Stepping Stones to Reading

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Abstract

Even before they are able to read, young children possess many skills that can help pave the way for literacy. For example, preschoolers have sizable spoken vocabularies and often know that English words are read from left to right. The focus of this paper is on another type of knowledge that many preschoolers possess—knowledge of the names of alphabet letters. We discuss theories and research pertaining to the acquisition of reading skills with an emphasis on recent research evaluating how children use their knowledge of the alphabet in their initial attempts to read and spell. Although fluent reading requires knowledge of letter sounds, children can often make preliminary links between print and speech on the basis of letter names. The knowledge of letter names that young children bring with them to the classroom helps explain why some words are easier for them to learn than others. An understanding of the research can help teachers base their instruction on the skills that children already possess and build from there. Following the discussion of theories and research on literacy acquisition, we discuss educational implications and offer suggestions for translating theory into practice.
Developing literacy skills is an achievement that, once accomplished, will benefit a person throughout his or her entire lifetime. Unlike speech, which most children acquire naturally through exposure to language, children need explicit instruction to become fluent readers and spellers. Although there have been claims that learning to read a written language should be no harder than learning to speak the spoken language (Goodman, 1986), research consistently shows that the acquisition of literacy involves the gradual accumulation of knowledge about the linguistic and orthographic features of the language and is a process that requires guidance. Understanding the typical pattern of literacy acquisition can facilitate the development of effective instructional methods.

Young children begin to acquire literacy-related skills long before they are able to read or spell individual words. These skills pave the way for an understanding of the alphabetic principle. Alphabetic writing systems use individual letters or groups of letters (graphemes) to represent the sounds in spoken words (phonemes). Understanding the relationship between the grapheme and the phoneme is the foundation on which word reading and spelling skills develop. Once the alphabetic principle is understood, readers and writers can decipher and construct words with reasonable accuracy, providing a basis for comprehension. Given that the alphabetic principle is a key to fluent reading and writing, many researchers have examined how children learn to connect graphemes and phonemes and what skills they bring to this task.

**Development of Literacy Skills**

Much of the early research suggested that reading and spelling skills develop concurrently along a series of stages, with each stage building upon the previous stages (e.g., Byrne, 1992; Frith, 1985; Lomax & McGee, 1987; Share & Gur, 1999). In this view, children
form connections that link the written word to its pronunciation and meaning, and different
connections predominate at different stages of development. Stage theories suggest that early
attempts to relate print to sound are characterized by visual cues. The next stage involves
phonetic cues, and this in turn gives way to the systematic use of recurring letter patterns. These
theories are supported by evidence that children appear to use different strategies as they gain
proficiency in reading and writing.

**Early stages of development**

Research suggests that children initially attempt to relate print and speech through a non-
alphabetic process by which they connect visual features of print to words stored in memory
(e.g., Byrne, 1992; Ehri, 1999; Ehri & Wilce, 1985; Frith, 1985; Lomax & McGee, 1987; Mason,
1980; Masonheimer, Drum, & Ehri, 1984; Share & Gur, 1999). During this first phase, often
referred to as logographic or pre-alphabetic, children do not link graphemes to phonemes in a
systematic way. Instead, they select a distinctive feature of the printed word, such as the humps
on the *m* of *camel*, and use it to identify the pronunciation or meaning of the word. In this view,
prereaders are context-dependent learners who recognize print in much the same way that they
identify pictures. For young children, both pictures and print are unique visual patterns to which
a name is attached. During the logographic phase of reading development, every new word is a
new visual configuration that requires independent processing in order to form a rudimentary
representation. Processing involves the rote memorization of paired-associate learning, and
children use this strategy to learn to identify a limited number of words.

At the logographic stage of development, children’s ability to “read” printed material is
influenced by the context in which the print occurs, as well as the actual physical characteristics
of the print. For example, young children are quick to identify the print that follows a large
yellow M shaped like golden arches as the word *McDonalds*. However, they may be unable to identify the same printed letters when they appear in a neutral context. As another example, after learning to associate a colorful group of letters next to a picture of a giraffe to a particular spoken response, children can identify the print as *Toys R Us* when they see just the colorful letters. Features such as size, shape, color, and location all provide cues to the appropriate response.

