture about a birthday party, and pick out the magnetic letters that are used in the words tip, lap, pet, and kite. A single total raw score was obtained from these items and ranged from 0 to 14. This component of the SHELL has been correlated with readiness skills (r = .39), early literacy skills (r = .40), and oral expression at age 5 years (r = .50; Snow et al., 1995).

Outcomes variable. The Broad Written Language Cluster of the WJ-R (Woodcock & Johnson, 1989), comprising the Dictation and Writing Sample subtests, was used to assess written language skills in Grades 3 through 5. In Dictation, the child writes responses to a variety of questions that require knowledge of spelling, grammar, and word usage. In the Writing Sample, the child must write sentences that are evaluated by the quality of the grammar and general accuracy of the sentence structure. The Written Language Cluster produces a standardized raw score, or W-score. Reliability coefficients for the WJ-R cluster scores were in the mid .90s, and criterion validity ranged between .50 and .60 (Woodcock & Johnson, 1989).

Procedures

As part of a larger study examining early health outcomes, the children were followed from infancy through the first 6 years of formal schooling (fifth grade). Research assistants administered the predictor measures to the children individually during the spring or summer prior to their kindergarten entry. The WJ-R Written Language Cluster outcome measure was administered during the spring or summer of Grades 3–5. The children's responses were audio recorded and refereed for scoring of tests. All of the tests in the battery were blocked, and the blocks were counterbalanced to control for order effects and to provide the examiner with some flexibility with respect to the administration of measures within a block. Demographic information for this study was gathered during annual home visits by the project coordinator just prior to kindergarten entry.

Data Analyses

In addition to preliminary analyses examining means and standard deviations of the variables, the correlations among the preschool predictors, and the correlations between the preschool predictors and the later written language outcomes at Grades 3–5, we conducted hierarchical linear modeling analyses (HLM; Raudenbusch & Bryk, 2002; Singer & Willet, 2003) via SAS Proc Mixed (SAS Institute, 2003). There are several advantages to using HLM to examine longitudinal developmental data and variables associated with development. First, each student contributes whatever data are available to the model. Thus, even if a student was measured only once, say in third grade, his or her data can contribute to the estimation of the intercept; and a student with two or more observations, for example in prekindergarten and fifth grade, can contribute to the slope. Next, HLM can allow for the estimation of individual variation (a random effect) among the intercept and slope terms. The dependence resulting from multiple observations of the same students was modeled by estimating a within-subjects variance component (Level 1), as well as the between-subjects or residual variance (Level 2). In longitudinal models the variable of time (i.e., age) is nested within students. We refer to time (i.e., age) as the Level 1 component and student as the Level 2 component. In all the models for this study, a random effect was estimated for the intercept (i.e., level) in the model, but the slopes (i.e., growth) were fixed to be equal across observations and an average estimated due to the small sample size. In addition, the models were fit with unstructured covariance matrices.

HLM was employed to describe individual growth trajectories in WJ-R Broad Written Language between Grades 3 and 5, and to examine the extent to which the level and rate of growth differed across children with varying abilities at the prekindergarten time point. These abilities were language-based in nature and included a measure of core language abilities, phonological processing, prereading, and writing concepts. We also chose to statistically control for maternal education as a proxy for the effects of potential environmental factors and the child's gender. Effect size estimates (i.e., r_d) were computed using the unstandardized regression coefficient multiplied by the standard deviation of the predictor, divided by the square root of the error (i.e., residual) obtained from the longitudinal analysis. Cohen (1988) designated an effect size of .2 as small, .5 as moderate, and .8 as large.

Results

Descriptive statistics for the preschool predictor variables are presented in Table 1, whereas Table 2 contains the means and standard deviations for WJ-R Broad Written Language Cluster for the children in Grades 3–5. As

Table 1 Descriptive Statistics for the Preschool Predictor Variables (N = 65)

Kindergarten variable	М	SD
Male (%)	44.6%	
Maternal education (years)	13.14	2.03
CELF-3 total language	94.25	12.18
WJ-R incomplete words	472.20	8.93
WJ-R Letter-Word Identification	402.71	16.87
SHELL Writing Concepts Total	8.49	4.44

Note. CELF-3 = Clinical Evaluation of Language Fundamentals, 3rd edition; WJ-R = Woodcock-Johnson Tests of Cognitive Abilities-Revised; SHELL = School-Home Early Language and Literacy assessment. CELF-3 Total Language has a M=100 and a SD=15; WJ-R scores are reported in W-Scores; and SHELL Writing Concepts Total reflects a raw score.

