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From Scribbles to Scrabble: Preschool Children's Developing Knowledge of Written Language

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Abstract

The purpose of this study was to concurrently examine the development of written language across several writing tasks and to investigate how writing features develop in preschool children. Emergent written language knowledge of 372 preschoolers was assessed using numerous writing tasks. The findings from this study indicate that children possess a great deal of writing knowledge before beginning school. Children appear to progress along a continuum from scribbling to conventional spelling, and this progression is linear and task dependent. There was clear evidence to support the claim that universal writing features develop before language-specific features. Children as young as 3 years possess knowledge regarding universal and language-specific writing features. There is substantial developmental continuity in literacy skills from the preschool period into early elementary grades. Implications of these findings on writing development are discussed.

Keywords

emergent literacy; emergent writing; language development; preschool; writing; written language

In the past two decades, emergent literacy researchers have found converging evidence indicating that children enter school with a great deal of skill and knowledge about reading and writing, although perhaps not in a formal or conventional way (e.g., Ferreiro & Teberosky, 1982; Sulzby, 1989; Sulzby & Teale, 1991; Whitehurst & Lonigan, 1998, 2001). This early knowledge plays a vital role in laying the foundation for later literacy success. Although, research on writing has been scarce compared to research on reading, findings from investigations have indicated that young children, 3 to 6 years of age, are capable of producing letters of the alphabet (Clay, 1985; Hiebert, 1978, 1981; Mason, 1980), writing their names (Bloodgood, 1999; Hildreth, 1936; Levin & Aram, 2004; Levin & Bus, 2003; Levin, Both-De Vires, Aram, & Bus, 2005; Levin & Ehri, 2009; Saracho, 1990; Stanley & Pershin, 1978), and beginning or invented spelling (Gombert & Fayol, 1992; Smith & Dixon, 1995; Tolchinsky-Landsmann & Levin, 1987).

Whereas these previous investigations have shown that children possess a great deal of skill or knowledge before being able to write conventionally, a question that continues to be debated is how writing develops. Just as children do not begin to talk by speaking in complex utterances, or decode by reading a novel, children do not begin writing in complete sentences. Similar to the development of oral language or reading, the acquisition of writing skill progresses in stages. Some researchers contend that before writing conventionally, children scribble to convey meaning through print (Ferreiro & Teberosky, 1982; Fox & Saracho, 1990; Gombert & Fayol, 1992; Luria, 1978; Saracho, 1990; Tolchinsky-Landsman

& Levin, 1985, 1987). However, these scribbles or early writings are not random. According to Tolchinsky's (2003) *differentiation hypothesis*, these scribbles contain certain features. In the beginning, children's scribbles or writing contain universal features. Universal features include characteristics of writing such as linearity (writing units/marks are organized in straight lines), discreteness (segmentation), and lack of iconicity (writing units are abstract). These features reflect children's understanding that writing and drawing are different, that writing does not represent meaning directly as pictures do. Instead, it is an attempt to convey meaning symbolically to represent linguistic units. These universal features reflect the basic representational nature of writing that all languages commonly share. Learning to write requires learning both a general principle of symbolic representation and the specific writing conventions for a particular language. So as children's written knowledge develops, other features are manifested in their written output. These features termed, language-specific features may vary across writing systems (e.g., English vs. Arabic), and include directionality (left to right), symbol shapes, and spacing between words. Once children have an understanding of the symbolic nature of writing, it is easier for them to learn about the specific visual features of the writing systems to which they are exposed. They subsequently refine their written output using language-specific features.

There is currently no one accepted theory of how writing develops; however, two hypotheses have been proposed about young children's written language awareness: the *Linearity Hypothesis* and the *Unified Hypothesis* (Ferreiro & Teberosky, 1982; Gibson & Levin, 1975; Goodman & Goodman, 1979; Hiebert, 1981; Smith, 1976; Tolchinsky, 2003). From the perspective of the Linearity Hypothesis, development of a skill takes place in sequential steps. Early features are mastered first, and these early features, in turn, contribute to the acquisition of later developing skills. As applied to writing, the Linearity Hypothesis predicts that children will demonstrate the universal features of writing before they demonstrate knowledge of the language-specific characteristics of a writing system (Tolchinsky, 2003).

According to Tolchinsky (2003), children begin to display some knowledge of the universal properties of writing as early as age 3 years, and, by 4 years of age, most children have written output that is linear and discrete. At this stage, children's writing or scribbles do not contain any letters, do not show correspondence to the length of the spoken word, and do not contain spaces between words. Instead, children's writing at this early stage includes features common to all languages such as linearity and the presence of distinguishable units which are often inconsistently separated from each other. Luria (1978) described this type of writing as *undifferentiated-noninstrumental* writing and Ferreiro and Teberosky (1982) described it as *undifferentiated writing*. Children begin displaying knowledge of the language-specific properties of writing such as directionality (left to right), and symbol shapes around age 5 years of age (Tolchinsky). Further evidence for a linear acquisition of early writing comes from the work of Ferreiro and Teberosky who were instrumental in describing much of the developmental process of writing.

In contrast to the Linearity Hypothesis, proponents of the Unified Hypothesis argue that children do not acquire knowledge of print in a uniform, linear sequence (Gombert & Fayol, 1992; Goodman & Goodman, 1979; Hiebert, 1981; Smith, 1976). As applied to early writing, the Unified Hypothesis predicts that children learn about general and language specific aspects of writing simultaneously and in no particular order, depending on their experiences with print. Some researchers believe that young children do not comprehend the symbolic and referential nature of writing; instead, researchers believe that young children treat print as if it represents meaning directly just like pictures do (Bialystok, 1991, 2000; Treiman, Cohen, Mulqueeny, Kessler, & Schechtman, 2007). Recently, Treiman et al., (2007) investigated children's knowledge regarding the visual characteristics of their names.

