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Name-writing proficiency, not length of name, is associated with preschool children's emergent literacy skills

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Abstract

The goals of this study were twofold: first, to examine whether preschool children's name-writing proficiency differentiated them on other emergent reading and writing tasks, and second, to examine the effect of name length on preschool children's emergent literacy skills including alphabet knowledge and spelling. In study 1, a range of emergent literacy tasks was administered to 296 preschool children aged 4–5 years. The more advanced name writers outperformed the less advanced name writers on all emergent literacy measures. Furthermore, children with longer names did not show superior performance compared to children with shorter names. In study 2, four measures of alphabet knowledge and spelling were administered to 104 preschool children. Once again, the more advanced name writers outperformed the less advanced name writers on the alphabet knowledge and spelling measures. Results indicated that having longer names did not translate into an advantage on the alphabet knowledge and spelling tasks. Name writing proficiency, not length of name appears to be associated with preschool children's developing emergent literacy skills. Name writing reflects knowledge of some letters rather than a broader knowledge of letters that may be needed to support early spelling.

Keywords

emergent literacy; emergent writing; name writing; preschool; spelling

It is becoming increasingly evident that children are learning to write and are capable of producing writing before they begin formal instruction. One writing activity that many preschool children do with a fair amount of sophistication is writing their names. Name writing has received substantial attention from researchers examining early literacy skills--perhaps because names are among the first words that children learn to write. Learning to write one's name has both personal and social significance (Bloodgood, 1999; Clay, 1975; Martens, 1996), providing children with their first opportunity to connect oral and written language (Villaume & Wilson, 1989). Name writing may thus serve as a foundation on which to build other literacy skills (Bloodgood, 1999; Levin, Both-De Vries, Aram, & Bus, 2005).

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Relationship between Name Writing and Emergent Literacy Skills

Name-writing skills have been shown to correlate highly with children's print concepts (Bloodgood, 1999; Cabell, Justice, Zucker, & McGinity, 2009; Ferreiro & Teberosky, 1982; Puranik, Lonigan, & Kim, in press; Welsch, Sullivan, & Justice, 2003). Welsch et al. conducted a step-wise regression analysis to examine which emergent literacy skills contributed to preschool children's name writing. Their results indicated that children's alphabet knowledge and print concepts accounted for 36% of the variance in the name-writing outcome. Likewise, Puranik et al. reported that children's knowledge of print concepts uniquely contributed to their name-writing skills after accounting for age, socio-economic factors, and their phonological awareness skills. Similar findings have been obtained in children with language impairments (Cabell et al.).

Past research indicates that children's name-writing skills correlate highly with their phonological awareness skills (Blair & Savage, 2006; Ferreiro & Teberosky, 1982). For example, Blair and Savage examined correlations between name writing and phonological awareness in 38 preschool children with a mean age of 4 years, 8 months. Their results showed that phonological awareness and letter-sound knowledge were strongly related to children's name-writing abilities. Name writing was uniquely associated with phonological awareness even after controlling for letter-sound knowledge. However, the extent to which phonological awareness is related to children's name-writing ability is not clear. Whereas Blair and Savage found that phonological awareness was related to name writing, Bloodgood (1999) did not find significant correlations between phonological awareness skills (i.e., rhyme and beginning sound awareness) and children's name-writing ability. Similarly, Welsch et al. (2003) found that phonological awareness skills did not contribute significant unique variance after print-related skills were taken into account, leading the researchers to conclude that "accuracy of children's name writing reflects their general knowledge about print and sounds" (p. 771). One reason for the difference in findings may have to do with the different phonological awareness tasks included in these studies. Most importantly, however, Blair and Savage's study did not include measures of alphabet knowledge and print concepts.

In addition to the fact that name writing is associated with phonological awareness and children's knowledge of print concepts, it has been shown to be highly correlated with children's alphabet knowledge (Bloodgood, 1999; Diamond, Gerde, & Powell, 2008; Drouin & Harmon, 2009; Molfese, Beswick, Molnar, & Jacobi-Vessels, 2006; Welsch et al., 2003). Researchers have claimed that name writing represents an ideal platform for learning about alphabet letters. Molfese et al. reported that preschool children with high name-writing scores also had high letter-naming scores. In fact, Diamond et al. reported a bidirectional relationship between name writing and letter naming. Research with preschool children suggests that the first letter children learn to write phonetically is the first letter of their names (Both-de Vries & Bus, 2008; Treiman & Broderick, 1998). Treiman and Broderick argued that children develop a "special familiarity with the initial letter of their own name, learning about its visual shape and its conventional label, which therefore appears to provide a critical impetus for further growth in alphabet knowledge" (p. 112). Furthermore, children use their names to understand letter-sound relationships (Levin & Aram, 2004; Martens, 1996). Given that their names have special salience for children; children's names appear to be an excellent starting point for learning the alphabet principle (Adams, 1990).

One way that children demonstrate knowledge of the alphabetic principle is through spelling. Research indicates that when children first begin spelling, they tend to use the letters of their names to spell other words before exhibiting conventional spelling. Both-de Vries and Bus (2010) who examined name writing and spelling in Dutch preschool children

reported that 52% of the letters used to spell other words were letters from the child's first name. This bias is most profound for the initial letter of children's names (i.e., children use the first letter of their names to spell other words they do not know how to spell; Bloodgood, 1999; Both-de Vries & Bus, 2008; Levin et al., 2005; Treiman & Broderick, 1998). In a meta-analysis aimed at the identification of preschool and kindergarten predictors of conventional literacy, the National Early Literacy Panel (NELP; Lonigan, Schatschneider, & Westberg, 2008) reported that name-writing abilities showed a moderate relation of $r = .36$ (across three studies) to spelling in preschool and kindergarten children.

Name-Writing Proficiency and Emergent Literacy Skills

Although correlational, the findings of the studies reviewed above indicate that children's name-writing skills are associated with other emergent literacy skills. Additional evidence for the important role of name writing comes from studies examining how proficiency in name writing reflects proficiency in other emergent literacy areas. These include studies that have compared children with more proficient name-writing skills to children with less proficient name-writing skills. For example, Bloodgood (1999) examined children's name writing in relation to their alphabet knowledge, word recognition, syllable tapping, rhyme oddity, and spelling skills in the fall and spring of the school year. She found that the more proficient name writers outscored the less proficient name writers on all tasks. Similarly, Welsch et al. (2003) examined how proficiency in name writing differentiated children on their letter-name knowledge, concept of word, print knowledge, rhyme awareness, and beginning-sound awareness tasks in 3,546 4-year-old preschool children from low-income households. Children were divided into four groups based on the level of their name writing. The more proficient name writers outperformed the less proficient name writers on each of the variables included in their study.