Although children are not actually reading during the logographic stage, they are learning to link a visual configuration to a particular spoken word and are beginning to understand that print and speech are associated. The logographic approach allows children to learn a limited number of words. However, these early associations are not systematic and do not provide a foundation on which actual decoding skills can develop. As the overlap between the visual features of words increases, reducing the effectiveness of a visual strategy, children must increasingly rely on the individual letters in words in order to read them. According to stage theories, children then begin to shift from the rote memorization of the logographic stage to the systematic decoding of the *alphabetic stage* of literacy development.

During the alphabetic period, children start to associate graphemes with their corresponding phonemes. The development of associations between graphemes and phonemes allows for a systematic, grapheme-by-grapheme approach to deciphering words. Ehri (1995) suggested that the alphabetic phase of development begins with a *partial alphabetic* phase during which only some of the letters are analyzed, followed by a *full alphabetic* phase during which most of the letters are linked to sounds. In Ehri’s view, children first focus on the boundary letters of a word when attempting to decode it. Eventually, the print-to-sound connection is more complete and children use most, if not all, of the grapheme-phoneme pairs in each word to link the printed form to the spoken form.
Stepping beyond the logographic phase

Studies that have compared how children perform when reading visually distinctive print and phonetically accurate print suggest that children who cannot yet read words out of context rely on visual cues to connect print and speech (e.g., Abreu & Cardoso-Martins, 1998; Ehri & Wilce, 1985; Frith, 1985). The research further suggests that, once children begin to move from the prereading stage to the novice reader stage, as shown by the ability to read at least one preprimer type word (e.g., no, stop, or dog), phonetic cues become more important than visual cues. However, recent research indicates that literacy development is not strictly stage-like in nature, in that children do not necessarily operate in only one manner at any particular point in time. In fact, given the proper cues, even prereaders can use phonetic information to link print to speech (e.g., Bowman & Treiman, 2002; Rack, Hulme, Snowling, & Wightman, 1994; Treiman & Rodriguez, 1999; Treiman, Sotak, & Bowman, 2001). Because the shift away from visually-based reading launches the child into the realm of phonetic decoding, it is important to examine the factors that promote this shift. Understanding which phonetic cues prereaders use provides the opportunity to develop instructional methods that build on prereaders’ existing knowledge and the opportunity to incorporate the appropriate cues into reading instruction.

What specific types of phonetic information might encourage prereaders to form systematic print-to-sound connections? U.S. prereaders are reasonably familiar with the names of letters (e.g., Byrne, 1992; Lomax & McGee, 1987; McBride-Chang, 1999; Treiman, Tincoff, Richmond-Welty, 1996; Worden & Boettcher, 1990). In fact, most American children learn the names of the alphabet letters from an early age. They are exposed to picture books, alphabet books, toys, computer games, songs, and television programs all geared toward teaching them the names of letters. The prereader’s environment provides a rich source of alphabetic
knowledge that can be built upon to bridge the gap between visual “reading” and phonetic reading. Because research suggests that the development of letter-sound knowledge lags behind the development of letter-name knowledge (e.g., Byrne, 1992, Treiman et al., 1996; Worden & Boettcher, 1990), a key to encouraging the shift from visual to phonetic reading may lie in the use of letter names during early instruction. Recent scientific research supports this supposition. Treiman and colleagues have found evidence that prereaders are not limited to a logographic strategy when learning new words (e.g., Bowman & Treiman, 2002; Treiman & Rodriguez, 1999; Treiman et al., 2001). Even prereaders can form systematic connections between print and speech when those connections are based on a type of knowledge that they do possess—knowledge of the names of the alphabet letters.

Research on letter-name cues

The earlier views of literacy acquisition focused on the skills that were lacking at each stage or phase of development. Ehri (1998) claimed that prealphabetic children, who have only a rudimentary knowledge of the alphabetic system, resort to logographic processing because they do not have the knowledge needed to form phonetic connections between the print they see and the sounds they hear. A newer approach to literacy acquisition highlights the knowledge and skills that young children already possess when attempting to learn to read. Treiman and colleagues evaluated the effects of different types of information such as letter names, letter sounds, or visual distinctiveness, along with letter position, on the reading and spelling performance of prereaders and novice readers. The goal was to determine if beginning readers could use some properties of print more easily than others. What types of knowledge do young children possess that might allow them to make the initial connection between print and speech? Specifically, can young children use their knowledge of letter names to begin to make certain
links between printed and spoken words?

