Document n° 4

État de la recherche sur les lettres-personnages (mnémoniques intégrées), 2019-2026

– Note de synthèse avec références : sept publications à comité de lecture dans cinq pays.

– National Academies of Sciences, Engineering, and Medicine, *A New Vision for High-Quality Preschool Curriculum*, 2024, pages 143-145.

– Ehri, *The Reading Teacher*, 2022.

Ce document fait partie du dossier remis au Conseil scientifique de l'éducation nationale le 15 octobre 2026 par la société Récréalire, éditeur de la méthode Les Alphas (477 route des Marais, 74410 Saint-Jorioz). L'ensemble du dossier est disponible sur le site de Récréalire.

Les appuis scientifiques aux Alphas

Résultats favorables et positions de chercheurs

Argumentaire pour la requête • 23 septembre 2026

Passage à intégrer à la requête

Les Alphas disposent de résultats scientifiques favorables directement documentés. L'article de Van Reybroeck, Content et Schelstraete, publié en 2006 dans Langage et Pratiques et identifié par l'UCLouvain comme validé par les pairs, rapporte des bénéfices à court et moyen termes plus grands avec les Alphas qu'avec un entraînement utilisant les lettres et les sons, pour le même nombre d'activités et exactement les mêmes activités. Ce résultat comparatif étaye directement l'intérêt pédagogique du dispositif. [1]

Dans les Alphas, la forme de la lettre, le personnage et le son sont associés pour rendre accessible une relation abstraite. José Morais reconnaît expressément la cohérence entre les personnages et les lettres et souligne la puissance de la convergence des indices dans cette méthode. Une intervention ultérieure, publiée en 2018, documente également des gains de conscience phonologique avec les Alphas, maintenus à six mois. [2, 3]

Les travaux récents renforcent cet appui scientifique. Sept publications parues entre 2019 et 2026 rapportent des résultats favorables pour l'apprentissage des lettres, les correspondances avec les sons ou leur mobilisation dans la lecture. Aux recherches américaines s'ajoutent des travaux menés au Brésil, à Singapour, en Allemagne et en Turquie. Ils documentent notamment une meilleure reconnaissance des lettres, une mémorisation plus efficace de leurs sons et, dans certaines interventions, un bénéfice en lecture de mots. [9–15]

Plusieurs spécialistes américains soutiennent explicitement ce principe. En 2022, Linnea Ehri présente les expériences contrôlées comme des preuves convaincantes de son efficacité pour mémoriser les correspondances entre lettres et sons. En 2024, Shayne Piasta insiste sur l'intégration de l'image à la forme même de la lettre. Timothy Shanahan recommande également cet usage après avoir révisé son ancienne objection à la lumière des recherches. [6–8]

Cette orientation est reprise dans le rapport collectif des National Academies of Sciences, Engineering, and Medicine de 2024, qui préconise un enseignement explicite des noms et des sons des lettres incluant des mnémoniques intégrées. L'ensemble de ces recherches et recommandations constitue un appui scientifique convergent en faveur de ce mécanisme. Les Alphas disposent en outre de résultats propres et d'une conception dont la cohérence entre forme et son a été expressément reconnue par José Morais. Ces éléments doivent être pris en compte dans leur appréciation scientifique. [1, 3, 5, 9–15]

Les recherches qui documentent les bénéfices des Alphas

La publication de 2006 et la comparaison de 2002

Van Reybroeck, Content et Schelstraete présentent un entraînement mis en œuvre auprès d'enfants de troisième maternelle, âgés de cinq à six ans et issus de milieux sociaux défavorisés. Les personnages des Alphas servent à introduire les phonèmes, à les identifier et à les manipuler. Les auteurs rapportent des acquisitions en identification et segmentation du phonème initial et, dans une certaine mesure, en fusion de deux phonèmes. Ils relient ces acquisitions à une facilitation des premiers apprentissages du langage écrit. [1]

Dans cette publication, ils reprennent également les résultats de la recherche comparative de Van Reybroeck menée en 2002. Leur conclusion est explicite : [1, 4]

> *« Dans une précédente recherche (Van Reybroeck, 2002), les effets de deux entraînements phoniques ont été comparés : un premier réalisé avec les Alphas et un second où le même nombre et exactement les mêmes activités ont été réalisées à l'aide des lettres et des sons. Les résultats ont montré des bénéfices à court et moyen termes plus grands de l'entraînement avec les Alphas suggérant que le contexte de l'histoire et la personnification des concepts abstraits tels que les correspondances graphème-phonème peuvent influencer l'apprentissage initial de la lecture. »*