In four different studies, they systematically examined young children's knowledge regarding capitalization patterns (i.e., uppercase first letter followed by lowercase letters), print orientation (e.g., horizontal vs. vertical), and knowledge regarding the specific letters in their names. Treiman et al. found that children younger than four years of age demonstrated knowledge of both the language-specific features (e.g., knowledge of specific letter shapes of their names and left-to-right directionality) and the universal features (e.g., linearity) of writing. Treiman et al. took their findings as evidence against Tolchinsky's (2003) differentiation hypothesis (i.e., children do not acquire knowledge of print in a linear sequence) hypothesizing that young children's writing was not an attempt at symbolization but instead represented meaning directly. There is no sequential learning of writing features; young children focus on the characteristics of writing that are visually salient and attract their attention (such as the first letter in their names). Additional support for the Unified Hypothesis comes from Gombert and Fayol (1992), who reported on the writing behavior of French speaking children three to six years of age. Contrary to their expectations, they found that the writing of the younger participants in their study, including some 3-year-old children contained features such as linearity, directionality (left-to-right), presence of discrete units and regular spacing between letters and words. Thus, there is no consensus on whether the features of writing are learned in a linear sequence or a unified fashion; however, researchers are consistent in their claims that children's early writings exhibit certain developmental features.

Questions regarding the development of writing, and the coherence of tasks used to measure writing are becoming increasingly important given the importance of the preschool years for later literacy and academic success as well as the strong push toward the early prevention of difficulties in these domains. Studies examining the development of writing that are designed to describe a wide-range of emergent writing skills involving a large number of children from varying socio-economic backgrounds are necessary to improve our understanding of young children's early writing. Understanding whether writing features are learned in a linear or unified manner has implications for developing instructional models of emergent writing, perhaps leading to more precise theoretical models of emergent writing. Hence, the purpose of this study was to concurrently examine the development of preschool children's performance on a range of emergent writing tasks, and to examine systematically if the features of writing develop in a linear or unified manner.

In this study, we aimed to provide a more conceptually coherent examination of how writing develops than has been reported before. We did this by concurrently examining a broad range of possible emergent writing skills. It is important to use a broad range of tasks when examining emergent writing because research has shown that children use different writing forms for different tasks (Sulzby, 1989; Sulzby, Barnhart, & Hieshima, 1989). Most researchers have confined their examinations of early writing to one or two writing skills (e.g., name writing, alphabet knowledge). For example, Treiman et al. (2007) only examined children's receptive knowledge of their names, and not children's name writing knowledge. Additionally, few studies have assessed children's ability to write the letters of the alphabet. Tasks generally used to assess alphabet knowledge require the child to say a letter name when presented with a letter stimulus or point to the letter named from a set of three to four letters. It is important to expand assessment of alphabet knowledge to examine children's knowledge of letters in writing because, as Tolchinsky (2003) noted, there might be a difference between what children know and how they convey this information through the actual production of print.

Beyond examining name-writing, letter writing, and spelling, very few studies have examined young children's early ability to compose or convey meaning beyond the single-word level through writing. Noteworthy exceptions are studies by Bloodgood, (1999) and

Bus et al. (2001) which included children's spontaneous writing. However, analyzing spontaneous writing is problematic for at least a couple of reasons- they are difficult to score and the output is difficult to control making comparisons across children difficult. We initially included a spontaneous writing task but later dropped it because most children had difficulty with it; they often just shrugged their shoulders and stated that they did not know how to write. The spontaneous writing task was replaced with the two closed-ended tasks; writing to describe a picture and writing after repeating a sentence, which most children attempted to complete. These two tasks also had the advantage that the output was controlled, which made them easier to score than a spontaneous writing sample on which the output could vary considerably from child to child.

Additionally, this study was conducted using a cross-sectional examination of a relatively large group of children across the preschool period. Studies examining emergent writing have indicated large variability in children's performance. Yet, most previous studies examining the development of writing have generally involved a small number of participants from select socio-economic groups or have been descriptive case-studies. Using a large sample with children from varying socio-economic backgrounds could help to clarify and complement the results from small sample studies (Sulzby et al., 1989).

Finally, we used a detailed scoring system to enable us to quantify and capture the features in children's early writing. No previous studies, to our knowledge, have attempted to quantify features in children's writing. A major shortcoming concerning knowledge of emergent writing is the lack of consensus on how it should be measured and quantified. For instance, in its recent synthesis of the results of published studies that examined the relation between early literacy skills and later conventional literacy outcomes (i.e., decoding, reading comprehension, and spelling), the National Early Literacy Panel (NELP; Lonigan, Schatschneider, & Westberg, 2008) identified 10 studies on writing; however, no study used a similar scoring system. In general, the practice in research is to assign a holistic score for a piece of writing. As a result, each child's score varies depending on the criterion used for a particular study. Consequently, comparisons among studies and generalization of findings across studies are difficult. Addressing the numerous gaps in research allowed for a comprehensive examination of how to measure emergent writing and what, if any, developmental trends were present. Most importantly, it allowed us to assess children's use of writing features across several different tasks including at the word and sentence level.

Method

Participants

Participants for this study were recruited from 34 private and public preschool classes and private child care centers in a moderate sized city in north Florida. Informed consent forms were distributed to parents of all children in the participating centers. From these preschools, parents or guardians of 377 children returned signed consent forms to allow their children to participate in this study. Of this group, five children refused to participate in the assessment. Results are reported for the remaining 372 children who ranged in age from 3 to 5 years. Children were grouped into one-year age bands. There were 30, 3-year-olds, whose mean age was 42.6 months (*SD* = 3.95; range = 36 to 48 months), 201, 4-year olds, whose mean age was 55.73 months (*SD* = 2.44; range = 49 to 59 months), and 141, 5-year-olds, whose mean age was 62.04 months (*SD* = 1.7; range = 60 to 71 months). There were comparable number of males (54%) and females (46%) included in the sample. The ethnic breakdown of this sample was 54% Caucasian, 35.9% African American, 2.7% Hispanic, 2.7% Asian, and 4.7 % who reported more than one race.

Due to our interest in obtaining a diverse sample, no exclusionary criteria (such as cut-off scores) were used, except to ascertain that none of the children had a history of frank neurological, motor, uncorrected visual deficits, or developmental delays that might have hindered typical literacy development or made it difficult for them to complete the assessment. Procedures and routines at the participating preschools were comparable and included activities such as painting, drawing, puzzles, toys, dress-up clothes, books, music, and activity centers. Additionally, all preschools reported activities involving identifying children's names and learning the letters of the alphabet.