The first in the series of studies by Treiman and colleagues followed up on an experiment by Ehri and Wilce (1985) that compared children’s ability to learn print-speech correspondences involving visually distinctive print (e.g., $W^{BC} = \text{giraffe}$, where the letters differed in size and position) to their performance with phonetically plausible print ($JRF = \text{giraffe}$). When Ehri and Wilce taught prereaders (children unable to read any simple preprimer words) to read sets of five cards, each containing a single word displayed in either visually distinctive print ($W^{BC}$ read as \text{giraffe}) or phonetically plausible print ($JRF$ read as \text{giraffe}), children tended to learn items in the visual condition more easily than items in the phonetic condition. In contrast, novice readers (children who could read at least one simple preprimer word) tended to perform better in the phonetic condition. Treiman and Rodriguez (1999) introduced a second phonetic condition to this type of study to distinguish between performance based on letter sounds and performance based on letter names. For example, would children find it easier to link the letter $t$ in a printed word to the spoken word \text{team}, in which the name of the entire letter is heard, than to the spoken word \text{tame}, in which the whole letter name is not heard? Over a series of three sessions, children were given sets of five made-up, two-letter words to learn to read. The sessions varied according to the how the printed words related to their pronunciations. In the visual condition, visually distinctive print was linked to specific non-phonetic pronunciations. For example, children were taught that a visually distinctive arrangement of letters, $T_M$, was pronounced as \text{wide}. In the letter-name condition, the connection between the print and the pronunciation was based on the name of the letter in the first position of the made-up spelling. For example, children were taught print-pronunciation pairs such as TM pronounced as \text{team}, where the pronunciation was phonetically plausible and the entire name of the initial letter was heard in the pronunciation. The
letter-sound condition also offered phonetically plausible pronunciations. However, in this condition, the spoken words did not include the entire letter names in their pronunciations. During this session, children were taught print-pronunciation pairs such as TM pronounced as *tame*. Different sets of words were used across the sessions so that no child was ever taught different pronunciations for the same letter pair. After completion of all three sessions, the children were shown the correct spellings of all of the words used in the study.

The results of this study indicated that even the prereaders learned significantly more items when the pronunciation began with a letter name (TM = *team*) than when it began with a letter sound (TM = *tame*) or when it was printed in a visually distinctive manner (TM = *wide*). The children in this study were reasonably knowledgeable about letter names (responding correctly to an average of 15.5 out of 26 letters), but less knowledgeable about letter sounds (averaging 5.5 out of 26). The children’s superior knowledge of letter names as compared to sounds allowed them to derive more benefit from letter-name cues than from either letter-sound cues or visually distinctive print. Thus, it appears that even children who are unable to read any simple preprimer words can make some systematic links between printed and spoken words when the links involve a type of knowledge that they possess, knowledge about the names of letters.

Treiman et al. (2001) extended these findings to spelling by developing a task in which children were presented with spoken words and taught to spell them under the same three conditions discussed above. As with the reading task, prereaders performed significantly better in the letter-name condition than in either the letter-sound condition or the visually distinctive condition. That is, children who were not yet able to read words out of context were able to learn to spell phonetically plausible made-up words that began with the name of an alphabet letter.
better than phonetically plausible made-up words that began with a letter sound or those words whose spellings were visually distinctive (spelled with plastic and foam rubber letters that differed in color and size). This result provides further evidence that young children can take advantage of phonetic cues that make sense to them based on their knowledge about letters. Similar effects of letter names have been found for children learning to read and write in languages other than English (e.g., Levin, Patel, Margalit, & Barad, 2002), suggesting that this effect is not limited to a single language.