Le maintien du nombre et de la nature des activités donne à cette comparaison un intérêt particulier pour apprécier l'apport du dispositif. Les auteurs rapportent un avantage en faveur de l'entraînement avec les Alphas à deux horizons temporels. Ce résultat constitue un appui empirique direct à leur intérêt pédagogique. [1]

Les résultats favorables de la publication de 2018

Vander Stappen et Van Reybroeck étudient 36 élèves francophones, répartis aléatoirement entre conscience phonologique avec les Alphas et dénomination rapide. L'entraînement comprend seize séances de vingt-cinq minutes. [2]

Le groupe utilisant les Alphas progresse davantage en conscience phonologique (interaction groupe × temps : $p = 0,02$) ; les acquis se maintiennent à six mois. Immédiatement après l'intervention, la part des erreurs phonologiques dans les erreurs d'écriture passe de 27,73 % à 15,96 %, contre 29,28 % à 28,47 % dans l'autre groupe. Ces résultats documentent l'efficacité de l'intervention pour les compétences phonologiques ciblées. [2]

Les positions favorables des chercheurs américains

Les National Academies recommandent le principe en 2024

Le rapport A New Vision for High-Quality Preschool Curriculum est une expertise collective publiée par les National Academies of Sciences, Engineering, and Medicine. Dans la synthèse consacrée à l'apprentissage des lettres, page 144, il préconise un enseignement explicite des noms et des sons qui intègre ce procédé : [5]

> *« explicit letter-name and letter-sound teaching that includes embedded mnemonics »*

Traduction : un enseignement explicite des noms et des sons des lettres incluant des mnémoniques intégrées. Le procédé figure ainsi dans une recommandation collective fondée sur les recherches. [5]

Linnea Ehri décrit des preuves convaincantes en 2022

Dans The Reading Teacher, Linnea Ehri, professeure émérite à la City University of New York, explique que la ressemblance entre la lettre et l'objet représenté constitue le lien essentiel permettant de retrouver le son. Elle qualifie de convaincantes les preuves expérimentales de l'amélioration de la mémorisation des correspondances graphème–phonème. Elle précise que les résultats de ses premières expériences ont été confirmés par Shmidman et Ehri (2010) puis Roberts et Sadler (2019). Avec la pratique, l'association devient automatique. [6]

Shayne Piasta souligne la qualité des preuves en 2024

Dans son entretien du 26 janvier 2024 consacré à l'enseignement de l'alphabet, Shayne Piasta fait état de recherches solides favorables aux mnémoniques intégrées. Elle invite les enseignants à envisager leur introduction dans leurs pratiques. Sa définition rejoint précisément le critère de cohérence graphique : l'objet représenté prend la forme de la lettre et fournit un indice pour le son. Elle confirme qu'il doit s'agir d'une même représentation. Entretien, de 38 min 47 s à 40 min 12 s. [7]

Timothy Shanahan recommande explicitement leur usage en 2021

Dans son analyse publiée sur Shanahan on Literacy, Timothy Shanahan revient sur son ancienne idée selon laquelle les images imposeraient une mémorisation supplémentaire. Les études sur les mnémoniques intégrées l'ont conduit à réviser cette position. Pour l'enseignement des lettres et des sons, sa recommandation est explicite : [8]

> *« use embedded mnemonics. They work. » — Traduction : utilisez des mnémoniques intégrées. Elles fonctionnent.*

Les résultats américains et leur intérêt pour le dossier

Ces recherches américaines documentent les bénéfices du principe d'intégration entre la forme de la lettre, les indices mnémotechniques et les apprentissages visés. Elles apportent un appui scientifique au mécanisme ; les résultats portant directement sur les Alphas sont présentés à la page 2.