Materials

The assessment protocol that was developed for this study included 5 writing tasks. In the first task, *Write Letters*, children's ability to write letters was assessed. On this task, children were asked to write each of 10 letters named by the examiner. Both tasks used the same 10 letters (B, D, S, T, O, A, H, K, M, and 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). Name Writing was included because it is among the very first things that children learn to write (Bloodgood, 1999; Fox & Saracho, 1990; Levin et al., 2005; Saracho, 1990). The *Write Name* task assessed children's ability to write their names and required children to write their names using paper and pencil provided.

The *Write CVC Words* task (six items) assessed children's knowledge of the spelling of common simple CVC words (i.e., mat, bed, duck, cat, fell, hen). Word spelling was included because research has shown that invented spelling of words is an excellent reflection of children's developing understanding of the alphabetic principle or the components that underlie it (i.e., letter knowledge and phonological awareness) (Shatil, Share, & Levin, 2000). Finally, writing of phrases or sentences was included to capture children's developing knowledge of the alphabetic principle in tasks beyond the single-word level. The *Picture Description* task (two items) assessed children's abilities to use writing to provide a description of an event and the *Sentence Retell* task (two items) assessed children's abilities to write a sentence. For the *Picture Description* task, children were shown a picture and asked to write a description of it using paper or pencil provided. For the *Sentence Retell* task (two items) children were asked to orally repeat a short sentence spoken by the examiner and then to write the sentence using paper and pencil provided. Children could write or draw their responses for both composition tasks. Examination of preschooler's writing at the sentence level could provide insight into how they use their writing-related knowledge such as knowledge of letters, universal and language-specific properties of writing, and print-related knowledge (e.g., letters strung together make up words and that words are separated by spaces to convey meaning). These tasks were pilot-tested with 20 children to ensure that materials being used and directions given to the children were appropriate.

Procedure

Children were tested individually by trained research assistants in their child care centers or preschools. The assessment was conducted in a quiet room and completed in one session that lasted approximately 20–30 minutes. The tasks were administered in the same order to all children.

Scoring of tasks—The scoring system used varied for each of the tasks examined because the goal was to use the most detailed system to capture the nuances of children's writing. Details of the scoring system are outlined in Table 1. For the *Write Letters* task, children's responses were scored as 0, 1, or 2 depending on if and how well or how poorly

the letters were formed. Because we wanted to capture developmental patterns in the features of writing such as linearity and left-to-right orientation, each feature was scored as present (score 1) or absent (score 0) for the *Write Name*, *Picture Description*, and *Sentence Retell* tasks.. The features scored were identified from previous investigations (e.g., Levin & Bus, 2003; Levin et al., 2005; Saracho, 1990) and modified for this study. Ten features were scored for the *Write Name* task and nine features were scored for the *Picture Description* and *Sentence Retell* tasks (see Table 1). Illustrations of the scoring system used for the *Write Name* and *Sentence Retell* tasks are provided in Appendix A and B, respectively.

Finally, the *Write CVC Words* task was scored on a 7-point scale based on systems used to measure invented spelling. Children were given a score of 1 if they responded verbally with random letters, 2 if they produced a scribble, 3 if they used random letters to spell a word (e.g., bed → toh; fell → ka), 4 if they wrote the correct initial or last letter (e.g., mat → mob; bed → tad), 5 if their spelling contained the correct initial and last letter (e.g., fell → fl or hen → hn), 6 if they had the first and last letter and a vowel but the incorrect vowel (e.g., hen → hin; bed → bad) or used invented spelling (e.g., duck → duc; fell → fel) and 7 if they had the correct spelling.

Inter-rater reliability—The *Write Letters* task were scored by the research assistants and double-checked by a graduate assistant. Inter-rater reliability was not calculated for this task because the scoring was simple and straightforward. The first author and two trained graduate assistants independently scored all of the *writing and composing* tasks. To ensure uniformity in scoring, approximately 30 percent (n = 77) of the written samples were chosen to obtain a measure of inter-rater reliability. Inter-rater reliability was calculated for each writing feature scored for the *Write Name* and the *composing* tasks and the scoring for the *Spell CVC Words* task. Reliability of scoring for these tasks ranged from 93 to 100%.

Results

Internal consistency of scales measuring emergent writing skills

Indices on the internal consistency of skills and features used to measure writing and writing related measures are shown in Table 1. Internal consistency estimates obtained for the *Write Letters* (α = .93) task. High internal consistencies were obtained for all writing and composing measures scored on presence or absence of writing features (αs = .92 – .96). The *Write Name* task originally was scored on a 10-point scale but the internal consistency for this task improved when spelling of last name was omitted as a feature scored (i.e., α increased from .89 to .92). This is very likely because very few children in this age range were able to write their last names. For the four composing tasks (two each of *Picture Description* and *Sentence Retell* tasks), originally scored on a 9-point scale, internal consistency improved when scribbling and number of words were omitted as features that were scored (i.e., αs increased from .93 to .96 on the *Picture Description 1* task, from .91 to .96 on the *Picture Description 2* task, from .87 to .96 on the *Sentence Retell 1* task and from .89 to .96 on the *Sentence Retell 2* task). The improvement in reliability when scribbling was omitted is perhaps because scribbling disappears on route to conventional writing whereas improvement in reliability when number of words was omitted, was most likely because there was little variability in the number of words children in this age range were able to write. These results indicate that the various features of writing for the scoring system fit well together. Hence, means and standard deviations reported for the *Write Name task* were obtained by summing the individual feature scores for 9 features and individual feature scores for 7 features for the *composing tasks* that provided the best fit. Features of writing were not examined for the *Write CVC Words* task; however, excellent internal

consistency was obtained (α = .96), indicating that the abilities that children displayed were not word-specific.

Descriptive Analyses

Means and standard deviations for children's scores on all tasks by each age-group are presented in Table 2. To examine performance differences between age groups, data for the dependent writing measures were analyzed using an analysis of variance (ANOVA) with age-group as the between-subjects factor. Because we tested age-related differences across three age-groups, significance levels for pairwise comparisons were adjusted using a Bonferroni correction to control for experiment-wise Type I error.