Table 2
Descriptive Statistics for the Woodcock–Johnson
Tests of Cognitive Abilities–Revised (WJ-R) Broad
Written Language Cluster Score at Grades 3
Through 5

Grade	WJ-R Broad Written Language Cluster		
	\overline{N}	M	SD
3	58	491.25	8.60
4	64	495.08	9.21
5	61	499.28	9.11

Note. All WJ-R Broad Written Language Cluster scores are reported as W-scores.

seen in Table 1, average group scores obtained from the CELF-3 Total Language preschool predictor measure (M = 94.75, SD = 12.18) revealed no overall language problems for the sample just prior to kindergarten entry.

Table 3 presents the correlations among the language-based preschool predictors. Preschool SHELL Writing Concepts was strongly correlated with prereading ability as defined by the WJ-R Letter-Word Identification Subtest (r = .62), and moderately correlated with core language abilities as defined by the CELF-3 Total Language (r = .38) and with phonological processing as defined by the WJ-R Incomplete Word Subtest (r = .32). Prereading skills were correlated with core language abilities (r = .43) at a moderate level, and with phonological processing (r = .53) at a strong level. Finally, core language abilities and phonological processing were moderately correlated at r = .49.

Table 4 shows the correlations between the language-based preschool predictors and WJ-R Broad Written Language Cluster outcomes at Grades 3–5. As can be seen, these values increased across the later elementary school grades. Preschool core language ability was moderately correlated with WJ-R Broad Written Language in Grade 3 (r = .49), and more strongly in Grades 4 (r = .65) and 5 (r = .68). SHELL Writing Concepts and WJ-R Incomplete Word (i.e., phonological processing) were moderately correlated with WJ-R Broad Written Language across the grades. For SHELL Writing Concepts and WJ-R Broad Written Language the correlations were largely within a moderate range: r = .39 in Grade 3, r = .45 in Grade 4, and r = .49 in Grade 5; whereas for WJ-R Incomplete Words and WJ-R Broad Written Language the correlations were observed to increase from r=.28 in Grade 3 to r=.42 in Grade 5. Finally, prereading skills (WJ-R Letter-Word Identification) was moderately to strongly correlated with WJ-R Written Language across the later elementary school grades at .45, .51 to .57, respectively.

Table 5 contains the unstandardized parameter estimates (b), standard errors (se), and effect size estimates (r_d) from the longitudinal analysis of WJ-R Broad Written Language. The first seven rows of Table 5 contain the estimates of intercept and the predictors (gender, maternal education, and the languagebased preschool measures) at Grade 4 (i.e., level). For example, although nonsignificant, boys are -1.71 units lower on WJ-R Broad Written Language in fourth grade than are girls. The last six rows in Table 5 contain the estimates associated with a unit change in WJ-R Broad Written Language, per year, for each unit increase in preschool language skills. The rate of growth (i.e., slope estimates) are introduced in the model as "Age by predictor" interactions. For example, the "Age by Male" interaction indicates that the rate of change for boys in WJ-R Broad Written Language, although nonsignificant, was 0.98 units steeper than the rate of change for girls.

We found evidence that WJ-R Broad Written Language skills in Grade 4 was significantly associated with higher core language abilities at preschool, b(SE) = .26(.09), p = .003, $r_d = 0.79$; and higher prereading skills, b(SE) = .15(.06), p = .02, $r_d = 0.63$, after adjusting for gender and maternal education. More specifi-

Table 3
Correlations Among the Language-Based Preschool
Predictors

Preschool variables	1	2	3	4
1. CELF-3 total language	_			
2. WJ-R Incomplete				
Words	.49***			
3. WJ-R Letter-Word				
Identification	.43***	.53***	_	
4. SHELL Writing				
Concepts total	38**	32***	62***	

Note. CELF-3 = Clinical Evaluation of Language Fundamentals, 3rd edition; WJ-R = Woodcock-Johnson Tests of Cognitive Abilities-Revised; SHELL = School-Home Early Language and Literacy assessment.