The important role played by name writing in children's developing emergent literacy skills may not be straightforward, however. For example, Diamond et al. (2008) reported a bidirectional relationship between name writing and letter naming. In contrast, there is evidence that children initially learn their names as logograms, as strings of letters, or write their names by rote (Ferreiro & Teberosky, 1982; Puranik & Lonigan, 2011; Villuame & Wilson, 1989). Furthermore, researchers have found that although children know how to write their names, it does not *necessarily* mean that they can name the letters (Drouin & Harmon, 2009) or know the sounds of the letters contained in their names (Treiman & Broderick, 1998). Drouin and Harmon examined name writing and letter knowledge in 114 preschool children and reported that although name writing was related to letter knowledge (letter name and sound), there were incongruities between their name-writing knowledge and knowledge regarding the specific letters in their names, leading to the conclusion that name writing did not offer young emergent writers any special advantage in regards to alphabet knowledge. Thus, name writing may reflect mechanical knowledge of letters instead of conceptual knowledge of letters (Drouin & Harmon).

Additional evidence that name writing reflects mechanical rather than conceptual knowledge comes from examining the relationship between name writing and spelling. Some researchers suggest that knowledge used to write one's name and knowledge used to spell words may be different. Support for that conclusion comes from the fact that children write their names at a much higher level than they spell other words (Levin et al., 2005; Puranik & Lonigan, 2011). Furthermore, findings from some studies indicate that children's phonological awareness, a skill required for spelling has not been shown to contribute to children's name-writing skills (Cabell et al., 2009; Puranik et al., in press; Welsch et al., 2003). Logically, this conclusion makes sense given that spelling a word requires knowledge of letter-sound correspondence, whereas there is research indicating that children learn their

names as logograms and do not use knowledge of letter-sound correspondences to write their names. They use a different strategy for name writing and inventing spellings of other words.

Therefore, in this study we wanted to further clarify the role of name writing in supporting early literacy skills. We did this first by examining how children's name-writing proficiency differentiated them on other emergent literacy skills. The two studies (Bloodgood, 1999; Welsch et al., 2003) that have attempted to address this topic in typically developing children have confined their investigations to mainly reading-related skills such as phonological awareness and print knowledge. For example, Welsch et al.'s (2003) study did not include measures of writing such as spelling or letter writing. Furthermore, although large, the sample in Welsch et al. consisted primarily of children from low-income households, limiting generalizability of findings. The Bloodgood (1999) study, although comprehensive, was conducted on a small sample of children ($N = 49$ for fall and $N = 55$ for spring), and it included kindergarten children ($n = 20$ for fall and $n = 21$ for spring) who likely had already been exposed to formal literacy instruction. We extended the findings of these previous investigations by assessing a comprehensive set of emergent reading *and* writing tasks, which included more developmentally appropriate phonological awareness skills, with a large sample of preschool children from diverse backgrounds.

Most importantly, we extend the findings of previous research by examining whether children's proficiency in name writing differentiated them on other literacy measures by accounting for the length of their names, which was not done in previous studies. The length of a child's name could have some an impact on their name writing skills. On the one hand, it could be argued that children with longer names may have a more difficult time writing their names given that they have more letters to learn resulting in a disadvantage compared to children with shorter names. On the other hand, children with longer names may have an advantage over children with shorter names because they are forced to learn and practice more letters making them more proficient writers than children with shorter names. This advantage might be reflected in their letter-knowledge and spelling skills. Previous research with English-speaking kindergartners has shown that children with long first names tend to produce longer spellings of other words compared to kindergartners with short first names (Treiman, Kessler, & Bourassa, 2001). "Children with long names, such as a child named Christopher who does not use the shortened form Chris, may produce longer spellings of all types of words than children with short names, such as a child named Sam. This may occur because Christopher has more letters from his name that he can use as own-name intrusions [children's tendency to use the familiar set of letters in their names when spelling other words]" (p. 563, Treiman, Kessler, & Bourassa). If children with more proficient name-writing skills have better letter knowledge and children with longer names have more letters at their disposal, then it should be reflected in alphabet knowledge and spelling tasks. Thus, an additional goal of this study was to investigate whether the length of a child's name provided an advantage (or a disadvantage) in learning other emergent writing skills including alphabet knowledge and spelling after accounting for their name-writing proficiency. We specifically addressed the issue of name length by examining the number of unique letters in a child's name.

Present Studies

To summarize, we report two studies that extend previous research by examining whether preschool children's name-writing proficiency differentiated them on other emergent literacy tasks and to examine the effect of name length on emergent literacy (including emergent reading and emergent writing) tasks. In Study 1, we examined children's name-writing proficiency in relation to their performance on other emergent literacy measures

(i.e., spelling, letter writing, alphabet knowledge, print concepts, and phonological awareness) and the effect of name length on these emergent literacy measures. In Study 2, we more closely examined the effect of name length on alphabet knowledge and spelling. The specific questions addressed in these studies included: (a) What does children's proficiency in name writing tell us about their emergent reading and writing skills? (b) Is length of a child's name associated with their emergent literacy skills? and (c) Do children with longer names show better performance on measures of alphabet knowledge (letter name, letter identification, letter writing, and letter sound) and spelling compared to children with shorter names?

In line with previous research, we hypothesized that children's name-writing proficiency would differentiate them on other emergent literacy measures. However, we also hypothesized that children with longer names would not have an advantage (or disadvantage) relative to children with shorter names (i.e., there would be no effect of name length) in terms of their name-writing proficiency. Although previous research has shown that children with longer names have more letters at their disposal to spell, we did not expect that this would translate to better alphabet knowledge or spelling skills because we hypothesized that name writing is one of a constellation of emergent literacy skills that develop concurrently. Children with longer names may produce longer spellings of other words; however, longer names would not result in more phonetic spelling of other words because familiarity with writing one's name is important but insufficient to facilitate phonetic spelling of other words. To address this issue, we specifically used a developmental scoring system that accounted for the number of letters and phonemes children were able to represent accurately in their spelling.