As can be seen in Table 2, there were age-related performance differences on each of the writing and writing-related tasks. Means for writing skills increased across the age-groups. Overall, 3-year-old children scored significantly lower than did the 5-year-old children on all tasks, and the 3-year-old children scored significantly lower than did the 4-year-old children on the *write letters*, *write name*, and *spell CVC words* tasks. Scores for the 4-year old children were significantly lower than scores for the 5-year-old children on *write letters*, *write name*, and *write CVC words* task. These data suggest that children are learning a great deal regarding writing and writing related skills, improving their alphabet and name knowledge, and making significant gains in their composing abilities between the ages of 3 and 5 years.

Children did well on the first measure, the *Write Letters* task. A quantitative summary of children's performance on the *Write Letters* task is included in Table 3. Most children had some knowledge of the letters of the alphabet. Only seven (23.3%) of the 3-year-old children were not able to write any of the letters of the alphabet. Given that a substantial proportion of the 3-year-olds, (approximately 77%) were able to write some letters of the alphabet, it was surprising to find that 7.3% of the 5-year-olds and 9.9% of the 4-year-olds obtained a score of 0 on the *Write Letters* task. 6.5% of the 4-year-olds and 22% of the 5-year-olds had perfect scores on the *Write Letters* task. The letter O as expected was the most frequently written letter by all three age-groups, followed by the letters A, T, and B. Again, the rank order of the letters that children had the most difficult time writing differed by age group but included the letters K, S, M, and D.

Children's knowledge of their names improved significantly with age. Overall, 70% had some knowledge of the specific letters in their names and approximately 54% were able to write their complete first names. Several of the 3-year-old children demonstrated substantial knowledge regarding their names. 53.4% were able to write the first letter of their name and about 16.7% wrote all of the letters in their name. 78.6% of the 4-year-olds and 90.1% of the 5-year-olds were able to write the first letter of their names and 45.8% the 4-year-olds and 80.2% of the 5-year-olds were able to write all the letters in their names.

As can be seen in Table 4, children's abilities on the *Write CVC Words* task showed significant improvement with age. There were significant differences between the 3- and 4-year-olds, the 3- and 5-year-olds, and the 4- and 5-year-olds. Children as young as 3 years of age were able to write some of the initial letters of the words they were asked to spell. A significant proportion of both 4-year-olds (23–30%) and 5-year-olds (30–54%) demonstrated knowledge in writing of initial or final letters of the words they were asked to spell. One child in the 5-year-old group had a perfect score.

Developmental continuum of emergent writing

One of the primary goals of this study was to determine if a developmental sequence could be detected for the features of writing. The Guttman scaling procedure (Guttman, 1950) was

used to determine if a continuum could be established for the writing constructs measured. With this type of scaling, a linear sequence of skill development is implied; a child who scores on a more difficult feature will automatically score on a less difficult feature. For example, if a child is able to write his or her first name, it is implied that the child's writing also displays early features such as left-to-right direction and linearity in writing. To meet the criteria for a Guttman scale, the coefficient of reproducibility (C_R) must be higher than .90. The C_R is calculated using the formula *1-(E/N)* where E is the number of error responses and *N* is the total number of responses. A response is counted as an error if it does not follow a hypothesized sequence. In this case, a pattern where the child writes his or her first name but the writing is not linear is unexpected and, hence, would be counted as an error. For this study, the C_R would be indicative of the precision with which one could predict the feature/s a child's writing contained from his/her score on that item.

Based on previous work (Levin & Bus, 2003; Levin et al., 2005; Saracho, 1990; Sulzby et al., 1989; Tolchinsky, 2003), features were ordered according to how they might appear developmentally. If writing features were learned in a sequential manner, it would result in adequate scaling or a high C_R. If writing features were not learned in a sequential manner, it would result in an inadequate scaling or a low C_R. For the *Write Name* task, the features were ordered as follows: linearity, segmentation, presence of simple units, left-to-right direction, first letter of name, presence of complex characters, random letters, many letters, and conventional spelling of first name. After the features were ordered, any child's writing that did not follow that order was considered to have an error. The C_R for the *Write Name* task was .94. This means that if a child scored 4 points on the write name task, one could infer with 94% accuracy that the child's writing contained the first four features, namely linearity, segmentation, presence of simple units, and left-to-right orientation. Children's performance by each age group on the writing features examined for the *Write Name* task is presented in Table 5.

For the *composing* tasks, the features were ordered as follows: linearity, segmentation, presence of simple units, left-to-right direction, presence of complex characters, random letters, and invented spelling. High coefficients of reproducibility (C_R = .99 for Picture Description 1 and both Sentence Retell tasks and C_R = .98 for Picture Description 2 task) were obtained for the composing tasks that were scored dichotomously, which implies a fixed order in the acquisition of the features of writing. Children's performance by each age group on the writing features examined for the composing tasks are presented in Table 6. The three universal features--linearity, segmentation, and presence of simple units--were found more commonly than any of the other features in young children's writing, and they appeared before the language-specific features.

Discussion

Overall, the results of this study indicate that young children possess a great deal of written language knowledge before they begin school. They are able to write letters of the alphabet, write their names, and use invented spelling to spell CVC words. There appears to be a linear sequence to how writing features develop; universal features appear before language-specific features. These data indicate that preschool children's knowledge about writing and their writing-related skills both increases and becomes more stable between 3- and 5 years of age. Together, children's performance on the *Write Letters*, *Write Name*, *Write CVC Words*, and *Composing* tasks indicate that they possess language-specific knowledge from a very early age. Although their average performance was low, results show that preschool children as young as 3 years of age demonstrate universal and language-specific knowledge of writing.

