

by Alisha Nicole Demchak and Emily Solari

Alphabet knowledge is essential for children's future reading and writing and represents one of the most important early childhood emergent literacy skills (Ehri, 1998; Whitehurst & Lonigan, 1998). Children's alphabet knowledge has long been acknowledged as one of the best predictors of their later word reading abilities (Hammill, 2004; National Early Literacy Panel [NELP], 2008; National Reading Panel [NRP], 2000; Schatschneider et al., 2004; Snow et al., 1998). Consequently, failure to acquire this essential skill is an important indicator of risk for future reading difficulties (Hammill, 2004; NRP, 2000; Snow et al., 1998; NELP, 2008; Piasta & Wagner, 2010; Schatschneider et al., 2004). Although decades of research have shed light on many aspects of alphabet knowledge, teachers are often still left with instructional questions. This article will highlight several scientific studies that provide a deeper understanding of the nuances of alphabet knowledge acquisition in young children and what we know about effective instructional practices. The article will reveal a few key findings:

1. Certain letter characteristics paired with child characteristics make learning some letters easier than others.
2. Children benefit from teacher-led, explicit instruction that pairs letter names and letter sounds and follows a briskly paced, logical sequence.
3. The addition of intentional literacy experiences, such as writing and shared reading in an early childhood classroom, can provide practice opportunities to see letters and the sounds they represent in meaningful ways.

Letter and Child Characteristics: Impacts on Alphabet Learning

Certain letter characteristics influence how easily children learn them. For example, a letter's position in the alphabet, how it is articulated, whether it is associated with multiple sounds, its similarity in shape between upper and lowercase forms, its letter name structure, and its frequency in print all contribute to the overall ease or difficulty of learning specific letters.

Families are often the first to engage children with the alphabet. These experiences come in the form of reading books or singing songs, such as the quintessential ABC song, or engaging with early childhood media, including TV shows and games. Research has examined whether the frequency with which letters appear in the English language and in these activities increases the ease of learning (Huang & Invernizzi, 2012). Kim and colleagues' (2020) recent study confirmed that the ease of learning a letter is partly influenced by how frequently it appears in the English language, addressing earlier inconsistencies in research on the role of frequency in letter acquisition.

Similarly, research has also explored whether a letter's position in the alphabet is related to acquisition. For example, letters found earlier in the alphabet sequence have been shown to be easier to learn than letters found later in the alphabet (McBride-Chang, 1999). Letters at the beginning of the alphabet may receive more

Certain letter characteristics influence how easily children learn them. For example, a letter's position in the alphabet, how it is articulated, whether it is associated with multiple sounds, its similarity in shape between upper and lowercase forms, its letter name structure, and its frequency in print all contribute to the overall ease or difficulty of learning specific letters.

attention both in home and school settings, especially if the curricular material focuses on teaching one letter a week, beginning with the letter A.

Treiman and colleagues (1998; 2004; 2007) conducted a series of pivotal studies that began to shed light on the wide variety of nuances in letter characteristics and letter learning. Some of these studies examined letter characteristics (i.e., elements specific to individual letters), and other studies examined child characteristics (e.g., children's names). For instance, in a 1998 study, Treiman and colleagues deter-

mined that children's experiences with their own names improved their knowledge of letters. Results revealed a superiority in identifying the initial letter in their name. For example, a child named Macy was more likely to identify the letter *M* than a child named Sofie.

In another study led by Treiman (1998), research showed that the difference in learning letters depended upon whether the sound of the letter is said when saying its name. This can happen when the letter sound is located at the beginning of the letter name. For instance, when we say the letter name *B* (bee), the first sound is /b/; in the letter name *J* (jay), the first sound is /j/; and in the letter name *T* (tee), the first sound is /t/. This can also occur when the letter sound is located at the end of the letter name. For instance, when we say the letter name *F* (eff), the last sound is /f/; in the letter name *L* (el), the last sound is /l/; and in the letter name *M* (em), the last sound is /m/. For some letters, the sound of the letter is not heard when saying its name (e.g., H, W, Y). Treiman's study revealed that while letter sounds cued at the beginning are easier than those cued at the end, both types were easier to learn than letters with no letter-name/letter-sound association. Additionally, letters that were associated with multiple sounds (e.g., *c* associated with the /k/ and /s/ sounds) caused more confusion for children than letters associated with only a single sound.