Several additional follow-up studies have been conducted to further define the role of letter names in linking print to speech in the development of early literacy skills. Bowman and Treiman (2002a) evaluated reading and spelling performance for made-up words in which the letter-name cue was located in the final position of the item, as in PN for *pen*, where the entire letter name of N is clearly heard at the end of the word’s pronunciation. The position of the letter-name cue was found to influence its usefulness to prereaders. Whereas children found initial position letter-name cues helpful, performing better in the letter-name condition than in the corresponding control condition, final position letter-name cues did not improve performance. These results appear to reflect children’s tendency to focus on the initial letters of words, a tendency that allows them to form print-speech connections for initial letters before they are able to do so for final letters. To insure that the differences between initial and final position were not the result of using different children and different words across the two sets of studies, Bowman and Treiman also performed a study to compare how the same children performed when the same target letters were used in the initial and final positions of the invented words (e.g., LF = *elf* versus FL = *fell*). Again, prereaders benefited from initial position letter names but not final position letter names. These results suggest that prereaders can use the letter-
name knowledge that they bring to the task of learning to read when the task is structured in such a way as to allow them to attend to the relevant information and to make the proper print-to-sound connections.

Additional research has detected several other factors that influence children’s ability to use letter names in connecting print and speech. First, children’s ability to take advantage of vowel letter names follows the same patterns as their ability to use consonant letter names (Bowman & Treiman, 2002b), in that children perform better when a vowel letter name occurs in the initial position of the word that when it occurs in the final position. For example, a study using the same task described previously found that children learned print-pronunciation pairs such as AP for ape or OT for oat more readily than pairs such as PA for pay or TO for toe. Second, whereas young children may experience some degree of success when using a logographic strategy to “read” print, their attempts to spell based on visually distinctive print are typically unsuccessful (Bowman & Treiman, 2002a; Treiman & Rodriguez, 1999; Treiman et al., 2001). In fact, the lack of a phonetic connection between printed and spoken words hinders prereaders’ spelling performance to the point that both letter names and letter sounds in word-initial position produce superior performance to visually distinctive print. For example, after being shown how to spell a set of five made-up words using phonetically plausible letters of uniform size and color or a set of five made-up words using letters that were not phonetically plausible but that varied in size and color, children tended to produce the phonetically plausible spellings based on both letter names and letter sounds more often than the visually distinctive spellings. These results highlight the importance of phonetic information when children are trying to produce print to correspond to the sounds they hear. Whereas children may be able to experience a small degree of success when learning to “read” visually distinctive print by using
rote memorization, they cannot rely on a memorization technique when attempting to spell a set of words. When spelling, children tend to use auditory cues rather than visual cues.

**Educational Implications**

Given the mounting evidence that even prereaders can sometimes go beyond the rote memorization method of linking visual patterns and spoken words, teaching programs should be developed that take advantage of this information. Research suggests several factors that allow even young children to go beyond a logographic approach in learning about print. One factor is the availability of links between print and speech that make sense based on knowledge that children possess. For many young children in the U.S., as we have discussed, this includes knowledge of letter names. Because young children typically learn the names of alphabet letters before they learn the sounds, and because they become quite proficient at identifying letters by name, early reading material should include words that contain letter names. For example, one can teach words such as *eat* and *no*, which contain vowel letter names, as well as words such as *peek* and *car*, which contain consonant letter names. Prereading children can use the information contained in these words to form systematic connections between print and speech, thereby taking the initial steps toward using letter information to identify print.

Therefore, we suggest that words containing letter names be included in early reading instruction. The feasibility of doing so is supported by the fact that an examination of words found in reading materials targeted at kindergartners and first graders shows that 43% offer the possibility of linking at least one letter in the printed form of the word to the corresponding letter name in some position of the spoken form (Bowman & Treiman, 2002a; Treiman & Kessler, 2003). For example, *eat, no, pizza, car, belt*, and *pile* all include one letter whose name appears in the corresponding spoken word. Thus, young children are likely to encounter words that offer
the possibility of letter-name connections between print and speech. By paying special attention
to such words, teachers may help children form their first partial connections between printed
and spoken words. Children must eventually form full alphabetic connections, linking all of the
graphemes in each word to phonemes. However, letter names may play a special role in early
development by helping children grasp the systematic relationship between printed and spoken
language.