Development of Emergent Writing Skills

The results demonstrate a developmental trend in the performance of early writing and composing skills, such as writing one's name, writing letters, and spelling simple CVC words. This is in line with findings of other studies examining emergent writing skills that show improvement in print and written language knowledge and skills with age (e.g., Hiebert 1981; Levin & Bus, 2003; Lomax & McGee, 1987). The relatively large numbers of participants, from a large range of SES permits greater generalizability of our findings. Differences between each age-group were significant for most tasks (e.g., *Write Letters, Write Name, Write CVC Words*) whereas differences between each age-group for some tasks (e.g., *Picture Description, Sentence Retell*) were not significant. This implies that some skills develop early whereas some are later developing skills. For example, the ability to write letters, increased significantly from age 3-years to age 4-years, and from age 4-years to age 5-years; however, the ability to compose sentences did not. Cognitive maturity, increased exposure to print and print-related activities in preschool and home, the natural progression of learning, and enhanced emergent reading skills all appear to be plausible explanations for the developmental trend.

These data provide additional support for the findings of previous investigations regarding children's advanced knowledge in the domain of personal names compared to other writing tasks (Bloodgood, 1999; Ferreiro & Teberosky, 1982; Levin et al., 2005; Tolchinsky-Landsmann & Levin, 1987). They not only validate the results of studies showing that children as young as 3- and 4-years of age have substantial universal and language-specific knowledge regarding their names (e.g., Treiman & Broderick, 1998; Treiman et al., 2007; Villaume & Wilson, 1989), but they also extend the findings of these previous studies by demonstrating this knowledge in children's name writing abilities. Children's knowledge about their names at 3- and 4-years of age extends beyond the universal characteristics of all language systems to include specific shapes of letters. A significant proportion of the two younger groups had specific knowledge about the letters in their own names, particularly the first letter. This sophisticated level of name knowledge is impressive and supports findings of previous studies that name writing is a very early step in learning to write. When the younger children were asked to write their names, several of them could not; however, they often volunteered to spell their names orally instead. When asked to spell their names, several spontaneously added "I know what my name starts with" and would then proceed to write the first letter of their name.

Identification of Features of Emergent Writing

Children do not start out by writing in sentences. Children begin the writing process by first acquiring an understanding of the basic nature of writing which is manifested through their use of the universal features. Once they have learned these universal features, they begin to learn the language-specific features of the writing systems to which they are exposed (Ferreiro & Teberosky, 1982; Gibson & Levin, 1975; Tolchinsky, 2003). Other researchers believe that children do not begin writing by first comprehending the symbolic nature of writing. Instead, young children believe that writing represents meaning, like pictures (e.g., Bailystok, 1991, 2000), and focus on the characteristics of writing that are visually salient to them (e.g., Treiman et al., 2007). Hence, they learn about the universal and language-specific features in no particular order.

A primary aim of this study was to investigate the nature of writing development. We addressed this question by systematically examining whether the features of writing are learned in a linear or a unified fashion. The Guttman scaling procedure (Guttman, 1950) was used to examine if a continuum could be established for the development of writing features. If writing features were learned in a sequential manner, it would result in adequate scaling or

a high C_R. If writing features were not learned in a sequential manner, it would result in an inadequate scaling or a low C_R. The C_Rs obtained on the *Write Name, Picture Description*, and *Sentence Retell* tasks were high, providing clear evidence for sequential acquisition of writing features. This was further confirmed in the *Write Letters* and *Write CVC Words* (spelling) task. Although several of the 3-year-old children had limited ability to spell words, when they attempted to write, their scribbles or written output were linear and discrete (i.e., segmented). These results appear to support the Linearity Hypothesis (Ferreiro & Teberosky, 1982; Gibson & Levin, 1975; Tolchinsky, 2003) in that universal features of writing are learned before language-specific features. Besides demonstrating knowledge of universal writing features such as linearity, segmentation, and presence of simple units, a visual examination of the data showed left-to-right orientation--a language specific writing feature--was one that appears to develop early and often in conjunction with universal writing features. Perhaps, children attend to the left-to-right orientation for writing English because it is visually salient (Treiman et al., 2007).

Preschooler's knowledge regarding their names is more advanced than their other writing skills (Bloodgood, 1999; Ferreiro & Teberosky, 1982; Levin et al., 2005; Tolchinsky-Landsmann & Levin, 1987). Most of the children who were able to write their names displayed both universal and language-specific features. Based solely on children's performance on the *Write Name* task, it would appear that our results confirm the findings of Treiman et al. (2007). Treiman et al., interpreted their findings as evidence against the linearity hypothesis (i.e., children learn about the universal and language specific features of their writing systems simultaneously and in no particular order); however, they only examined children's receptive knowledge of their names in their study. Two explanations are possible for children's name writing proficiency. First, it is possible that children learn to write their names by rote and write their names as they visually remember it (as a chunk or a whole unit). Alternatively, because children's knowledge regarding their names is the most advanced of their writing skills (Bloodgood, 1999; Ferreiro & Teberosky, 1982; Levin et al., 2005; Tolchinsky-Landsmann & Levin, 1987), those who were able to write their names, exhibit almost all the features of writing making it difficult to differentiate whether universal or language-specific features are learned sequentially or simultaneously.

Although it might seem that because knowledge of one's name is the most advanced of young children's written language skills, perhaps the youngest children display both universal and language specific knowledge only when writing their names. If only children's name-writing performance was examined, it would seem that children learn about universal and language-specific features in no particular order. However, because we included several measures of writing, we were able to examine patterns across more than one writing task. For instance, children's performance on the *composing* tasks clearly shows a linear acquisition of developmental writing features. The youngest children's performance on the spelling task also showed evidence of language specific knowledge. A majority of the children, including the 3-year-olds were able to write the letters of the alphabet. The performance of the youngest children on the *Write Name and Write CVC Words* tasks provides further evidence that 3- and 4-year-old children display the language specific properties of their writing system, albeit significantly earlier than reported by Tolchinsky (2003). Importantly, these results extend the findings of previous investigations by demonstrating that preschool children possess universal and language-specific knowledge not only in the domain of personal names but also in other writing tasks. Hence, a comprehensive examination of writing development requires the assessment of several writing tasks.