Since then, many researchers have built upon and extended the work of Treiman and colleagues. For example, Turnbull (2010) explored children's familiarity with the shape of uppercase letters in relation to learning lowercase letters. Findings revealed that children were 16 times more likely to know a lowercase letter if they were already familiar with the shape of the corresponding uppercase letter. This shows that children generalize their learning of uppercase letters to lowercase letters.

Huang et al. (2014) simultaneously explored several hypotheses related to the following areas of alphabet learning:

- letter-sound ambiguity (i.e., letters associated with multiple sounds, such as *c* in *cat* and *cell*)
- letter-name structure (i.e., the relationship between a letter name and its sound)
- letter-name knowledge (i.e., letter names that cue their letter sounds, such as the letter *B* starting with the /b/ sound)
- own name advantage (i.e., children tend to learn the letters in their name first)
- phonological awareness facilitations (i.e., children with more developed phonolog-

ical awareness have an easier time isolating sounds of letters)

- interactions between phonological awareness and letter-name structure (i.e., using phonological awareness skills and letter-name knowledge)

Although all six areas contributed to a child's letter knowledge, the greatest associations with lowercase letter-name knowledge were found in own-name advantage and letter-name structure. Huang (2014) built upon the initial own-name hypothesis findings to reveal that not only were children more likely to know the names of letters that appear in their names, as Treiman and colleagues discovered, but children were also more likely to know the sounds associated with these letters. This finding contrasts with the results of the original study.

Piasta and colleagues (2010) compared alphabet learning under three sets of conditions:

- letter names and sounds
- letter sounds only
- no letters, just numbers

They wanted to examine letter characteristics (i.e., letter name associated with letter sound) and child characteristics that impact alphabet learning (e.g., child's phonological abilities). This study was one of the first to investigate both letter characteristics and child characteristics. Results revealed that preschool children who were taught both letter names and letter sounds learned the sounds of the letters featuring sound cues within the letter names (regardless of the cue location) at a more accelerated rate than letters with no sound association. This pattern held true across levels of phonological processing abilities. Results appeared to show that explicit instruction in letter sounds may be critical for those children with lower phonological abilities.

Evidence-Based Instructional Practices in Alphabet Knowledge

National and state standards outline expectations for letters and sounds in early childhood classrooms. For example, The Head Start Early Learning Outcomes Framework (NCECDL, 2020) sets expectations for five-year-olds to know 18 uppercase letters, 15 lowercase letters, and several sounds. This is reflective of Piasta and colleagues' research that suggests that the optimal number of upper and lowercase letters that end-of-preschool children should be able to name for the best chance of later reading success is 18 and 15, respectively. However, it is important to recognize that an exact threshold of predictability has not yet been determined by research.

Despite widespread acceptance of the importance of alphabet knowledge, less is known about the best practices for fostering development, and classrooms vary widely in their alphabet knowledge instructional practices (Piasta & Wagner, 2010; Piasta et al., 2019). In a survey of Head Start teachers, numerous respondents expressed uncertainties regarding various aspects of letter learning in their classrooms (Gerde, 2019). Additionally, ongoing research indicates that we have yet to identify the most effective pedagogical strategies for long-term gains in preschool and early childhood education. Teachers often face challenges in balancing playful learning with implicit and explicit instruction in their classrooms (Durkin et al, 2022). Despite these uncertainties, there is preliminary evidence of what effective alphabet knowledge instruction entails.

Despite widespread acceptance of the importance of alphabet knowledge, less is known about the best practices for fostering development, and classrooms vary widely in their alphabet knowledge instructional practices.