Study 1

Method

Participants—Participants for this study were recruited from a larger study examining emergent reading and emergent writing skills in preschool children. These children attended public and private child-care centers or preschools in a moderate sized city in north Florida. No exclusionary criteria (such as cut-off scores) were used to screen children because of our interest in sampling a diverse group of preschoolers; however, teacher-reports were used to confirm that none of the children had a history of frank neurological, motor, or uncorrected visual deficits, or had developmental delays that might have hindered typical literacy development or made it difficult for them to participate in the assessments. Informed consent forms were distributed to parents of all children through their classroom teachers at 30 participating centers that served students from a diverse range of socioeconomic status. Parents or guardians of 296 children returned signed consent forms and participated in this study. Children ranged in age from 51 to 65 months, with a mean age range of 58.5 months ($SD = 3.56$). Ethnicities of these children, based on parent report, were: White (48.9%), Black/African-American (42.2%), Asian (2.4%), Hispanic (3.1%), and other (3.4%). The sample included 168 males (56.8%) and 128 females (43.2%). Parental education was approximately normal in its distribution and ranged from “did not complete high school” to “postdoctoral degree.” The median level of education reported was in the range of “completed some college” to “completed AA degree.” Only 10% of the sample reported completing a BA or above, and less than 10% reported less than a high school diploma or GED.

Procedure and Materials—Children were tested individually at their child-care centers or preschools by trained research assistants. The assessment was conducted in a quiet room and completed in two to three sessions that lasted approximately 20 to 40 minutes each depending on the individual child's ability to sustain attention and motivation for the tasks.

All assessments were completed in the spring of the school year. The following emergent reading- and writing-related tasks were administered.

Phonological awareness (PA): The Phonological Awareness subtest from the *Preschool Comprehensive Test of Phonological and Print Processing* (Pre-CTOPPP; Lonigan, Wagner, Torgesen, & Rashotte, 2002) which was the development version of the *Test of Preschool Early Literacy* (TOPEL; Lonigan, Wagner, Torgesen, & Rashotte, 2007) was administered. The Phonological Awareness subtest includes 18 items that assess analyses (elision) and 21 items that assess synthesis (blending) skills across the developmental continuum of phonological awareness (Anthony et al., 2002). These two PA tasks were chosen based on theoretical conceptualizations of the development of PA and extensive research with preschool children indicating the importance of these skills for learning to read (Anthony et al.; Wagner & Torgesen, 1987). Sample items for the analysis subtest included asking children to respond to questions such as “Look at these pictures. My word is (sunflower). Say (sunflower). Now point to sunflower without flower.” The child is expected to point to the picture of (sun) from an array of four pictures. Sample items for the blending subtest included asking children to respond to questions such as, “What words do these make: hot-dog, air-plane.”

Alphabet knowledge: The Alphabet subtest of the *Test of Early Reading Ability-3rd Edition* (TERA-3; Reid, Hresko, & Hammill, 2001) was used to assess alphabet knowledge. The TERA-3 is a standardized, norm-referenced assessment appropriate for use with preschool children. The Alphabet subtest includes 29 items, which measure letter-name and letter-sound knowledge. Sample items include questions such as, “what letter is this?” “This word says *blue*. What letter does it start with?” The internal consistency coefficients for the subtest, as reported by the authors, range from .88 to .97.

Print concepts: To assess children’s knowledge about print conventions, we developed a measure that included 24 items to assess knowledge regarding the universal principles of print (e.g., which one is drawing? which one is writing? which one can you write with?), environmental print (e.g., which one says Wal-Mart™? which one says Coca Cola™?), functions of print (e.g., what do people do with a map?), and concepts regarding writing (e.g., which one is a word? which is the best way to write ‘milk?’). Children were shown a set of four pictures and had to point to the correct picture for all the items except for portions of the functions of print subtest (5 items) where they had to also answer specific questions (e.g., what do people do with a newspaper?). The internal consistency estimate obtained for the print concepts task was acceptable ($\alpha = .84$). Concurrent validity for the print concepts task was established by examining correlations with subtests of the Pre-CTOPPP (Lonigan et al., 2002). Correlations between the Print Concepts task used in this study and the Print Knowledge and the Expressive Vocabulary subtests of the Pre-CTOPP was .69 and .66 respectively.

Name writing: The examiner gave the child paper and pencil and asked the child to write his or her first name. Children’s name writing was scored based on developmental scoring systems used in several previous studies on name writing (Cabell et al., 2009; Hildreth, 1936; Levin & Bus, 2003; Levin et al., 2005; Lieberman, 1985; Puranik et al., in press). It should be noted, that a couple of children wrote their nicknames instead of their real names. In both cases, the nicknames were considered acceptable responses. Scores could range from 1 to 9 depending on specific writing features present or absent in children’s name writing. Scores were awarded as follows: 0- No response or a scribble produced by scratching generally distributed over the page; 1- A scribble which is linear, i.e., organized in a horizontal or vertical line; 2- Writing contains distinguishable/separate units (e.g., circles, dots, or lines that are separated). Child needed to have at least 2 to receive credit with the

exception of a cursive line that goes up and down repeatedly; 3- Writing contains simple characters—units are simple forms including dots, circles, square and triangle like forms, short lines and symbols- that are separated; 4- Writing contains simple characters and is written demonstrating left-to-right orientation; 5- Writing contains first letter of name and other letters may be represented by simple characters; 6- Writing contains first letter of name and other letters may be represented by complex characters—the units are not simple, but include pseudo and real letters; 7- Writes name using correct first letter and represents other letters in name with random letters; 8- Writes more than half of the letters contained in their first name; 9- Correctly spells first name using conventional spelling. Internal consistency for the name-writing task was .92.

Letter writing: To assess letter-writing skills, children were asked to write each of 10 letters named by the examiner (B, D, S, T, O, A, H, K, M, C). The number of letters was based on recommendations made by Mason and Stewart (1990), and the particular letters were chosen based on previous research documenting the letters known most frequently by preschool children (e.g., Justice, Pence, Bowles, & Wiggins, 2006; Phillips, Lonigan, & Graham, 2006). The letters were presented to the children in a random non-alphabetic order. The children's responses were scored as 0, 1, or 2 depending on whether, and how well or poorly the letters were formed. Children obtained a score of 0 if they did not respond or wrote an unrecognizable letter. A score of 1 was given if the letter was reversed or was poorly formed and recognized only in context. A score of 2 was given if the letter was written accurately and could be recognized out of context. Although children were not given any specific directions, most children wrote using upper-case letters. Children were not penalized for case; both upper- and lower-case letters were considered acceptable responses. Internal consistency estimates obtained for the letter-writing task was high ($\alpha = .93$).

Spelling: The spelling task included six items and assessed children's knowledge of the spelling of common simple CVC words (i.e., mat, bed, duck, cat, fell, hen). Children's spelling was scored on a 7-point scale using a modified version of the Tangel and Blachman (1992) spelling rubric. We specifically used this scale to assess children's ability to demonstrate letter-sound correspondences. According to this scale, children receive points for the number of phonemes they represent in writing. Excellent internal consistency was obtained ($\alpha = .96$).