Before being able to write conventionally, children attempt to convey meaning through scribbles (using dots, circles, and shapes) arranged linearly. These early scribbles or writing

reflect their understanding that writing serves a symbolic function--that sequences of symbols represent sequences of linguistic units. Take the examples of two children shown in the Appendices. William's (3 years, 5 months; Appendix A) writing of his name undoubtedly shows an understanding of the symbolic nature of writing. His writing of his name contains the universal features of linearity, segmentation, and simple units even though he has no recognizable letters. But it appears that knowledge of language-specific features is emerging because his writing shows left-to-right orientation. Similarly, Arianna (3 years, 4 months; Appendix B) uses universal features and not the language-specific features when attempting to write a sentence. Learning to write requires both an understanding of the symbolic nature of written language and knowledge of the specific writing conventions for a particular language. Children's ability to print letters and use directionality (left-to-right in this case) shows that they understand the symbolic and referential significance of those letters, although they might not yet have a complete understanding of letter-sound correspondence.

Our results also show that the progression along a continuum from scribbling to conventional spelling or writing appears to be task dependent, which is consistent with previous research (Gombert & Fayol, 1992; Sulzby et al., 1989; Tolchinsky, 2003). Children used advanced writing features for easier writing tasks (e.g., *Write Name*) but resorted to more basic features or even drawing when the writing task proved more challenging (e.g., *Picture Description*). For example, a child could spell his or her name perfectly or use initial and final letters when spelling basic CVC words; however, this same child could resort to writing random letters or using pseudoletters for the picture description task or the sentence retell task. This child's writing during the *Write Name* or *Write CVC Words* task would be considered more advanced (use of real letters or correct letters) than this child's writing during the *Picture Description* task or the *Sentence Retell* task (use of random or pseudo letters). However, the *Write Name* and the *Write CVC Words* tasks were easier than the *Picture Description* task, in which the child was required to write out an entire sentence.

Theoretically, there are at least two explanations for why writing proficiency is task dependent. First, according to Siegler's overlapping waves model of cognitive development (Siegler, 1996, Rittle-Johnson & Siegler, 1999), children employ a variety of strategies to solve problems including spelling. Moreover, they adapt their strategy use based on demands of the task, sometimes flexibly combining several strategies (sounding out, drawing analogies) when spelling. Rittle-Johnson and Siegler (1999) found that when faced with a challenging word, both first and second graders, moved away from their usual and frequently used strategy to using a backup strategy to spell that word. Writing is a complex process that requires the activation and coordination of several cognitive and linguistic skills (Scott, 2005; Singer & Bashir, 2004). At this emergent stage, it is not surprising that children's written output or the strategies they use to write varies according to the complexity of the task. We extend the overlapping waves model of cognitive development (Siegler, 1996, Rittle-Johnson & Siegler, 1999) to the development of writing in preschoolers. It would seem that when task demands are low such as when spelling single words or writing their names, young children use more advanced features (e.g., invented spelling, letter sound correspondences) but when task demands increase, they resort to using less advanced features (e.g., random letters).

Second, studies on writing in elementary school children have shown that young writers must first develop a solid foundation in lower-order transcription skills (i.e., handwriting, spelling, and punctuation) before they can divert resources to the higher-level processes of planning and revising (e.g., Berninger, 2000; Berninger, Mizokawa, Bragg, Cartwright, & Yates, 1994; Graham, 1997). That is, elementary school children who struggle with handwriting, spelling, or punctuation have less cognitive resources to devote to composition

(McCutchen, 1988). Since our results indicate that knowledge does not automatically transfer from simple to more complex tasks, it could mean that these young emergent writers have not yet developed a solid foundation of lower order skills. For preschoolers, this hierarchy of lower order skills may include knowledge of universal writing features, followed by language-specific features and then knowledge of letter names and letter-sound relationships before they can divert resources to the higher-level processes of writing conventionally. This explanation fits well with reports of studies showing that more advanced name writers are able to use the first letter of their names correctly to spell single words whereas less advanced name writers use letters randomly to spell single words (Both-de Vries & Bus, 2008, 2009). The more advanced name writers have a more solid foundation in lower order skills and hence can transfer that knowledge to more complex writing tasks whereas the less advanced name writers are not able to transfer their knowledge to more complex tasks.

To summarize, preschool children have both general and specific knowledge about their writing system. There was clear and systematic evidence that writing features develop sequentially and that universal features develop earlier than language-specific features. In line with the course of general cognitive development and our understanding of writing in older children, preschoolers could backtrack to using lower-order features when writing demands increase. Thus, a child's writing proficiency is task dependent and varies according to task demands as they attempt to become increasingly more symbolic in their representation of objects and events A complete understanding of the symbolic nature of written language and specific writing conventions is perhaps a slow process- it is dynamic, reversible, and emerging during the preschool period (Tolchinsky, 2003). Studies in the future examining writing skills longitudinally are crucial to clarify this relationship and determine the significance of these early developing skills for later literacy development.

Assessment of Emergent Writing Skills

Currently, there is no gold standard for scoring emergent writing. Although we included a broad range of features to score based on previous research, our estimates of internal consistency indicate that exclusion of some features improved reliability of the measurement. It is important to point out that the features that provided the highest level of cohesion varied with the task being scored. Writing features that provided high consistency for the *Write Name* task were different from the *Picture Description* and *Sentence Retell* tasks. Perhaps the most salient features for scoring may be dependent on the writing level (e.g., word vs. sentence) or the writing task (e.g., writing one's name versus composing). *Write Name* was a word-level task; whereas the *Picture Description* and *Sentence Retell* were sentence-level tasks. This will need to be investigated further. Findings from the present research suggest that writing in preschoolers is complex and that capturing the appropriate features (e.g., linearity, segmentation) based on the task may have important implications for a comprehensive emergent writing assessment.

Limitations

A few potential limitations to this study are worth noting. First, we had a relatively small number of 3-year olds compared to 4- and 5-year-olds. These data were collected as part of a larger project whose focus was 4- and 5-year-old children. Despite the small number of 3-year-olds, the data provide some degree of insight into the written language skills of this age group. Several of the younger children were unable to complete the complex writing tasks and their scores are reflective of floor effects. Some of these may have been overcome with a larger number of children in that age group. Second, for the *Write Name* task, we did not account for the length of a child's name. Children with longer names (e.g., Kayleigh) could have been at a distinct disadvantage compared to children with shorter names (e.g., Jon).