Through a series of studies that built upon past research, Roberts and colleagues (2018; 2019; 2019a; 2020) investigated whether letter names, letter sounds, or a combination of both contributed to alphabet learning and engagement. Past research has established that teaching letter names and sounds together, as opposed to letter names in isolation, is a more effective instructional practice (Lonigan et al., 2013; Piasta et al., 2010; Piasta & Wagner, 2010). For this study, 83 children were randomly assigned to one of four conditions: experimental lessons on letter names only, experimental lessons on letter sounds only, experimental lessons on letter names + letter sounds, or typical lessons on letter names + letter sounds. They had nine weeks of instruction in 10-minute sessions for four days a week. All experimental lessons included an introduction of the letter name, sound, or both (depending on the treatment), articulatory gestures, writing, a discrimination game, and a review. Typical lessons were designed to match the experimental group in terms of size, duration, and letter taught but

were designed to reflect the teachers' typical alphabet practices. This study also examined the extent to which the following underlying cognitive processes influenced learning:

- paired-associate learning - associating one item (e.g., a printed symbol) with another (e.g., a verbal label)
- articulation referencing learning - drawing attention to parts of the mouth involved with sound production
- orthographic learning - recognizing, storing, and recalling words

All groups made gains in their alphabet knowledge of the identified content, highlighting that explicit, letter-focused, teacher-led instruction is beneficial for alphabet learning. Instruction that combined letter names and letter sounds resulted in statistically greater growth; moreover, the experimental letter name and letter sound group that drew on cognitive learning processes outperformed the typical letter name and letter sound instruction. Interestingly, engagement levels were high across all treatment groups, challenging the notion that children do not enjoy or feel motivated by explicit lessons on letter names and sounds.

Additionally, Roberts and Sadler (2019) studied a particular alphabet instruction tool of interest in previous studies. A mnemonic is a technique or tool used to help remember information more easily. In alphabet learning, embedded or integrated mnemonics have been researched as an aid in learning letter sounds. Embedded or integrated mnemonics are when an image representing a letter's

Instruction that combined letter names and letter sounds resulted in statistically greater growth; moreover, the experimental letter name and letter sound group that drew on cognitive learning processes outperformed the typical letter name and letter sound instruction. Interestingly, engagement levels were high across all treatment groups, challenging the notion that children do not enjoy or feel motivated by explicit lessons on letter names and sounds.

sound is within the letter itself. For example, a picture of an insect could be embedded within the letter *i*, or an octopus could be embedded within the letter *o*, with its eight legs extending outward. Embedded mnemonics were studied by Ehri and colleagues (1984) and were found to aid in letter sound learning above and beyond alphabet instruction that used plain letters. This study was later replicated with children learning Hebrew and again was found to be advantageous (Shmidman & Ehri, 2010). More recently, Roberts and Sadler (2019) examined embedded mnemonics within the context of a study examining letter learning and motivation. As previously found, children taught letter sounds using mnemonics were more likely to learn the sounds than the treated control group, with the Roberts and Sadler (2019) study showing that those taught with embedded mnemonics learned, on average, twice as many letter sounds as their treated control peers. Furthermore, children in the embedded mnemonic group identified more than 1.5 times as many initial phonemes as the treated control group. This is significant given that letter sounds and phonemic awareness skills are crucial for reading success.

To examine the impact of differentiated alphabet instruction, Piasta and colleagues (2022) used previous findings that had examined individual item difficulty to develop instructional techniques and lessons tailored to individual children's alphabet learning needs. Children received instruction on four letters at a certain degree of difficulty and received no instruction on four letters of similar difficulty. Results found that children were more likely to learn the target letters than the control letters. Additionally, children learned the sounds but were less likely to learn the names of letters with a higher degree of item difficulty. Certain letters may need extra attention during instruction which should be taken into account when planning lessons. Instruction might need to be

Certain letters may need extra attention during instruction which should be taken into account when planning lessons. Instruction might need to be differentiated based on content focus, with additional practice and review as necessary.

differentiated based on content focus, with additional practice and review as necessary.

While there is no universally agreed-upon sequence for teaching letter names and sounds, it is important to consider the characteristics of letters and the factors that make them more or less difficult to learn. Given the number of letters preschoolers need to know by kindergarten to ensure future reading success, introducing one letter per week is too slow. Research suggests a faster pace, such as one letter per day (Sunde et al., 2019) or 3-4 letters per week (Piasta & Wagner, 2010). This quicker pace allows for more opportunities for practice and review, and additional time can be spent on letters that are typically more challenging for children.