Inter-rater reliability—The PA, alphabet knowledge, and print concepts tasks were scored by two research assistants and entered into the database twice. After practice and establishing coding guidelines, two research assistants and the first author coded the name-writing, letter-writing, and spelling tasks. To calculate inter-rater reliability, approximately 25 percent ($n = 74$) of the written samples were randomly chosen. Percentage of correct agreement for the three writing tasks was as follows: letter-writing- 94%, name-writing- 95%, and spelling- 91%. Scoring differences were settled by consensus following discussion.

Results

Effect of name writing proficiency—To address the first research question, participants were divided into three groups based on their name-writing abilities. The groups reflected the theoretical accounts of name-writing development (Ferreiro & Teberosky, 1982; Hildreth, 1936; Lieberman, 1985) and were similar to those used in previous research (Bloodgood, 1999; Cabell et al., 2009; Welsch et al., 2003). The participants were grouped as follows: (a) No-name writers--name writing was unconventional or nonsymbolic (including scribbles). Based on the analysis of features, children in this group either used scribbles or simple characters to represent their names, which were linearly arranged,

segmented, or both. Children in this group did not exhibit conventional writing (score of 0 through 5), (b) Partial-name writers--children in this group had partial knowledge of their names. Their name writing included the first letter of their names, random letters, or several letters in their names (score of 6 through 8), and (c) Full-name writers--children in this group were able to write their first names accurately using conventional spelling (score of 9). Demographic information for the three name-writing groups is presented in Table 1.

To examine the extent to which children's name-writing abilities were related to their performances on other emergent-literacy tasks, we examined children's mean performances on all the emergent-literacy measures as a function of their name-writing proficiency. Before conducting group comparisons, the equivalency for chronological age of the three groups was examined. The groups differed significantly on this variable, $F(2, 293) = 9.73, p < .001$. Post hoc univariate pairwise comparisons showed that the no-name writers and the partial-name writers were significantly younger than the full-name writers ($p < .001$). There were no statistically significant differences between groups for gender or ethnicity. Because of the statistically significant age differences between groups of children based on their name-writing proficiency and because children were nested in preschool centers, multilevel models with preschool center as a random variable and children's chronological ages as a covariate were used to examine differences between children at the different levels of name-writing proficiency on the other emergent reading and emergent writing measures. Means and standard deviations for the emergent-literacy measures for the no-name, partial-name, and full-name writers are presented in Table 2. Intraclass correlations from unconditional models showed that variance attributable to differences across classrooms was .23, .09, .16, .09, .03, and .08 for spelling, letter writing, alphabet knowledge, print concepts, blending, and elision, respectively. Statistically significant group differences were observed for all the measures, $F_s \geq 23.78, p_s < .001$. As expected, the full-name writers significantly outperformed the partial-name writers; who, in turn, outperformed the no-name writers on all the emergent reading and writing measures, including spelling ($p_s \leq .001$). In all three name-writing groups, large variability was noted in children's performance across the emergent literacy tasks. As proficiency in name writing improved, performance on other emergent literacy tasks also showed improvement.

Effect of name length—To address the second research question, the full-name writers only ($n = 170$) were divided into two groups based on the length of their names. We specifically investigated the effect of name length by examining the number of unique letters in a child's name; the number of unique letters provides more accurate information on how many letters a child has at his or her disposal than a simple count of the total number of letters does. To illustrate, the name "Anne" and the name "Jack" both have four letters, but "Anne" only has three unique letters in her name whereas "Jack" has four unique letters in his name. In addition, a name like "Patrick" has seven total letters and seven unique letters, but a name like "Lillian" has seven total letters but only four unique letters. After computing the number of unique letters in a child's name, we divided the groups into two: Short names (5 or fewer unique letters; $n = 83$, Range 2–5) and long names (5 or more unique letters; $n = 87$, Range 6–10). Again, before conducting group comparisons, the equivalency for chronological age of the two groups was examined. There were no differences in age between these groups, $F(1, 168) = 0.63, p = .43$. Group comparisons on emergent reading and emergent writing measures between children with short and long names using multilevel modeling are shown in Table 3. Results indicated that there were no statistically significant differences between the two groups on any tasks (i.e., spelling, letter writing, alphabet knowledge, print concepts, blending, and elision).

Study 2

The results of Study 1 showed that children with longer names did not have better letter knowledge and were not more proficient spellers in comparison to children with shorter names. One reason that we did not see differences between groups with short versus long names could have been because we did not adequately examine their alphabet knowledge. For example, in our letter-writing task in Study 1, we only examined children's writing of 10 letters. The letters included in the assessment may not have been in the child's name. So, in Study 2, we refined our examination of alphabet knowledge in several ways. First, we examined children's ability to write all 26 letters of the alphabet. Second, we included a letter-identification task that was not part of the assessment in Study 1. Third, in Study 1, children's letter-name and letter-sound knowledge was assessed using the Alphabet Knowledge subtest of the TERA-3. Given that it is a standardized assessment, the number of items is restricted. Moreover, no separate scores for letter-names and letter-sounds are available. In Study 2, we examined children's knowledge of letter-names and letter-sounds separately for all 26 letters of the alphabet.

Method

Participants—Participants for Study 2 were recruited from a larger study assessing emergent-writing skills in preschool children. The sample included 104 preschool children recruited in a similar manner to Study 1 from a moderate sized city in western Pennsylvania. Participants were recruited from 12 public and private pre-K centers, selected to represent children from a wide range of SES backgrounds. Children ranged in age from 37 to 71 months, with a mean age of 58.81 months ($SD = 8.5$). Table 4 contains demographic information on study participants based on name-writing proficiency.

Informed consent forms were distributed to parents of all children in the participating centers through their classroom teachers. Only children whose parents or guardians returned signed consent forms participated in this study. Similar to Study 1, we did not use exclusionary criteria to screen children, except to ascertain through teacher reports that none of the children had a history of frank neurological, motor, or uncorrected visual deficits, or had developmental delays that might have hindered typical literacy development or made it difficult for them to participate in the assessments.

Procedure and Materials—The procedures for testing were similar to Study 1. Children were tested individually at their preschools by trained research assistants. Assessments were conducted in a quiet room and completed in two to three sessions that lasted approximately 20 to 30 minutes each depending on the individual child's ability to sustain attention and motivation for the tasks. Assessments took place in the fall of the school year. Four tasks were used to assess children's alphabet knowledge, and the order of tasks was counterbalanced across children. Additionally, children completed a spelling task and wrote their names.