A second factor that allows young children to go beyond a logographic approach is the
availability of detectable print-speech links in salient positions of words. The research we have
discussed shows that young children take more advantage of letter names when they appear at
the beginnings of words than when they appear at the ends. Particularly for reading, children’s
ability to use letter names is fragile. However, letter names do provide young children with clues
that help them systematically link print to speech. Early reading materials that incorporate words
that begin with letter names provide phonetic information that prereaders may be able to use to
make connections between the words they see and the words they hear.

A third factor is the nature of the task. Children are more likely to use systematic print-
speech links in situations where rote memorization is less likely to succeed than in situations
where rote memorization is likely to be more successful. In reading, children can learn a number
of words using a visual strategy. In the auditory task of spelling, this approach is less likely to
succeed. When children hear words that begin with letter names, they may connect the letter they
hear and the letter used in the word’s spelling, making the link between sound and print more
apparent. Exposure to both reading and spelling tasks during the early phases of instruction
offers the best likelihood that children will begin to appreciate the systematic relationships
between print and sound. Although spelling is typically stressed less than reading during early
literacy instruction, it may actually be a better way to encourage the formation of print-sound connections. Specifically, the greater demands of the spelling task may force children to use any alphabetic knowledge and analytic skills that they possess.

In addition, instructors should be aware that, in the child’s eyes, all letters are not equal. Some letter names and forms are easier for children to learn than others. For example, young children’s knowledge of lower-case letters lags behind their knowledge of upper-case letters (McCormick & Mason, 1981; Worden & Boettcher, 1990), in part because lower-case letters are more visually confusable and in part because upper-case letters are often seen in the child’s environment. The advantage for upper-case letters is greatest at ages 4 and 5. By age 6, children typically perform well on both upper-case and lower-case letters. Therefore, although it is desirable for children to learn to read text as it appears naturally, early instruction should incorporate upper-case letters frequently.

Also important is that the letters of the alphabet can be ranked according to difficulty based on age. Although factors such as the letters that appear in a child’s name may cause some individual differences in the difficulty of specific letters, the average performance across children and letters indicates that, in general, letters are typically learned in a fairly stable order. For example, the letter O is usually one of the easiest for children between the ages of 3 and 7 to recognize, in part because it is a basic and familiar shape. Other letters such as D, G, K, L, V, and Y are considerably more difficult to learn and are typically among the last to be recognized (Treiman & Kessler, 2003). This raises the issue of which letters to focus on when teaching children the alphabet or when starting reading instruction. Children may learn to sing the alphabet song in alphabetical order, but they do not learn to recognize the printed letters in this traditional order. The more logical way to expose children to the printed letters is in order of
difficulty. Introduce the easier letters first to build the foundation, and then present the more
difficult letters. This will ensure a better match between what is taught and children’s ability to
acquire the information. Attention to the case and difficulty of the letters presented can greatly
enhance children’s ability to make a connection between printed and spoken language.

Based on the research findings, early educators should include tasks that highlight the
relationship between letter names and word pronunciations. An example of the type of tasks and
progression through the different difficulty levels is given in Table 1. The initial goal is to
encourage children to connect printed letters and words to spoken words through both reading
(identifying words) and spelling (selecting appropriate letters). As shown in the Table, the
relationship between print and sound should be explored for initial position letter names first.
Once children have detected the pattern, move on to words that contain final position letter
names. By holding everything except the final letter constant, children are encouraged to direct
their attention to the targeted letter. After exploring the relationship between print and sound
using letter names, expand to letter sounds. By presenting words that contain letter sounds in the
salient initial position supplemented by letter names in the final position, children are likely to
detect enough information to succeed at the task. When given words that have printed elements
that can readily be linked to their pronunciation, children can gain insight into the phonetic
relationship between print and speech, insight that is crucial to the successful acquisition of
literacy skills.