Intentionality in the Classroom Provides Additional Practice Opportunities

In addition to explicit letter-name and letter-sound instruction, children may benefit from opportunities to see and use letters and letter sounds in meaningful ways in their play, writing, and reading (Bingham et al, 2018; Roskos et al., 2010). Teachers who intentionally plan implicit learning opportunities provide children with valuable real-life experiences with letters. Two areas, writing and storybook reading, have been explored as avenues for potential alphabet learning.

Research has shown a bidirectional relationship between writing and growth in letter knowledge (Diamond et al, 2008). Hall et al. (2014) discovered that interactive writing lessons enhanced U.S. preschoolers' knowledge of letter names but not letter sounds when compared to typical instruction. Additionally, Piasta and colleagues (2022) found positive effects on U.S. preschoolers' letter-name learning, letter-sound learning, and letter writing in a pilot study of alphabet lessons. However, there is not enough conclusive evidence that the act of writing itself is what promotes alphabet learning. Writing, however, can provide valuable opportunities for children to practice their understanding of letters and their functions. With the necessary environmental support (e.g., paper, writing implements, alphabet chart, etc.) and teacher guidance, children could engage in using newly learned letters and sounds to practice written communication with others (Gerde et al., 2015).

Shared book reading is another common early childhood practice. Previous research has shown that children can gain alphabet knowledge through teacher-guided readings (Justice et al., 2010). More recently, Roberts et al. (2020) directly tested U.S. preschoolers' letter-name

and letter-sound learning in and out of the context of a storybook. They found that students presented with letters in context learned fewer letter sounds than those presented with letters in isolation, though there were no differences in letter naming. Despite these mixed results, storybook reading may still provide opportunities for students to practice newly learned alphabet skills in a meaningful context.

Purposefully planning and facilitating reading and writing in early childhood classrooms can reinforce explicit alphabet instruction and complement other learning activities. Prior research has shown that children spend, on average, about 18 minutes of the typical school day learning in language and literacy domains (Pelatti et al., 2014). Teachers should capitalize on every opportunity to increase engaging literacy experiences for their students.

Alphabet Knowledge Takeaways

Letter-name and letter-sound knowledge is not the end goal; efforts to improve alphabet knowledge instruction are a means to discover the most efficient and effective ways to facilitate later literacy development for all children. Early studies of alphabet knowledge examined how individual letters and child characteristics either facilitated or hindered learning. More recent research builds on this by examining evidence-based practices for alphabet instruction in the early childhood classroom setting. Evidence exists that explicit instruction that connects letter names and sounds, follows a logical sequence at a rigorous pace, and includes opportunities for practice and review, offers the best chance for student success and motivation. Furthermore, when paired with intentional classroom practices, it sets a solid foundation for future reading and writing achievement. ■

References

Bingham, G. E., Quinn, M. F., McRoy, K., Zhang, X., & Gerde, H. K. (2018). Integrating writing into the early childhood curriculum: A frame for intentional and meaningful writing experiences. *Early Childhood Education Journal*, 46, 601-611.

Diamond, K. E., Gerde, H. K., & Powell, D. R. (2008). Development in early literacy skills during the pre-kindergarten year in Head Start: Relations between growth in children's writing and understanding of letters. *Early Childhood Research Quarterly*, 23 (4), 467-478. <https://doi.org/10.1016/j.ecresq.2008.05.002>

Durkin, K., Lipsey, M. W., Farran, D. C., & Wiesen, S. E. (2022). Effects of a statewide pre-kindergarten program on children's achievement and behavior through sixth grade. *Developmental Psychology*, 58(3), 470-484

Ehri, L. C., Deffner, N. D., & Wilce, L. S. (1984). Pictorial mnemonics for phonics. *Journal of Educational Psychology*, 76(5), 880-893. <https://doi.org/10.1037/0022-0663.76.5.880>

Evidence exists that explicit instruction that connects letter names and sounds, follows a logical sequence at a rigorous pace, and includes opportunities for practice and review, offers the best chance for student success and motivation.