Name writing: Children were given a pencil and paper and asked to write their first names. Procedures for scoring were identical to Study 1. The reliability coefficient for the name-writing task was .93.

Letter identification: On this task, children were shown a card with four upper-case letters printed on them and asked to point to the letter named by the examiner (e.g., "Point to the letter X"). All 26 letters were presented to children in a fixed random (non alphabetic) order. The reliability coefficient for the letter-identification task was .95.

Letter naming: Children were shown cards with an upper-case letter printed on it and were asked to name the letters. All 26 letters were presented to the children in a fixed random (non-alphabetic) order. The examiner pointed to a letter and asked the child “What is the name of this letter?” For the first two stimuli only, the examiner provided feedback if the child provided a letter sound instead of the letter name by saying, “That’s the sound the letter makes, what is the name of the letter.” Reliability for the letter-naming task was .97.

Letter writing: On this task, children were asked to write each of 26 letters of the alphabet. The letters were presented orally to the children in a fixed random (non-alphabetic) order. The examiner introduced the task by saying, “I want you to write out some letters for me. If you do not know them all, that is alright. Just try your best.” The examiner then pointed to where the child needed to begin writing. Scoring criteria were identical to Study 1. As with Study 1, upper- and lower-case letters were accepted as appropriate responses. Reliability for the letter-writing task was .97.

Letter sounds: Children were shown individual upper-case letters printed on a page and asked to say its sound. The examiner introduced the task by saying, “I want you to tell me the sounds that letters make. I will show you a letter and you tell me the sound that the letter makes. If you don’t know them all, that’s alright. Just try your best.” For the first two stimuli only, the examiner provided feedback if the child provided the letter name instead of the letter sound by saying, “That’s the name of the letter, now tell me the sound that letter makes.” The maximum score was 26. Reliability for the letter-sound task was .96.

Spelling: The spelling task included 12 items and assessed children’s knowledge of the spelling of common simple CVC and VC words. The spelling task was scored on a 9-point scale. The spelling scoring rubric along with some examples are shown in Appendix A. Excellent internal consistency was obtained ($\alpha = .98$).

Inter-Rater Reliability—The letter-identification, letter-naming, and letter-sound tasks were scored by two research assistants and entered into the database twice. The three writing tasks, namely letter-writing, name-writing, and spelling, were also scored by two research assistants first but this was followed by a check for inter-rater reliability. Inter-rater agreement was calculated for each of the 26 letters in the letter-writing task; percent correct agreement ranged from 87% to 98% (mean 93%) and Cohen’s Kappa was .98. Percent correct agreement for the name-writing task was 96%. Percent correct agreement was also calculated for each of the 12 words in the spelling task, and it ranged from 87% to 94% (mean 92%). Cohen’s Kappa was calculated for each word and ranged from .87 to .98. Scoring differences across all the letter-writing and spelling tasks were settled by consensus following discussion.

Results

Effect of name-writing proficiency—As in Study 1, children were divided into three groups based on their name-writing proficiency. The groups differed significantly on age, $F(2, 101) = 39.9, p < .001$. Post hoc pairwise comparisons showed that the no-name writers and the partial-name writers were significantly younger than the full-name writers ($p < .001$). There were no statistically significant differences between groups for gender or ethnicity. Data for the dependent measures were analyzed using multilevel modeling to account for children nested in classrooms with age as a covariate in all subsequent analyses. Descriptive statistics for the emergent-literacy measures for the no-name, partial-name, and full-name writers are presented in Table 5. Statistically significant group differences were observed for most of the dependent measures. After controlling for age, the full-name writers significantly outperformed partial-name writers; who, in turn, outperformed the no-

name writers on the letter identification, letter naming, letter writing and spelling ($ps \leq .001$). Differences between name-writing groups were not statistically significant for the letter-sound task. As proficiency in name writing improved, performance on letter identification, letter naming, letter writing, and spelling also showed improvement.

Effect of name length—To examine differences in performance on the alphabet knowledge tasks based on the length of children's names, similar to the procedure used in Study 1, the full-name writers were divided into two groups (i.e., short names and long names) based on the number of unique letters in their first names. There were no statistically significant differences in age between the two name-length groups, $F(2, 101) = .71, p = .49$. Scores on the alphabet knowledge measures and spelling were analyzed using multilevel modeling to account for the fact that children were nested in classrooms. Descriptive statistics for the name-writing, alphabet knowledge, and spelling tasks based on name length are shown in Table 6. No statistically significant group differences were observed for any of the dependent measures, $F_s(2, 36) < 3.10, ps > .05$.

General Discussion

The goals of this study were to determine whether preschoolers' name-writing skills had special status as a marker of children's developing early literacy skills and to examine if the length of a child's name had an effect on their performance on these early literacy tasks. Results of this study indicated that level of name-writing proficiency differentiated preschool children with respect to other critical emergent reading tasks and emergent writing tasks. The results also revealed that the length of children's names did not confer an advantage or disadvantage to children in terms of their emergent literacy skills, including their alphabet knowledge and spelling skills.

Consistent with previous reports, the findings of this study showed that young emergent writers were very adept in writing their names (e.g., Bloodgood, 1999; Both-de Vries & Bus, 2008, 2010; Diamond et al., 2008; Levin & Ehri, 2009; Levin et al., 2005; Puranik & Lonigan, 2011; Welsch et al., 2003). Overall, very few children were unable to write any part of their names. Only 42 (or 14.2%) of the entire sample of 296 children in Study 1 did not use letters to write their first name. More than half of the children in Study 1 (approximately 57%) were able to write their first names accurately using conventional spelling. In Study 2, 38 (or approx. 36%) of the sample of 104 children did not use letters to write their first names; however, more than one-third of the sample was able to spell their first names correctly.

Name-writing proficiency—The results of Study 1 showed that children who were the most proficient name writers showed superior performance on all emergent reading-related tasks, including alphabet knowledge, phonological awareness, and print concepts, which is consistent with the findings reported by Welsch et al. (2003) and Bloodgood (1999). Additionally, children who were able to write their names accurately had the highest scores on both the letter-writing task and the spelling task. They were able to write more letters and spell more words compared to children in the other two name-writing proficiency groups. In contrast, children with the poorest name-writing skills had the lowest scores on both the letter-writing task and the spelling task. In Study 1, on the letter-writing task, the most advanced name writers (full-name writers) were most able to write letters accurately (between 64% and 96%); whereas the least advanced name writers (no-name writers) wrote letters with between 6% and 55% accuracy. Identical results were obtained in Study 2, with the full-name writers showing better performance on most of the alphabet knowledge tasks and spelling compared to the partial-name and no-name writers. The only task for which a statistically significant difference between the most proficient and the less proficient name

writers was not noted was the letter sound task (Study 2), perhaps because letter sounds may have been too difficult for this age group regardless of name-writing proficiency. Difficulty with letter sounds has been reported in other samples of preschool children (e.g., Molfese et al., 2008).