Then again, having more letters in one's name might mean greater opportunities for practicing letter writing and using those letters to attempt other writing tasks. Finally, the role of preschool instruction and home literacy experiences are essential components to understanding how writing develops in young children. Unfortunately, we did not gather information on specific preschool instruction or children's home literacy experiences. Inclusion of these data has the potential of increasing our knowledge of writing development.

Implications

Our finding that writing develops in a linear sequence implies that teaching of writing should also be sequential. Given that children's name writing is more advanced than other writing skills, the stage of name writing ability the child displays could influence when and how instruction should proceed. It might not be very fruitful to teach a child the letters of the alphabet or letter names if the child is still at the scribbling phase or only displays knowledge of universal writing features. Instead, for children at this stage, teachers can promote understanding of basic writing features by acknowledging and highlighting specific features observed in their student's scribbles (such as linearity and use of simple units). Our results indicate that children begin writing from a very young age. These very young children at lower stages may need more time to explore with a pencil and paper before beginning formal instruction as suggested by Hildreth (1936). Neuman & Roskos (1992) also reported that interest in writing could be facilitated by providing children as young as 3-years-old with the necessary tools (pencils, crayons) and the opportunity to engage in writing. Young children would benefit from being encouraged to scribble and pretend write during play time even if they are unable to write conventionally. Scaffolded support through use of prompts, cues, modeling, and feedback to facilitate early writing skills especially for those children who are not very motivated would be beneficial (Bus & Out, 2008; Gillanders & Jimenez, 2004). For children, displaying language-specific features (e.g., complex characters and left-to-right orientation), writing one's name appears to be an ideal starting point for teaching specific letter names and shapes. For these children, drawing attention to the letter-sound relationships for their own names and their classmates' names would be appropriate (Aram & Biron, 2004). For more advanced preschoolers who are able to write using invented spelling, increasing the number and variety of social opportunities for student-teacher interactions with letters and words would prove useful (Tomasello, 1999). These results could be potentially instructive for early childhood educators interested in monitoring children's progress or identifying children to promote early writing skills. Depending on where the child falls on the continuum of developing writing features, teachers could be important facilitators and guides as children become intentionally more symbolic in their writing.

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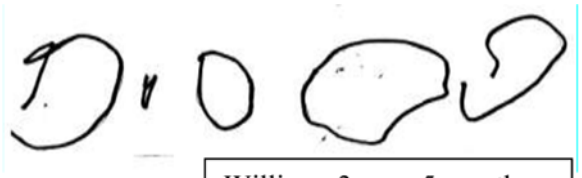
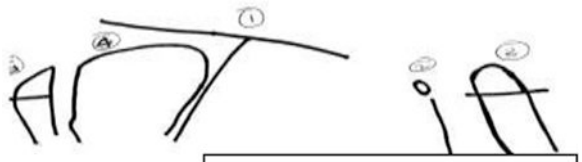
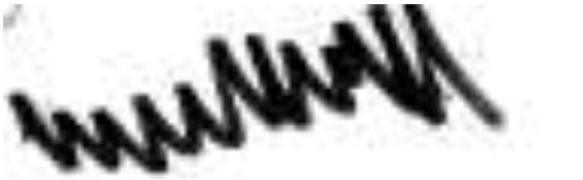
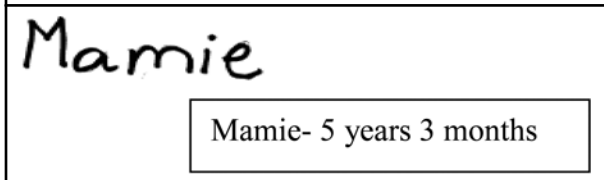
Appendix A

Illustrations of Scoring System for the Write Name Task.

Sample of Name Writing	Linearity	Segmentation	Simple characters	Left-to-right orientation	First letter of name	Complex characters	Random Letters	Many Letters	Spell first name	Total
 William- 3years 5 months	1	1	1	1	0	0	0	0	0	4
 Tiana- 3 years 9 months	1	1	1	0	1	1	1	1	1	8
 Elizabeth 3 years 4 months	1	0	0	0	0	0	0	0	0	1
 Mamie- 5 years 3 months	1	1	1	1	1	1	1	1	1	9

Appendix B

Illustrations of Scoring System for the Sentence Retell (“She is making the bed”) Task.

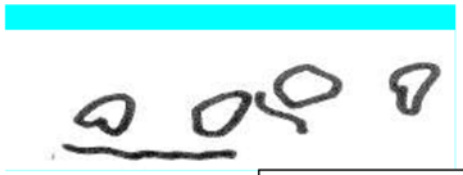
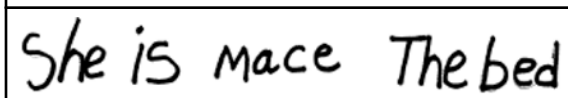
Sample of Sentence Retell	Linearity	Segmentation	Simple characters	Left-to-right orientation	Complex characters	Random Letters	Invented spelling	Total
 Arianna- 3 years 4 months	1	1	1	1	0	0	0	4
 Keshawn- 4 years 8 months	1	1	1	1	1	1	0	6
 Amy- 5 years 3 months	1	1	1	1	1	1	1	7

Table 1

Description of Scoring System and Reliabilities used for Emergent Writing Tasks

Skill measured	α	Scoring
Write Letters	.93	1- Poorly formed letter or reversals, 2 - Correctly written letter
Write Name	.92	Score of 1 or 0 for absence or presence of each feature: (1) linearity- writing units are organized in straight lines, (2) segmentation- writing contains distinguishable/separate units (e.g., circles, dots, letters, or letter like characters that are separated). Child needed to have at least 2 to receive credit, (3) simple characters- units are simple forms including dots, circles, and short vertical or horizontal lines), (4) left-to-right orientation, (5) first letter of name, (6) complex characters- the units are not simple, include pseudo and real letters, (7) random letters, (8) many letters- more than half of the letters in their first name, and (9) correctly spell first name.
Write CVC Words	.96	(1) Random letters (verbal), (2) Scribbling, (3) Random letters, (4) Initial or last letter, (5) Initial and last letter, (6) Invented spelling: 3 letters/ all three sounds represented, (7) Correct spelling
Picture Description Sentence Retell	.96	Score of 1 or 0 for absence or presence each feature: (1) linearity, (2) segmentation, (3) simple characters, (4) left-to-right orientation, (5) complex characters, (6) random letters, and (7) invented spelling.