Roberts et Sadler en 2019

Cette étude expérimentale répartit aléatoirement 38 enfants entre un enseignement avec personnages et récits intégrés aux lettres et un enseignement explicite avec lettres ordinaires. Les séances sont conduites sur sept semaines. Les résultats favorisent les mnémoniques intégrées pour les sons des lettres, l'identification du phonème initial et la fusion. La taille de l'effet pour les sons des lettres est importante : d = 1,31. Les réponses sont évaluées devant des lettres ordinaires. [9]

Murray et ses collaborateurs en 2022

Dans une étude menée auprès de 83 enfants de kindergarten, des récits mnémotechniques mettent en évidence l'organisation des traits de b et d. Les enfants bénéficiant de l'intervention obtiennent de meilleurs résultats en dénomination et en écriture des lettres. Les auteurs rapportent aussi un transfert à la reconnaissance et à la lecture de mots simples contenant ces lettres. Le récit sert ici à mieux repérer leur structure graphique. [10]

Roberts et Smolkowski en 2025

Cette étude quasi expérimentale porte sur 258 enfants dans six écoles appariées. Elle compare des personnages incorporant la forme des lettres à un enseignement structuré utilisant des lettres ordinaires accompagnées d'un mot-indice séparé. Le résumé publié par la revue rapporte de plus grands gains en fluence des sons des lettres et des différences jugées pertinentes sur le plan pédagogique en segmentation phonémique et en décodage. Les enseignants évaluent également plus favorablement l'engagement des enfants du programme avec personnages. [11]

José Morais explique la cohérence propre aux Alphas

Dans sa préface du 28 mars 2006, José Morais, professeur à l'Université libre de Bruxelles, décrit les Alphas comme une méthode phonique associant des indices acoustiques et articulatoires aux mouvements de personnages dont les formes sont cohérentes avec celles des lettres. Il écrit : [3]

> *« La convergence des indices est donc un élément puissant dans cette approche. »*

Cette appréciation porte directement sur la conception des Alphas. Elle explique pourquoi la relation entre le personnage, la forme graphique et le son constitue un support pour accéder au code. Elle complète les résultats empiriques exposés dans cette note.

Les recherches récentes prolongent les résultats favorables

Les travaux ci-dessous complètent les études américaines présentées à la page précédente. Ils documentent des bénéfices dans plusieurs langues et contextes éducatifs, jusqu'à une publication de mars 2026.

Durães et Barrera en 2021

Au Brésil, 25 enfants apprennent six lettres au cours de dix séances. Les deux groupes travaillent avec des images associées aux lettres ; dans le groupe mnémotechnique, les images incorporent leur forme. Ce groupe obtient de meilleurs résultats pour reconnaître les lettres entraînées ($p = 0,031$), les écrire ($p = 0,020$) et produire la lettre initiale des mots travaillés ($p = 0,003$). Cette comparaison documente un avantage de l'intégration graphique sur des apprentissages directement liés aux lettres enseignées. [12]

O'Brien Seward et Zhang en 2022

À Singapour, 90 enfants bilingues participent à une étude avec répartition aléatoire de petits groupes. Pendant quatorze semaines, le programme de lecture associe des images intégrées aux lettres, leur effacement progressif, les sons et des activités interactives. Le groupe témoin suit des activités mathématiques sur tablette. Cinq mois après l'intervention, le groupe ayant reçu le programme de lecture obtient de meilleurs résultats en lecture de mots ($p < 0,01$; $d = 0,40$). Ce résultat étaye l'efficacité de ce programme incorporant des mnémoniques intégrées. [13]

Grünke et ses collaborateurs en 2024

En Allemagne, quatre élèves de première année rencontrant des difficultés apprennent les correspondances entre dix lettres et leurs sons à l'aide d'images mnémotechniques. L'étude suit les performances de chaque enfant avant et pendant l'intervention, introduite à des moments différents. Les quatre enfants améliorent leurs performances de restitution des sons devant les lettres. Les analyses rapportent des effets forts et significatifs pour chacun d'eux (indices de non-recouvrement et Tau-U : $p < 0,001$). Ces résultats montrent l'intérêt du procédé auprès d'élèves en difficulté. [14]

Kalender en 2026

En Turquie, 85 élèves de première année sont suivis dans trois classes pendant dix-huit semaines. L'intervention associe des images à la forme des lettres puis organise le passage aux graphies ordinaires. Dans une tâche consistant à choisir la lettre initiale du nom d'une image, les élèves du groupe mnémotechnique répondent significativement plus vite que ceux de chacun des deux groupes témoins ($p < 0,001$). L'analyse trouve également un avantage de précision face à l'un des groupes témoins. L'étude apporte ainsi un résultat récent en faveur d'un accès plus rapide à la correspondance entre son et lettre. [15]

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A New Vision for High-Quality Preschool Curriculum

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Committee on a New Vision for High Quality Pre-K Curriculum

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Consensus Study Report

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understanding what one is teaching. Without such knowledge of the goals and big ideas of the domain, it is difficult for teachers to recognize their nascent forms in children's everyday activities, play, and other representations (Broderick & Hong, 2020; Edwards et al., 1993, 2012), and in turn, teachers may be unable to build on children's prior knowledge and effectively implement an approach focused on asset-based learning trajectories. Given the limited preservice and in-service experiences offered to many preschool teachers, this requires considerable effort on the part of curriculum developers (see, later in this chapter, Educative Curricula: Teaching Both Children and Their Teachers).