Gerde, H. K., Bingham, G. E., & Pendergast, M. L. (2015). Reliability and validity of the Writing Resources and Interactions in Teaching Environments (WRITE) for preschool classrooms. *Early Childhood Research Quarterly*, 31, 34-46.

Hall, A. H., Toland, M. D., Grisham-Brown, J., & Graham, S. (2014). Exploring interactive writing as an effective practice for increasing Head Start students' alphabet knowledge skills. *Early Childhood Education Journal*, 42, 423-430.

Hammill, D. D. (2004). What we know about correlates of reading. *Exceptional Children*, 70(4), 453-469. <https://doi.org/10.1177/001440290407000405>

Huang, F. L., Tortorelli, L. S., & Invernizzi, M. (2014). An investigation of factors associated with letter-sound knowledge at kindergarten entry. *Early Childhood Research Quarterly*, 29(2), 182-192. <https://doi.org/10.1016/j.ecresq.2014.02.001>

Kim, Y. S. G., Petscher, Y., Treiman, R., & Kelcey, B. (2020). Letter features as predictors of letter-name acquisition in four languages with three scripts. *Scientific Studies of Reading*, 25(6), 453-469. <https://doi-org.proxy1.library.virginia.edu/10.1080/10888438.2020.1830406>

Lonigan, C. J., Purpura, D. J., Wilson, S. B., Walker, P. M., & Clancy-Menchetti, J. (2013). Evaluating the components of an emergent literacy intervention for preschool children at risk for reading difficulties. *Journal of Experimental Child Psychology*, 114(1), 111-130. <https://doi.org/10.1016/j.jecp.2012.08.010>

National Center on Early Childhood Development, Teaching and Learning (NCECDTL; 2020). *Interactive Head Start early learning framework: Ages birth to five*. US Department of Health and Human Services. Retrieved from the NCECDTL website: Interactive Head Start Early Learning Outcomes Framework: Ages Birth to Five | ECLKC (hhs.gov).

National Early Literacy Panel. (2008). *Developing early literacy: Report of the National Early Literacy Panel. Executive Summary*. National Institute for Literacy.

National Institute of Child Health and Human Development (2000). Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction. Reports of the subgroups (NIH Publication No. 00-4754). U.S. Government Printing Office.

Pelatti, C. Y., Piasta, S. B., Justice, L. M., & O'Connell, A. (2014). Language-and literacy-learning opportunities in early childhood classrooms: Children's typical experiences and within-classroom variability. *Early Childhood Research Quarterly*, 29(4), 445-456.

Piasta, S. B., Park, S., Fitzgerald, L., & Libnoch, H.A., (2022). Young children's alphabet learning as a function