On the spelling task in both Study 1 and Study 2, the full-name name writers were able to spell all the target words more accurately than were the children in the other two groups. A qualitative examination of spelling revealed that a substantial proportion of full-name writers were able to use their advanced knowledge about letters to represent phonemes when spelling words. These results are consistent with previous findings by Both-de Vries and Bus (2008, 2010) with Dutch preschoolers. They reported that more advanced name writers were able to spell more words correctly than were less advanced name writers. Our study extends their findings to a large and diverse group of English-speaking preschoolers. Thus, children's name-writing proficiency differentiates children on emergent literacy tasks, including letter writing and spelling.

Name length—Previous research with kindergarten children has indicated that children with longer names have more letters at their disposal to use when spelling (e.g., Treiman & Broderick, 1998). Research with preschool children has indicated that children frequently use the letters of their names when spelling other words (e.g., Both-de Vries & Bus, 2008; Treiman & Broderick, 1998). One goal of this study was to examine if preschool children with longer names had an advantage over children with shorter names specifically with regard to their alphabet knowledge because they knew more letters. Such knowledge of letters would enable them to use these letters to spell, leading to better spelling proficiency. Neither the results of Study 1 nor Study 2 showed that children with longer names had any advantage over children with shorter names in terms of their emergent literacy skills—even when proficiency in name writing was considered. Furthermore, they did not have an advantage when it came to alphabet knowledge or spelling.

Why did children with longer names in this study not show better performance on the spelling task? One important reason could be because we accounted for children's name-writing proficiency. Additionally, in previous studies, the effect of name length was not examined (e.g., Both-de Vries & Bus, 2008; Treiman & Broderick, 1998). Most importantly, the difference in the findings of this study and previous studies that have indicated that children with longer names have more letters at their disposal to use when spelling other words, may have to do with the manner in which spelling was scored. In this study, we used a developmental scoring system that accounted for the number of phonemes a child was able to represent accurately. Previous studies have examined the number of letters in the child's name that also appeared in their spellings of other words. Although children might use the letters of their names to spell other words, as suggested by past research, it does not appear to result in phonetically more sophisticated spellings as evidenced by the findings of this study. Having more letters does not help one spell phonetically if those letters are not connected to sounds. This result provides further evidence that children use different strategies when spelling their names than they do when spelling other words. A qualitative spelling rubric, such as one used in this study, appears to a better indicator of knowledge of the alphabetic principle or the sophistication of children's phonetic representations compared to investigations of spelling that have examined the frequency with which children use the letters in their names. Children with longer names did not have an advantage over children with shorter names, even though they had more letters at their disposal. Thus, it appears that name-writing proficiency--but not length of name--is associated with children's emergent literacy skills.

To summarize, this study was undertaken to clarify the role of name writing and its association with other emergent literacy and emergent writing skills. We attempted to do this by extending the findings of previous research in several ways by including a broader array of emergent literacy skills that included emergent writing tasks such as letter writing and spelling, accounting for name writing proficiency, controlling for the length of a child's name, and using a developmental scoring system to capture sophistication in children's spelling in a large and diverse group of preschool children ranging in age from 3 to 5 years. The descriptive analyses showed that scores on all emergent reading and emergent writing skills improved with name-writing proficiency (i.e., along with improved name-writing skills, children showed improved performance in their alphabet knowledge, letter-writing skills, print knowledge, and spelling skills). Furthermore, although not reported here (see Puranik & Lonigan, 2011), the correlational analyses indicated that all emergent literacy skills were strongly correlated, suggesting that emergent reading and emergent writing develop concurrently (i.e., they have overlapping developmental patterns and share an interdependent relationship starting in preschool; Lonigan, McDowell, & Phillips, 2004; Whitehurst & Lonigan, 1998).

Researchers have reported that a child's interest in literacy activities is important to the development of their language and literacy skills (Levy, Gong, Hessels, Evans, & Jared, 2006; Payne, Whitehurst, & Angell, 1994; Roberts, Jurgens, & Burchinal, 2005; Scarborough & Dobrich, 1994; Sénéchal, LeFevre, Hudson, & Lawson, 1996). It is highly likely that children who are more interested in print- and literacy-related activities know more about print conventions. These children may in turn be more likely to be motivated to learn about letters and to write their names. Likewise, children who know more letters may become further interested in literacy-related activities and in writing their names. This reasoning also fits well with Diamond et al.'s (2008) findings regarding bidirectional influences between name writing and letter naming. It is important to note that Diamond et al. found this pattern of bidirectionality only for the more proficient writers (children who used letters to write their names) and not for the less proficient writers (children who did not use letters to write their names). Thus, it is more likely that, children who are more motivated to learn about letters show greater interest in writing their names and do so with greater proficiency, whereas children who are less motivated are less likely to learn letter names and learn to write their names.

What does proficiency in name writing tell us about a child's developing emergent literacy skill? The larger question still remains: Does name writing reflect mechanical knowledge of letters instead of conceptual knowledge of letters (e.g., Drouin & Harmon, 2009; Puranik et al., in press; Treiman & Broderick, 1998)? One distinctive aspect of our study was that we attempted to clarify the role of name writing by accounting for name length (specifically, we accounted for the number of unique letters in a child's name), which has not been done in previous studies. Our findings indicated that length of name did not confer any advantage or disadvantage in terms of phonological awareness and print concepts (Study 1) or any advantage in letter-naming, letter-identification, letter-writing, and spelling skills (Study 2). If name writing reflects conceptual knowledge, then at the very least, children who had longer names should have been able to identify, name, and write more letters, and they should have been able to use those letters when spelling single words. However, this was not the case. In both Study 1 and Study 2, children with longer names did not outperform children with shorter names even after controlling for name-writing proficiency, providing strong evidence that name writing reflects mechanical knowledge rather than conceptual knowledge of emergent writing. Even though children with longer names may produce longer spellings of other words, as previously reported (Both-de Vries & Bus, 2010; Treiman et al, 2001), as we hypothesized, longer names did not appear to result in more phonetic spelling of other words because familiarity with writing one's name is important

but insufficient to facilitate phonetic spelling of other words. Taken together, the findings from both studies indicate that proficiency in name writing reflects children's general knowledge about their emerging literacy skills.