Teaching content to young children takes place mainly in playful contexts, ranging from intentional small- and large-group and individual work, to everyday routines, to child-initiated play and teachable moments (Diamond et al., 2013). Content instruction includes both incidental and intentional approaches. For curriculum developers, it is important to consider the goals, the children, and the range of teaching approaches to determine pedagogical practices (Burchinal et al., 2022). For example, naturalistic language scaffolding embedded in play and everyday routines positively supports children's receptive and expressive language development, especially for children with disabilities (e.g., Schreibman et al., 2015).

Literacy and Language

A substantial evidence base exists on teaching early literacy and language to inform curriculum development (International Literacy Association, 2018; National Institute for Literacy, 2008; Snow et al., 1998). For example, the large-scale meta-analysis of research on early literacy development conducted by the National Early Literacy Panel (National Institute for Literacy, 2008) identified foundational knowledge and skills that are the forerunners of conventional reading and writing. Among these predictors are alphabet knowledge, phonological awareness, concepts of print, early writing, and oral language. Continuing research with diverse populations of children on interventions to improve these and other early literacy and language outcomes, such as comprehension and background knowledge, has important implications for the development of high-quality preschool curriculum.

Compared with earlier views of the science of reading that focused on formal instruction in reading in elementary school, recent work emphasizes complexities beyond the "simple view of reading" and focuses on the substantial development of foundational literacy skills in the early years, especially in families and in preschool (Cabell et al., 2023; Zucker et al., 2022). Essential foundations such as language comprehension and production, print knowledge (Piasta et al., 2012), and content knowledge can develop

early. This recent research also moves beyond studying only typically developing, monolingual English-speaking children to include those who are multilingual leaners, are racially diverse, live in diverse cultures, and have disabilities (Cabell et al., 2023).

Teaching Letter Names and Sounds

This research corpus provides detailed guidance for curriculum developers. For example, teaching letter sounds explicitly using mnemonics (e.g., embedding letters in familiar actions, objects, or characters) and embedding letters and their sounds within words in interesting and imaginative stories facilitates positive motivation and learning outcomes (Roberts & Sadler, 2019).

Some curricula teach primarily letter names or teach letter names before letter sounds (phonics), but research shows that teaching letter names and sounds simultaneously leads to greater learning (Piasta, 2023; Piasta et al., 2010). Some curricula develop letters through whole-group instruction; however, differentiating teaching based on formative assessment and teaching primarily in small groups is more effective (Piasta, 2014, 2023). Such instruction also is more effective if targeted to each child's letter and sound knowledge and if sequenced to teach easier letters (e.g., letters in a child's name; note that letter sounds are not so sequenced), such as A, B, and X, before more difficult letters, such as Q, U, and V (Piasta, 2023; Piasta et al., 2022).

Some curricula teach all uppercase letters before any lowercase letters. Children do recognize uppercase letters more easily, but once they can name one, they can learn the lowercase version without waiting to learn the full uppercase alphabet (Piasta, 2023).

In summary, research supports combining brief (approximately 10–15 minutes), fast-paced, explicit letter-name and letter-sound teaching that includes embedded mnemonics. Unfortunately, this approach is not used frequently. Research does not support other popular approaches, such as teaching using multisensory techniques, letters within contexts, or combined alphabet and phonological awareness (Piasta, 2023).

By contrast, some preschool curricula use large-group lessons and move all children through the same activities (e.g., "letter of the week" approaches), minimizing individualization. As described previously, effective curricula embed consistent formative assessment to adapt instruction to children's current level of knowledge and skill.

Book Reading

In a similar vein, specific language scaffolds during book-reading activities promote children's development of language and literacy, especially for populations who have experienced being marginalized (Pentimonti &

Justice, 2010; Pentimonti et al., 2010, 2017). For example, teachers might reduce the number of possible choices, as in, "What is this part of the animal called? Is it the teeth or the jaw?" (Pentimonti & Justice, 2010, p. 247). Preschool teachers' use of such scaffolds is infrequent, however, so curricula could build them into lessons, emphasizing flexible use based on formative assessment (Pentimonti et al., 2017). For example, to teach the competence of predicting future events in a story, teachers might present possible choices for children just developing the ability, such as, "Do you think Juan will dress up as an animal or superhero for the party?" For children who are further along in developing the ability, the teacher might challenge them to reason and hypothesize by asking, "Why do you think so?" or "Why is it helpful to predict what will happen?"