- of instruction and letter difficulty. *Learning and Individual Differences*, 93, 102-113. <https://doi.org/10.1016/j.lindif.2021.102113>
- Piasta, S. & Wagner, R. (2010). Learning letter names and sounds: effects of instruction, letter type, and phonological processing skill. *Journal of Experimental Child Psychology*, 105(4), 324-344. <https://doi.org/10.1016/j.jecp.2009.12.008>
- Piasta, S. B., & Wagner, R. K. (2010). Developing early literacy skills: A meta-analysis of alphabet learning and instruction. *Reading Research Quarterly*, 45(1), 8-38. <https://doi.org/10.1598/RRQ.45.1.2>
- Roberts, T.A., & Sadler, C.D. (2019). Letter sound characters and imaginary narratives: Can they enhance motivation and letter sound learning? *Early Childhood Research Quarterly*, 46(1), 97-111. <https://doi.org/10.1016/j.ecresq.2018.04.002>
- Roberts, T. A., Vadasy, P. F., & Sanders, E. A. (2018). Preschoolers' alphabet learning: Letter name and sound instruction, cognitive processes, and English proficiency. *Early Childhood Research Quarterly*, 44 (3), 257-274. <https://doi.org/10.1016/j.ecresq.2018.04.011>
- Roberts, T. A., Vadasy, P. F., & Sanders, E. A. (2019). Preschoolers' alphabet learning: Cognitive, teaching sequence, and English proficiency influences. *Reading Research Quarterly*, 54(3), 413 – 437. <https://doi.org/10.1002/rrq.242>
- Roberts, T. A., Vadasy, P. F., & Sanders, E. A. (2020). Preschool instruction in letter names and sounds: Does contextualized or decontextualized instruction matter? *Reading Research Quarterly*, 55(4), 573 – 600. <https://doi.org/10.1002/rrq.284>
- Roskos, K. A., Christie, J. F., Widman, S., & Holding, A. (2010). Three decades in: Priming for meta-analysis in play-literacy research. *Journal of Early Childhood Literacy*, 10(1), 55- 96. <https://doi-org.proxy1.library.virginia.edu/10.1177/1468798409357580>
- Treiman, R., & Broderick, V. (1998). What's in a name: Children's knowledge about the letters in their own names. *Journal of Experimental Child Psychology*, 70(2), 97-116.
- Treiman, R., Cohen, J., Mulqueeny, K., Kessler, B., & Schechtman, S. (2007). Young children's knowledge about printed names. *Child Development*, 78(5), 1458-1471. <https://doi.org/10.1111/j.1467-8624.2007.01077.x>
- Treiman, R., & Kessler, B. (2004). The case of case: Children's knowledge and use of upper and lowercase letters. *Applied Psycholinguistics*, 25(3), 413-428. [doi:10.1017/S0142716404001195](https://doi.org/10.1017/S0142716404001195)
- Treiman, R., Tincoff, R., Rodriguez, K., Mouzaki, A., & Francis, D. J. (1998). The foundations of literacy: Learning the sounds of letters. *Child Development*, 69(6), 1524-1540. <https://doi.org/10.1111/j.1467-8624.1998.tb06175.x>
- Turnbull, K. L. P., Bowles, R. P., Skibbe, L. E., Justice, L. M., & Wiggins, A. K. (2010). Theoretical explanations for preschoolers' lowercase alphabet knowledge. *Journal of Speech, Language, and Hearing Research*, 53(6), 1757-1768. [https://doi.org/10.1044/1092-4388\(2010\)09-0093](https://doi.org/10.1044/1092-4388(2010)09-0093)
- Schatschneider, C., Fletcher, J. M., Francis, D. J., Carlson, C. D., & Foorman, B. R. (2004). Kindergarten prediction of reading skills: A longitudinal comparative analysis. *Journal of Educational Psychology*, 96(2), 265-282. <https://doi.org/10.1037/0022-0663.96.2.265>
- Shmidman, A., & Ehri, L. (2010). Embedded picture mnemonics to learn letters. *Scientific studies of reading*, 14(2), 159-182. <https://doi-org.proxy1.library.virginia.edu/10.1080/10888430903117492>
- Snow, C. E., & Burns, M.S. (1998). *Preventing reading difficulties in young children*. National Research Council.
- Sunde, K., Furnes, B., & Lundetræ, K. (2019). Does introducing the letters faster boost the development of children's letter knowledge, word reading, and spelling in the first year of school? *Scientific Studies of Reading*, 24(2), 141-158.
- Whitehurst, G. J., & Lonigan, C. J. (1998). Child development and emergent literacy. *Child Development*, 69(3), 848-872. <https://doi.org/10.1111/j.1467-8624.1998.tb06247.x>



Alisha Demchak

Alisha is a fourth-year doctoral research fellow in the School of Education and Human Development at the University of Virginia, funded by the Virginia is for Leaders: Development of Experts in Evidence-Based Literacy (DEEL) Practices for Students with Disabilities training grant. Her research centers on early literacy development and supporting teachers to implement and sustain evidence based instructional and assessment practices in early childhood classrooms.



Emily Solari

Emily Solari is the Edmund H. Henderson Professor of Education at the School of Education and Human Development at University of Virginia. She directs Virginia Literacy Partnerships and the Virginia Language & Literacy Screening System (VALLS) a collaboration between UVA and the Virginia Department of Education. Dr. Solari's research focuses on better understanding reading development in subgroups of learners who are at-risk for reading difficulties and those identified with reading disabilities, with the goal of developing and implementing evidence-based language and reading instruction and interventions. Her scholarship includes experimental studies, professional development studies, and evaluations of language and literacy interventions and programs.