^{**} p < .01. *** p < .001.

Table 4 Correlations Among Demographics, Language-Based Preschool Skills, and Woodcock-Johnson Tests of Cognitive Abilities-Revised (WJ-R) Broad Written Language Cluster Across Grades 3 Through 5

	7	WJ-R Broad Written Languag	e
Preschool variables	Grade 3 $(n = 58)$	Grade 4 $(n = 64)$	Grade 5 $(n = 61)$
Male	-0.29*	-0.22	-0.19
Maternal education	0.33*	0.48***	0.38**
CELF-3 total language	0.49***	0.65***	0.68***
WJ-R Incomplete Words	0.28^{*}	0.32^{*}	0.42***
WJ-R Letter-Word Identification	0.45***	0.51***	0.57***
SHELL Writing Concepts total	0.39**	0.45***	0.49***

Note. CELF-3 = Clinical Evaluation of Language Fundamentals, 3rd edition; SHELL = School-Home Early Language and Literacy assessment. p < .05. p < .01. p < .001.

cally, for each point of change in the CELF-R Total Language standard score and the WJ-R Letter-Word Identification W-Score, there was a .26 point and .15 point change, respectively, in the WJ-R Broad Written Language W-Score. Additionally, higher maternal education was associated with later writing skills, b(SE) =.87(.43), p = .04, $r_d = 0.44$, but phonological processing (WJ-R Incomplete Words), writing concepts (SHELL Writing Concepts), and gender did not contribute significantly.

The level and rate of increase in WJ-R Broad Written Language skills per year (i.e., age) were positively associated with several of the preschool measures. On average, children with higher core language abilities ($r_d = 0.79$) and higher prereading skills at preschool ($r_d = 0.63$) showed small but significant increases in WJ-R Broad Written Language during elementary school than did children having lower core language and prereading skills. Additionally, greater core language abilities during late preschool were estimated to have a small effect size of $(r_d = 0.27)$ on the change in WJ-R Broad Written Language per year. Similarly, an increase in prereading skills was associated with

Table 5 Results of the Longitudinal Analysis Showing the Specific Predictors of the Level of Woodcock-Johnson Tests of Cognitive Abilities-Revised (WJ-R) Broad Written Language Cluster Scores Across Grades 3 Through 5

Preschool predictors	WJ-R Broad Written Language, b (SE)	Effect Size (r_d)
Intercept	495.17 (1.05)***	
Male	-1.71(1.57)	0.21
Maternal education (years)	0.87 (0.43)*	0.44
CELF-3 total language	0.26 (0.09)**	0.79
WJ-R Incomplete Words	-0.05(0.12)	0.11
WJ-R Letter-Word Identification	0.15 (0.06)**	0.63
Shell Writing Concepts Total	0.35 (0.22)	0.39
Rate of Growth (or Slope)		
$Age \times Male$	0.98 (0.77)	0.12
Age × Maternal education (years)	-0.07(0.21)	0.04
Age × CELF-3 total language	0.09 (0.04)*	0.27
Age × WJ-R Incomplete Words	009 (0.05)	0.02
Age × WJ-R Letter-Word Identification	0.07 (0.03)*	0.30
Age × SHELL Writing Concepts	-0.003 (0.11)	0.003

Note. CELF-3 = Clinical Evaluation of Language Fundamentals, 3rd edition; SHELL = School-Home Early Language and Literacy assessment. Centered at Grade 4.

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

a small increase in WJ-R Broad Written Language per year ($r_d=0.30$). The rate of change in WJ-R Broad Written Language was not associated with phonological processing (Age \times WJ-R Incomplete Words), writing concepts (Age \times SHELL Writing Concepts), maternal education, or gender.