Similarly, specific pedagogical practices in shared book reading improve a range of language and literacy competencies in young children, including those with or at risk for learning disabilities (Murphy et al., 2023). Preschoolers can also learn more than simply "names." For example, experimental and quasi-experimental studies of the *World of Words* curriculum found that both word knowledge and conceptual development were taught successfully by engaging children with new vocabulary through taxonomic categories, such as scientific or health concepts and content (Neuman & Kaefer, 2018; Neuman et al., 2011). In one study, statistically significant effects were found in the intervention group on children's curriculum-related expressive vocabulary, content knowledge, and knowledge of information texts compared with the control group (Neuman et al., 2016). Although *World of Words* is a language curriculum designed to increase children's vocabulary and world knowledge through content-rich units of study, the curriculum is available only in English.

Young children benefit from integrated and interdisciplinary approaches to teaching content. Arguably, integration is most important for language and literacy, as it gives meaning to their use, develops disciplinary literacy, and develops content knowledge, all with effectiveness equal to that of more siloed approaches (Purpura et al., 2021; Wright & Gotwals, 2023). However, developers consider the focus and interrelationship of curricula and curricular components with the subject and the children in mind (National Academies, 2022; see the section Integrated and Interdisciplinary Curricula later in this chapter). In literacy, for example, explicit, structured activities targeting awareness of the written language and phonological features of language help children develop early literacy competencies more than informal storybook reading (Justice et al., 2015).

To develop language skills, curricula encourage replacing simple "right or wrong" feedback with discussion of the ideas and strategies that underlie answers. In multiturn conversations, for example, teachers ask several children about their interpretation of a storybook or how they solved a

VIEWPOINT

INTERNATIONAL LITERACY ASSOCIATION

Key Knowledge to Support Phonological Awareness and Phonics Instruction

Shayne B. Piasta, *Alida K. Hudson*

What do teachers need to know about phonological awareness and phonics instruction to support beginning readers? Understanding these concepts and enacting effective teaching practices require considerable specialized knowledge.

Scientific findings do not teach children to read. Teachers do. As the field discusses the Science of Reading, we emphasize the important role of teachers in providing high-quality instruction informed by this body of evidence. Teachers make decisions about what is taught and how, in their selection of curriculum, materials, and instructional strategies; planning; and in-the-moment instructional interactions (Borko et al., 1981; Schachter & Piasta, 2021). As for other professions, these decisions require specialized knowledge.

Specialized knowledge for teaching reading includes content and pedagogical knowledge (Shulman, 1987) about the components and processes involved in reading, how children develop reading skills, and effective practices to support literacy learning. These aspects, in particular, are informed by the Science of Reading (Petscher et al., 2020; Shanahan, 2020a). Specialized knowledge for teaching reading also includes content knowledge regarding oral and written language structures (Moats, 2020) as well as pedagogical content knowledge (Shulman, 1987), or knowledge of how to teach reading to the diverse array of learners in a classroom.

Accumulating research shows that teachers' specialized knowledge matters for children's early literacy learning (Hudson et al., 2021; Piasta et al., 2020). Much of this research concerns preschool through Grade 2 children's development of word reading and related skills, as supported through phonological awareness and phonics instruction. Although successful reading unquestionably involves more than word reading, these skills are a particular focus during the early elementary years and a source of many children's reading difficulties (Castles et al., 2018). In this article, we describe what early childhood and elementary teachers need to know about phonological awareness and phonics to support beginning readers.

Phonological Awareness and Phonics are Distinct but Interconnected

Phonological awareness and phonics are distinct, but often confused, concepts (Spear-Swerling et al., 2005). Phonological awareness is the ability to distinguish and manipulate various units of speech sounds such as syllables, onsets/rimes, and phonemes. Within this, phonemic awareness is the particular ability to distinguish and manipulate phonemes (i.e., individual speech sounds). For example, phonological awareness allows us to count two syllables in the spoken word "toolbox." Phonemic awareness allows us to count three individual speech sounds in "tool" and four in "box." Phonemic awareness, specifically, plays a key role in learning to read (National Early Literacy Panel, 2008; National Reading Panel, 2000). Notably, phonological and phonemic awareness involve spoken language; these can be demonstrated and taught without referring to letters or print.