Limitations

Although the results of these studies are informative, a few limitations exist. First, in these studies, we examined name writing but not the effects of name recognition or children's ability to spell their names orally because we assumed that name writing was a better and more sophisticated indicator of children's knowledge of letters and their names (Levin & Ehri, 2009). Future studies may include both tests of children's ability to recognize and orally spell their names for a more precise understanding of children's knowledge regarding their names. Second, when examining spelling, we used a developmental scoring system and did not count the number of letters in children's names that appeared in their spelling, which would allow for a quantitative versus a qualitative examination. Third, all of the children in the study were exposed to literacy-related activities--name writing, alphabet knowledge etc. Although we used multilevel modeling to account for nesting of children within classrooms, how practices vary among schools and how these practices may have influenced children's performance on literacy tasks was not examined. Future studies would benefit from examining the influence or impact of instruction of children's developing written-language skills. Fourth, Study 1 was conducted at the end of the school year (spring) whereas Study 2 was conducted in the beginning of the school year (fall). Given that name writing is acquired over a relatively short period of time for many children, there might be a limited window of opportunity to examine the relationship between end-of-the-year name-writing ability (when the majority of children can write their names accurately) and emergent literacy skills and beginning-of-the-year name-writing ability (when children are less accurate in the writing of their names) and emergent literacy skills. Although not planned, results of Study 1 and Study 2 allowed us to compare to some extent, the relationship between end-of-the-year name writing ability and emergent literacy skills and beginning-of-the-year name writing ability and emergent literacy skills. The findings of both studies were consistent and indicated that the more proficient name writers outperformed the less proficient name writers irrespective of the time in the school year these skills were measured. Moreover, no effect for name length was found in either study. Considering the children were different in Study 1 and Study 2, however, the results might be different if the same children participated in the assessment at both time points. It is possible that name writing as measured at the beginning-of-the-school year might be a better indicator of children's developing emergent literacy skills than end-of-the-school-year name-writing skills. A future study that examines name writing and other emergent literacy skills longitudinally may shed some light on this issue and improve our understanding of how name writing contributes to the development of early reading and writing skills.

Finally, an important point regarding how spelling was assessed must be addressed. Spelling, as assessed in these studies through writing, involves both children's understanding of the alphabetic principle and their letter-writing skills. Given the age of the children included in these studies, it could be argued that some children may have known the shape of a letter but may have had difficulty writing the letter. One way in which we attempted to circumvent this issue was to use a 3-point scoring system that did not penalize children for poor penmanship. Yet, assessing word spelling through alternative measures such as spelling words orally may have been a better indicator of children's spelling skills. However, in a recent study, Puranik and Apel (2010) reported their findings using alternative measures in which children's spelling was compared using three conditions. Children were asked to spell words using letter tiles, spell orally, and spell by writing. Their results indicated that spelling proficiency was the same regardless of the output modality;

children who could spell did equally well in the oral, tile, and written spelling conditions. This finding is consistent with research done with older children indicating that poor letter-writing fluency reflects weak letter knowledge rather than weakness with motor skills (Abbott & Berninger, 1993).

Summary and Conclusions

Name writing reveals a lot of information about children's emerging understanding of literacy--their alphabet knowledge (both receptive and expressive) and knowledge of letter-sound relationships (implicitly captured in the spelling task). The importance of supporting and facilitating preschool children's name-writing skills is further supported by our findings (e.g., Bloodgood, 1999; Both-de Vries & Bus, 2008, 2010; Hildreth, 1936; Treiman & Broderick, 1998; Welsch et al., 2003). Children's proficiency in name writing could help preschool teachers and educators provide a quick screening measure of their emergent literacy knowledge as suggested by others (e.g., Haney, 2002; Haney, Bissonnette, & Behnken, 2003). However, the findings from this study coupled with the findings of previous research regarding incongruities in children's knowledge regarding the letters in their name (e.g., Drouin & Harmon, 2009; Treiman & Broderick, 1998) caution against using name writing exclusively as an indicator of children's emergent literacy knowledge. Instead, the assessment of both name writing and alphabet knowledge might be a better indicator of children's developing emergent literacy skills. Furthermore, although name writing provides an excellent starting point, our results also caution against focusing exclusively on teaching children the letters of their names.

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Research Highlights

- Name writing proficiency appears to be associated with preschool children's developing emergent literacy skills.
- The more advanced name writers outperformed the less advanced name writers on all emergent literacy measures.
- Name writing proficiency is age dependent.
- Length of name has no association with preschool children's developing emergent literacy skills including alphabet knowledge and spelling.
- Children with longer names did not show superior performance compared to children with shorter names on alphabet knowledge and spelling tasks.

Table 1

Demographic information for no-name (n = 47), partial-name (n = 79), and full-name writers (n = 170) for Study 1

Variable		No-name writers	Partial-name writers	Full-name writers
Age	Mean (<i>SD</i>)	57.2 (3.8)	57.7 (3.3)	59.3 (3.4)
Gender	Male	52.4%	57.8%	56.7%
	Female	45.2%	42.2%	42.7%
Ethnicity	White	47.6%	44.6%	50.9%
	Black/AA	45.2%	44.6%	39.8%
	Hispanic	2.4%	3.6%	2.9%
	Asian	2.4%	2.4%	2.3%
	Other	0%	4.8%	3.5%

Table 2

Means and standard deviations on emergent reading and writing measures based on name writing proficiency for study 1

	No-name writers		Partial-name writers		Full-name writers		<i>F</i> for Overall 3-Group Contrast ^{**}
	<i>M</i> (<i>s.e.</i>)	Range	<i>M</i> (<i>s.e.</i>)	Range	<i>M</i> (<i>s.e.</i>)	Range	
Spelling	10.67 (.51)	0–9	14.56 (1.24)	0–38	21.1 (1.03)	0–42	<i>F</i> (2, 284.5) = 31.86
Letter Writing	3.97 (.87)	0–14	8.45 (.7)	0–20	13.75 (.56)	0–20	<i>F</i> (2, 295.6) = 73.71
Alphabet Knowledge ⁺	3.58 (.85)	0–8	5.61 (.67)	0–19	9.8 (.54)	0–26	<i>F</i> (2, 287.7) = 33.97
Print Concepts	9.04 (.68)	1–18	12.69 (.53)	4–21	16.01 (.39)	4–24	<i>F</i> (2, 289) = 50.51
Blending [#]	11.26 (.61)	0–19	14.37 (.47)	3–21	16.16 (.34)	6–21	<i>F</i> (2, 282.7) = 26.99
Elision [#]	7.17 (.63)	0–17	10.07 (.48)	0–17	11.78 (.36)	3–18	<i>F</i> (2, 287.7) = 23.78

Note.