To demonstrate these growth effects, we computed the adjusted means for broad writing at Grades 3–5 for children scoring one standard deviation above the mean and those scoring one standard deviation below the mean on the preschool measures of core language abilities and prereading skills. These adjusted means at the ages 9.5, 10.5, and 11.5 are plotted in Figures 1 and 2. As seen in Figure 1, children having more advanced prereading skills during preschool showed higher WJ-R Broad Written Language Cluster scores across all grades than did children with lower prereading skills; additionally, the rate of gain in WJ-R Broad Written Language skills was greater for children with better prereading skills than for those with lower prereading skills. Figure 2 shows a similar trend for the association between core language abilities at preschool and later WJ-R Broad Written Language; that is, children with higher core language abilities during preschool demonstrated better writing skills at Grades 3–5 than children with lower core language abilities during preschool.

Discussion

The primary purpose of this study was to determine the early predictors of narrative writing skills in children, with the goal of identifying possible markers for at-risk status just prior to when children enter kindergarten. These findings also hold importance for school psychologists and other early childhood specialists in the screening and assessment of written language in preschool and kindergarten-age children. Findings from this study showed that maternal education, core language abilities, and prereading skills were predictive of the level of writing skills achieved in Grades 3–5.

The level of prereading skills and core language abilities just prior to kindergarten entry also significantly predicted the rate of growth in written language in Grades 3–5; that is, children who had higher prereading skills or higher core language abilities during preschool evidenced faster growth in narrative writing than did children who had lower skills in these functions during preschool. Consistent with the "Matthew Effect" described in the reading literature (Stanovich, 1986), there appeared to be a significant pattern of widening differences between the two groups with increasing age and grade placement. If this linear trend persists beyond elementary school, then there is a worrisome possibility for increased writing problems for middle and high school students-

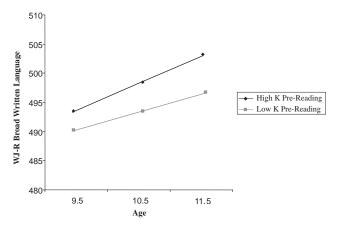


Figure 1. The growth of Woodcock–Johnson Tests of Cognitive Abilities–Revised (WJ-R) Broad Written Language Cluster over time for the lower and higher preschool prereading skill groups.

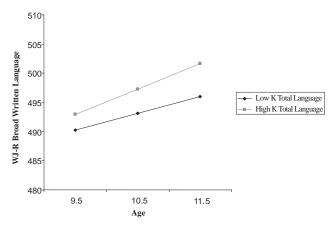


Figure 2. The growth of Woodcock–Johnson Tests of Cognitive Abilities–Revised (WJ-R) Broad Written Language Cluster over time for the lower and higher preschool total language ability groups.

especially with the increased demands on writing at these grade levels. Consequently, as suggested by the Matthew Effect in reading development, good writers likely will continue to improve with advancing grades whereas, without direct evidence-based interventions, poor writers likely will continue to show significantly slower growth in their written language skills over time.

The findings from this study are generally similar to those studies denoting the early predictors of later reading skills (NICHD Early Child Care Research Network, 2005; Scarborough, 1998; Schatschneider et al., 2004) and implicate a theoretical linkage to both reading and writing for these foundational skills. This similarity is most notable for findings implicating core language abilities. Surprisingly, early writing concepts and phonological processes did not predict level of written language in later grades, nor did any of the variables outside of prereading and core language abilities predict the rate of growth of written language. These findings were not consistent with the many preschool predictors identified as necessary for later reading proficiency. For example, Bus et al. (2001), Schatschneider et al. (2004), and Molfese et al. (2006) all showed significant correlations between kindergarten and first-grade literacy measures and school literacy achievement, with oral and code-related early literacy measures being particularly important in this regard. Using a sample somewhat similar on demographic characteristics to that employed in the current study, Molfese et al. (2006) demonstrated high concurrent correlations between letter-naming skills and skills in writing letters of their first names, writing dictated and copied letters, and writing dictated and copied numbers.

In contrast to the study by Molfese et al. (2006), however, but consistent with the findings of Coker (2006), our measures of phonological processing and knowledge of writing concepts were not predictive of later writing skills. Although these variables may have been enveloped by our prereading measure, or perhaps hindered in their manifestation by a small sample size and subsequent low power, the current results did not show that our phonological processing and early writing concepts variables were predictive of either the level of later writing function or the rate of growth of writing in the middle to later elementary grades. Further, one could argue that the lack of relationship may have been related to the types of measures employed, or because prereading subsumed the variances inherent in phonological processing and writing concepts; however, only small to moderate correlations were obtained in this regard.

