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# Learning to write letters: Examination of student and letter factors



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### ABSTRACT

Learning to write the letters of the alphabet is an important part of learning how to write conventionally. In this study, we investigated critical factors in the development of letter-writing skills using exploratory item response models to simultaneously account for variance in responses due to differences between students and between letters. Letter-writing skills were assessed in 415 preschool children aged 3 to 5 years. At the student level, we examined the contribution of letter-name knowledge, letter-sound knowledge, and phonological awareness to letter-writing skills. At the letter level, we examined seven intrinsic and extrinsic factors in understanding how preschool children learn to write alphabet letters: first letter of name, letters in name, letter order, textual frequency, number of strokes, symmetry, and letter type. Results indicated that variation in letter-writing skills was accounted for more by differences between students rather than by differences between letters, with most of the variability accounted for by letter-name knowledge and age. Although significant, the contribution of letter-sound knowledge and phonological awareness was relatively small. Student-level mechanisms underlying the acquisition of letter-writing skills are similar to the mechanisms underlying the learning of letter sounds. However, letter characteristics, which appear to play a major role in the learning of letter names and letter sounds, did not appear to influence learning how to write letters in a substantial way. The exception was if the letter was in the child's name.

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## Introduction

Competency in writing (and reading) is a necessary ingredient for children's academic success (e.g., Graham & Perin, 2007). Conventional writing first begins with children learning to write the letters of the alphabet. The importance of letter-writing skills is supported by empirical evidence indicating that the ability to write letters is an excellent predictor of early spelling, a word-level writing skill (Puranik, Lonigan, & Kim, 2011). Furthermore, substantial evidence indicates that letter-writing fluency (i.e., writing letters of the alphabet under timed conditions) is an excellent predictor of written compositional quality and quantity in kindergarten and elementary school children (e.g., Graham, Berninger, Abbott, Abbott, & Whitaker, 1997; Jones & Christensen, 1999; Puranik & Al Otaiba, 2012). Thus, learning to write letters constitutes an important early skill in the process of learning to write conventionally.

Despite the importance of letter-writing skills, less is known about the factors that contribute to the acquisition of letter-writing skills than is known about the development of letter names and letter sounds. An increased understanding of the factors that contribute to letter-writing skills could have important implications not only for improving basic developmental theories about writing but also for improving educational practices. In this study, we investigated the contribution of letter-name and letter-sound knowledge and phonological awareness (PA)—established predictors of children's reading skills—to children's letter-writing acquisition. In addition to the student characteristics of letter knowledge and PA, research indicates that letter characteristics such as letter type (whether a letter is a consonant–vowel [CV] or vowel–consonant [VC] letter) also influences the development of letter-name and letter-sound knowledge (Justice, Pence, Bowles, & Wiggins, 2006; Kim, Petscher, Foorman, & Zhou, 2010; Treiman & Kessler, 2003). These letter characteristics also are likely to influence the development of letter writing. Hence, this study examined the contribution of both student-level factors and letter characteristics to the acquisition of letter writing in preschool children. We addressed this question using exploratory item response modeling that allowed for the correct partitioning of variation among student factors and letter characteristics.

### *Student and letter factors*

#### *Student-level factors*

A large body of research now exists demonstrating the important role of letter knowledge in the acquisition of literacy skills (e.g., Bond & Dykstra, 1967; McBride-Chang, 1999; Share, Jorm, Maclean, & Matthews, 1984; Stevenson & Newman, 1986). Knowledge of letter names measured in preschool is one of the best concurrent and longitudinal predictors of learning to read in an alphabetic writing system (e.g., Lonigan, Schatschneider, & Westberg, 2008; see also Foulin, 2005, for a review). Research indicates that children learn a letter sound more easily when they know the name of the letter than when they do not know the name of the letter (Ehri, 1987; Treiman, Tincoff, Rodriguez, Mouzaki, & Francis, 1998). In addition to the facilitating letter-sound knowledge, some evidence indicates that knowledge of letter names facilitates early spelling (Treiman & Rodriguez, 1999). Letter names appear to provide a link between letters and print and help children to understand that the words they see on a page or spellings are not arbitrary strings of letters. In this study, we asked whether knowledge of letter names facilitated letter writing similar to its role in facilitating letter-sound knowledge and spelling. Letter writing represents a child's attempt to retrieve the graphic shapes and names of letters, and as such it should be facilitated by letter-name and/or letter-sound knowledge. Studies examining emergent literacy skills in young children have indicated strong correlations between letter-name and letter-writing skills ( $r_s = .80-.83$ ; Molfese, Beswick, Molnar, & Jacobi-Vessels, 2006; Worden & Boettcher, 1990) and between letter-sound and letter-writing skills ( $r = .83$ ; Worden & Boettcher, 1990).

Phonological awareness, which represents sensitivity to and ability to manipulate sound units in words, is related to letter-name and letter-sound knowledge (Burgess & Lonigan, 1998; Mann & Foy, 2003; McBride-Chang, 1999; Share, 2004) and is a very strong predictor of learning to read in an alphabetic language (Lonigan, Burgess, & Anthony, 2000; Wagner & Torgesen, 1987; Wagner,

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