⁺ Alphabet knowledge subtest of TERA-3, raw scores are reported;

[#] subtests from Preschool Comprehensive Test of Phonological and Print Processing.

^{**} All values significant at $p < .001$. For no-name writers group $n = 47$, partial-name writers group $n = 79$, and full-name writers group $n = 170$.

Table 3

Means and standard deviations on emergent reading and writing measures for the full name writers based on name length (N = 170) for study 1

	Short name		Long name		<i>F</i> for overall 2-group contrast*
	<i>M</i> (<i>s.e.</i>)	Range	<i>M</i> (<i>s.e.</i>)	Range	
Spelling	21.43 (.13)	0-41	21.26 (1.27)	0-42	<i>F</i> (1, 150.8) = 0.12
Letter Writing	13.99 (.68)	0-20	14.09 (.66)	0-20	<i>F</i> (1, 151.85) = .02
Alphabet Knowledge ⁺	10.09 (.75)	0-24	9.9 (.73)	0-26	<i>F</i> (2, 151.69) = .05
Print Concepts	15.91 (.53)	4-24	16.21 (.52)	5-24	<i>F</i> (2, 151.85) = .22
Blending [#]	16.13 (.42)	6-21	16.3 (.41)	6-21	<i>F</i> (2, 157.22) = .09
Elision [#]	12.21 (.49)	3-18	11.44 (.48)	4-18	<i>F</i> (2, 150.61) = 1.76

Note.

* nonsignificant

⁺ Alphabet knowledge subtest of TERA-3, raw scores are reported;

[#] subtests from the Preschool Comprehensive Test of Phonological and Print Processing. Name length was based on number of unique letters in child's name; for short name (*n* = 83) and long name (*n* = 87).

Table 4

Demographic information for no-name writers (n = 38), partial-name writers (n = 27), and full-name writers (n = 39) for Study 2

		No-name writers	Partial-name writers	Full-name writers
Age (months)	<i>M (SD)</i>	44.7 (5.6)	53.7 (6.9)	57.4 (6.7)
Gender	Male	53%	44%	44%
	Female	47%	56%	56%
Ethnicity	White	50%	56%	79%
	Black/AA	45%	41%	11%
	Hispanic	2.5%	3%	0%
	Asian	2.5%	0%	10%

Table 5

Means and standard deviations on alphabet knowledge tasks and spelling based on name writing proficiency for Study 2

	No-name writers		Partial-name writers		Full-name writers		<i>F</i> for Overall 3-Group Contrast
	<i>M</i> (<i>s.e.</i>)	Range	<i>M</i> (<i>s.e.</i>)	Range	<i>M</i> (<i>s.e.</i>)	Range	
Letter Identification	14.69 (1.29)	0–26	20.19 (1.26)	6–26	23.86 (1.23)	11–26	<i>F</i> (2, 97.1) = 12.78**
Letter Naming	10.81 (1.65)	0–26	17.85 (1.69)	2–26	21.21 (1.58)	6–26	<i>F</i> (2, 97.23) = 10.47**
Letter Writing	9.18 (2.19)	0–25	16.64 (2.17)	0–46	29.91 (2.05)	5–52	<i>F</i> (2, 90.45) = 20.98**
Letter Sound	9.68 (2.02)	0–25	8.73 (1.96)	2–23	11.26 (1.95)	0–26	<i>F</i> (2, 85.75) = 1.04
Spelling	23.75 (3.84)	1–56	31.65 (3.67)	5–83	58.31 (3.6)	24–101	<i>F</i> (2, 94.77) = 23.31**

Note. Values significant at ** $p < .001$. For no-name writers group $n = 38$, partial-name writers group $n = 27$, and full-name writers group $n = 39$.

Table 6

Means and standard deviations on alphabet knowledge tasks and spelling based on name length group for the full-name writers (N=39) for Study 2



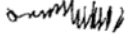

	Max. Score	Short name		Long name		F for overall 3-group contrast*
		M (s.e.)	Range	M (s.e.)	Range	
Letter Identification	26	25.13 (.52)	20–26	23.21 (.89)	11–26	$F(1, 36.06) = 3.7$
Letter Naming	26	22.78 (1.03)	11–26	22.17 (1.8)	6–26	$F(1, 36.05) = .09$
Letter Writing	52	33.77 (2.88)	5–52	31.05 (4.76)	6–52	$F(1, 35.67) = .28$
Letter Sound	26	13.47 (2.2)	2–26	15.44 (2.94)	0–24	$F(1, 29.3) = .60$
Spelling	108	64.89 (5.5)	24–101	68.46 (8.1)	36–100	$F(1, 34.11) = .20$

Note.

* nonsignificant. For Short name ($n = 30$) and Long name ($n = 9$).

Appendix A

Description of Spelling Scoring

Score	Stage	Rule	mat	bed
0		No response		
1	Graphic	A scribble produced by scratching.		
2		A single good form (e.g., a square, a circle-like form, a triangle-like form) not produced just by scratching, but in a more controlled manner.		
3	Literate	Conventional symbol: The writing contains at least one real letter not phonetically related to the letters in the word. A dot or circle on its own is not considered a conventional symbol.	P, W	X, Y, C
4		Random string of letters: More than one random (not phonetically related) letters.	Apn, cxo, cvh, lfk	nx, ops, npt, gan
5	Early Phonetic	Early Phonetic representation: The writing contains at least a single letter that is phonetically related to the word of the child was asked to write in any position of the word.	tio, tte, sai, eht, agm	Dad, Deh, ced,
6		Correct first letter of the word: Correct first letter in initial position and/or with other phonetically related letters.	M, mnn	bptre, bpt, bht
7	Phonetic	Multiple phonetic representation: The writing contains 2/3 related phonemes but not a repetitions of the same letter. The first letter of the word must be in the initial position.	mab, mht, map	bdc, bdd, bcd, bd,, bzd
8		Invented spelling: The writing contains two or more phonetic letters that represent most of the word's phonemes, along with any attempt to represent the vowel.	matt, mta	bad, bde, bied
9	Correct	Conventional spelling: The word the child was asked to write is written in its conventional form.	mat	bed

Modified from Tangel and Blachman (1992)