Table 2

Means and Standard Deviations for Writing Measures by Age Group

	3 years *(n = 30)*		4 years *(n = 201)*		5 years *(n = 141)*				
	Mean	***SD***	**Mean**	***SD***	**Mean**	***SD***	**Max. score**	***F* for Overall Age-Group Contrast***	**2-Group Contrasts**
Write Letters	3.27	4.93	9.66	6.76	13.01	6.51	20	$F(2,369) = 30.27^{**}$	3 < 4, 5; 4 < 5
Write Name	4.20	3.21	7.23	2.45	8.09	2.19	9	$F(2,369) = 30.52^{**}$	3 < 4, 5; 4 < 5
Write CVC Words	5.23	8.39	15.85	10.51	20.04	9.85	42	$F(2,369) = 27.49^{**}$	3 < 4, 5; 4 < 5
Picture Description	0.70	2.69	1.76	4.02	2.10	4.10	7	$F(2,369) = 1.05$	
Sentence Retell	0.67	2.59	3.27	4.90	3.71	5.31	7	$F(2,369) = 4.70^{*}$	3 < 5

Note. Significant at $^{*}p < .01$;

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

Table 3

Quantitative Summary of Children's Performance on the Write Letter Task by Age Group

	Age Group			
Letter	**3-year-olds**	**4-year-olds**	**5-year-olds**	**Combined sample**
B	13.3%	56.7%	74.5%	59.9%
T	16.7%	62.2%	68.1%	63.5%
O	40.0%	84.1%	90.8%	83.1%
H	23.3%	55.7%	72.3%	59.4%
M	16.7%	52.7%	68.8%	55.9%
S	13.3%	54.7%	68.8%	56.7%
A	26.7%	61.2%	80.1%	65.6%
K	10.0%	36.8%	61.0%	43.8%
D	16.7%	48.3%	68.1%	53.2%
C	23.3%	57.2%	78.0%	64.2%

Table 4

Performance on the Write CVC Words Task by Age Group

		Age-group		
Word	**Knowledge of letters**	**3-year-olds**	**4-year-olds**	**5-year-olds**
Word 1	Initial or last letter	10.0%	12.9%	27.0%
	Initial and last letter	3.3%	9.5%	14.9%
	Invented spelling-All 3 letters	0.0%	2.0%	1.4%
	Correct spelling	0.0%	6.0%	10.6%
Word 2	Initial or last letter	6.7%	13.9%	24.1%
	Initial and last letter	3.3%	2.5%	11.3%
	Invented spelling-All 3 letters	0.0%	6.5%	3.5%
	Correct spelling	0.0%	2.5%	1.4%
Word 3	Initial or last letter	3.3%	10.4%	14.9%
	Initial and last letter	3.3%	2.5%	7.8%
	Invented spelling-All 3 letters	0.0%	1.0%	2.1%
	Correct spelling	0.0%	11.9%	14.2%
Word 4	Initial or last letter	3.3%	12.4%	17.7%
	Initial and last letter	3.3%	6.5%	7.8%
	Invented spelling-All 3 letters	0.0%	1.0%	1.4%
	Correct spelling	0.0%	4.0%	5.0%
Word 5	Initial or last letter	6.7%	11.9%	12.8%
	Initial and last letter	0.0%	3.5%	13.5%
	Invented spelling-All 3 letters	0.0%	5.5%	4.3%
	Correct spelling	0.0%	5.5%	4.3%
Word 6	Initial or last letter	6.7%	12.4%	17.0%
	Initial and last letter	3.3%	2.0%	5.7%
	Invented spelling-All 3 letters	3.3%	1.0%	2.8%
	Correct spelling	0.0%	13.4%	25.5%

Table 5

Percentage of Participants' Meeting Criterion on Specific Writing Features for the Write Name Task

	Age-Group		
Writing Feature Scored	**3-year-olds**	**4-year-olds**	**5-year-olds**
Linearity	66.7%	89.1%	96.5%
Segmentation	70.4%	88.6%	94.3%
Simple Characters	66.7%	86.6%	94.3%
Left-to-Right Orientation	53.3%	90.5%	92.9%
First Letter of Name	56.7%	78.6%	90.1%
Complex Characters	50.0%	86.0%	92%
Random Letters	23.3%	70.5%	87.9%
Many Letters	20.0%	66.0%	83.7%
Write First Name	13.3%	45.8%	72.3%

Table 6

Percentage of Participants' Meeting Criterion on Specific Writing Features for Composing Tasks

Task	Age Group	Writing Feature Scored						
		Linearity	**Segmentation**	**Simple Characters**	**Left-to-Right Orientation**	**Complex Characters**	**Random Letters**	**Invented Spelling**
Picture Description 1	3-year-olds	6.7%	6.7%	6.7%	6.7%	6.7%	6.7%	0.0%
	4-year-olds	14.4%	16.0%	16.0%	13.6%	14.0%	11.5%	2.0%
	5-year-olds	16.3%	17.1%	17.7%	15.6%	17.7%	14.2%	3.5%
Picture Description 2								
	3-year-olds	6.7%	6.7%	6.7%	3.3%	3.3%	3.3%	0.0%
	4-year-olds	15.5%	16.0%	16.0%	14.0%	13.0%	11.5%	2.0%
	5-year-olds	17.0%	17.0%	19.1%	17.7%	17.7%	14.9%	2.8%
Sentence Retell 1								
	3-year-olds	6.7%	6.7%	6.7%	6.7%	3.3%	3.3%	0.0%
	4-year-olds	32.0%	29.0%	28.5%	26.5%	23.5%	18.0%	6.0%
	5-year-olds	29.8%	29.8%	30.5%	30.0%	29.8%	24.8%	6.4%
Sentence Retell 2								
	3-year-olds	6.7%	6.7%	6.7%	3.3%	6.7%	3.3%	0.0%
	4-year-olds	31.5%	27.4%	25.5%	24.5%	21.5%	18.5%	4.0%
	5-year-olds	31.2%	31.9%	31.9%	31.9%	30.5%	24.1%	5.7%