Relatedly, the quality of some of the measures may also have influenced their relative lack of predictive power. For example, the SHELL Writing Concepts Subtest comprised a combination of name writing, oral description of a picture, and emergent alphabetic principle tasks, perhaps compromising the strength of the writing portion of the SHELL. Another possibility relates to the observation that the predictive value of these phonolog-

ical processes in kindergarten may be more related to proximal outcomes (i.e., Grades 1 and 2) than to distal ones (e.g., Grades 3–5). This would be consistent with findings by Storch and Whitehurst (2002) and, more recently by Vellutino, Tunmer, Jaccard, and Chen (2007) for reading outcomes. Despite the lack of relationships of these variables with written outcomes, the current findings do elevate the importance of the reading–writing connection during the late preschool years.

Results from this study also highlight the importance of maternal education to the development of written language skills. The current findings are consistent with the work of Burchinal, Roberts, Zeisel, Hennon, and Hooper (2006) who showed that parenting skills and language abilities in early childhood mediate the association with risk for later academic achievement delays in the early elementary grades and, more specifically, with the longitudinal work of Coker (2006), who showed that a range of environmental variables are critical to the development of writing skills. More generally, the significant contribution of maternal education also is consistent with the literature documenting the importance of the home environment to the development of early literacy skills in both middle- and low-income homes (Burchinal et al., 2006; Liddell & Rae, 2001; Roberts, Jurgens, & Burchinal, 2005; Teale, 1987), and it has been identified as a strong predictor of children's academic performance and verbal abilities (Bornstein, Hahn, Suwalsky, & Haynes, 2003).

For example, Roberts et al. (2005) noted that the overall responsiveness and support of the home environment was the strongest predictor of children's language and early literacy skills, and contributed over and above specific literacy measures in predicting children's early language and literacy development. While it is not surprising that maternal education is one of the most commonly used indicators of SES (Ensminger & Fothergill, 2003), empirical reasons for the strength of these relationships remain unclear at present. In that regard, Britto, Fuligini, and Brooks-Gunn (2006) have advanced three potential pathways for better understanding the relationship between maternal education and children's early literacy development: maternal modeling of literate behaviors; expectations, beliefs, and attitudes; and parent-child interactions. It will be important for these pathways to be examined closely with respect to potential mechanisms for the contribution of maternal education to literacy outcomes.

This study is one of the first to examine the issue of preschool predictors of later written language trajectory, a critical academic process as children progress through school and into adulthood. Results from this study showed the importance of early reading skills and core language functions at preschool to the later development of written language skills, with prereading skills and core language abilities being important to the rate of growth for written language in Grades 3-5. Findings suggest that specific preschool markers for language-based functions may be predictive of children who may be at-risk for writing difficulties in the elementary school years. From a theoretical perspective, these findings further suggest the possibly that, for some children, early evidencebased interventions for reading, writing, and language may serve the later development of narrative writing skills; however, these findings do not account for why some children learn to read, but not write or, in the more rare scenario, why some children can write, but struggle with reading development (Tainturier, Valdois, David, Leek, & Pellat, 2002). Given the unique nature of our sample (low SES, African American), caution should be used when generalizing these findings to other samples such as low achievers (Savage & Frederickson, 2006), English Language Learners (Linan-Thompson, Vaughn, Prater, & Cirino, 2006), or other struggling groups of children.

It will be important to replicate and extend these findings in future work, perhaps using a specific developmental model for written language (e.g., The Simple View of Writing; Graham, Struck, Richardson, & Berninger, 2006) as a theoretical starting point. Examining the differential predictive value of theoretically driven preschool variables to both reading and written language outcomes at proximal and distal developmental time points also may serve to facilitate our understanding of the readingwriting connection during the preschool and early elementary school period, and to guide evidence-based early assessment and intervention practices for school psychologists and other educational diagnosticians.

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