**Conclusion**

Reading and spelling skills range from the early strategies of logographic learning all the
way to fluent reading with comprehension. This article has been primarily concerned with one
small piece of the puzzle—how to build on preliterate children’s existing knowledge to facilitate
the early development of literacy skills. Research indicates that, across languages and cultures, most children come to school with some knowledge of the names of alphabet letters. We can use this knowledge as a stepping stone to “real” instruction in reading and spelling. Regardless of the method used for literacy instruction, children need to be able to detect the relationship between print and speech before they can be successful at the more advanced stages of reading, such as decoding and comprehending text. Building a solid foundation requires one to ensure that children truly understand that there is a systematic relationship between printed and spoken words. Using children’s existing knowledge about the names of alphabet letters provides one way to bridge the gap between the visual and phonetic analysis of print. Once children have a basic understanding of the relationship between print and speech, they are ready to begin a reading instruction program in earnest.
References


### Table 1
Suggested Activities for Using Letter Name Words to Connect Print to Speech

#### Level 1 - Focus on Initial Position Letter Names

<table>
<thead>
<tr>
<th>Instructor</th>
<th>Student Reading</th>
<th>Student Spelling</th>
<th>Instructor Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present cards that contain pictures of words that begin with letter names. Point to picture and pronounce word.</td>
<td>Select printed word from list.</td>
<td>Select printed letter from list</td>
<td>Emphasize print-sound relationship for target letter</td>
</tr>
</tbody>
</table>

Example: "BEADS"

![Image](image1.png)

Notice that you see and hear the B in BEADS

#### Level 2 - Focus on Final Position Letter Names

<table>
<thead>
<tr>
<th>Instructor</th>
<th>Student Reading</th>
<th>Student Spelling</th>
<th>Instructor Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present cards that contain pictures of words that end with letter names. Point to picture and pronounce word.</td>
<td>Select printed word from list.</td>
<td>Select printed letter from list</td>
<td>Emphasize print-sound relationship for target letter</td>
</tr>
</tbody>
</table>

Example: "PEN"

![Image](image2.png)

Notice that you see and hear the N at the end of PEN

#### Level 3 - Focus on Initial Position Letter Sounds

<table>
<thead>
<tr>
<th>Instructor</th>
<th>Student Reading</th>
<th>Student Spelling</th>
<th>Instructor Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present cards that contain pictures of words that begin with letter sounds. Point to picture and pronounce word.</td>
<td>Select printed word from list.</td>
<td>Select printed letter from list</td>
<td>Emphasize print-sound relationship for target letter</td>
</tr>
</tbody>
</table>

Example: "CAR"

![Image](image3.png)

Notice that you hear the sound of C at the beginning of the word CAR
Additional Resources for Classroom Use

Bowman and Treiman, *Stepping Stones to Reading*

1. Invented spelling and spelling development. ERIC Digest web site http://www.ed.gov/databases/ERIC_Digests/ed272922.html

   This article builds on the current discussion concerning the development of literacy skills, with a focus on spelling. As with reading, the acquisition of spelling skills is a complex developmental process during which children progress through a series of increasingly more sophisticated stages. During the early stages, when young children are unlikely to produce completely correct spellings, they are able to use their alphabetic knowledge to produce phonetically motivated spellings that make sense based on their current level of development. The article provides a brief description of the stages of development followed by suggestions for implementing early spelling instruction.


   The Southwest Educational Development Laboratory (SEDL) has developed a web site to help teachers understand what research says about how children learn to read. They summarize the essential cognitive domains necessary for reading success, provide resources for improving students’ reading skills, offer reading assessment techniques, and summarize empirical research based on specific topics within the domain of reading. Numerous references to sample research articles are provided.


   This site offers a wonderful assortment of activities geared at teaching/learning the names and sounds of the alphabet letters. Both aspects of letter knowledge are encouraged through the use of songs, poems, and games. In addition to classroom activities, this web site offers activities that parents can supervise at home. Preschool and kindergarten teachers alike can use this site as a source of ideas for developing instruction to strengthen children’s alphabetic knowledge.


   The development of fluent literacy skills requires mastery of the alphabetic principle, which includes both phonological awareness and knowledge about the names and sounds of the alphabet letters. This article discusses both of these foundational skills and discusses developmental issues relevant to the instruction of these skills. For example, letter-sound knowledge in not simply an extension of letter-name knowledge. Although intertwined, the development of these distinct abilities is influenced by different factors. With an understanding of the developmental differences of these fundamental skills, teachers can focus on elements likely to positively impact learning.