Unlike phonological awareness, which is a particular skill, phonics refers to an instructional method. Phonics instruction emphasizes the connections between spelling (print) and sound (speech). It involves teaching not only individual letter sounds (e.g., *t* represents /t/) but also grapheme–phoneme correspondences more broadly (e.g., digraphs, trigraphs) and common orthographic patterns (e.g., vowel–consonant-e [VCe] pattern).

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At more advanced levels, phonics teaches children how word pronunciations and spellings depend on morphology and word origin.

Yet, these two concepts are also interconnected. Both play an important role in supporting skilled, fluent reading and spelling (Castles et al., 2018; National Reading Panel, 2000). Phonemic awareness helps children understand that words are comprised of phonemes. As children learn to read, they begin to associate these phonemes with letters, as supported by phonics instruction. These grapheme–phoneme correspondences, along with an increasingly sophisticated understanding of orthographic patterns, are used to decode and spell new words (Ehri, 2014). Teachers who understand these concepts devote instructional time to each (Spear-Swerling & Zibulsky, 2014), supporting phonemic awareness as a foundation for phonics instruction. They are able to choose illustrative instructional examples and understand children's responses (Moats, 2020); for example, setting aside their knowledge of how "tool" is spelled to identify its three phonemes and understanding why children might use four letters when writing "box." Teachers may also return to phonemic awareness instruction when children show difficulties in mapping speech to print.

PAUSE AND PONDER

- How does this build on what you already knew about phonological awareness and phonics instruction?
- How might this change how you approach such instruction in your classroom?
- How do children in your classroom vary in their skills, instructional needs, and linguistic diversity, and how can you tailor your phonological awareness and phonics instruction accordingly?

Teaching Phonological Awareness and Phonics Requires Understanding Language

Phonological awareness and phonics involve multiple systems of language. Spoken, or oral, language is comprised of five systems: phonology, syntax, morphology, semantics, and pragmatics[1] (Cárdenas-Hagan, 2018). Phonology is the system of speech sounds in a language. English includes approximately 44 phonemes that can be combined in various ways to form larger sound units (e.g., blends, syllables, words). Helping children develop phonological awareness requires that teachers have an explicit understanding of phonology. This knowledge informs the words selected for instruction and in-the-moment responses to children during phonological awareness tasks. Also important are teachers' abilities to clearly and accurately pronounce phonemes so that, to the extent possible, only a single, clipped speech sound is produced (e.g., /t/ rather than "tuh").

Phonics relies on phonology in conjunction with other systems, including orthography or the system of visual symbols that map print to speech. Notably, whereas exposure is often sufficient to learn oral language (e.g., children learn the phonemes and syntax of their languages, along with many word meanings, without explicit instruction), understanding orthography typically requires instruction and practice (Castles et al., 2018). English orthography includes individual letters and letter combinations (graphemes) that represent phonemes. Phonics teaches children about these grapheme–phoneme correspondences (e.g., *t* represents /t/, *oo* can represent /o͝o/ like in "book" and /ū/ like in "tool," *x* can represent /k/+/s/) such that they can use this knowledge to determine the spoken pronunciation of an unknown printed word (decode). As discussed in the next section, this is important because the pronunciation allows children to access word meanings and conceptual connections (after decoding *toolbox*: "My mom has a toolbox! It has a hammer and screwdriver in it."). This refers to the semantic system of language or the meaning of words and word combinations (e.g., phrases, sentences).

Phonics also teaches more complex aspects of orthography, such as allowable spellings (e.g., words in English do not end in *v*) and other patterns (e.g., syllables with a consonant–vowel–consonant [CVC] pattern like *box* tend to have lax vowel sounds, whereas VCe words like *bike* tend to have tense vowel sounds). At more advanced levels, phonics teaches children the morphological system, which involves the smallest meaningful units of a language (morphemes). The morphological system helps children understand the meanings of words (e.g., adding the morpheme *s* to *tool* means there is more than one tool). Additionally, morphology determines how multisyllabic words may be broken into parts for easier decoding (e.g., splitting into affixes and base words) and offers insights into particular grapheme–phoneme correspondences (e.g., *ch* represents /k/ when in words of Greek origin) and spellings (e.g., why the /s/ is spelled with a *c* in *electricity*). Teachers who have explicit knowledge of phonology, orthography, and morphology can provide the full spectrum of phonics instruction, from basic grapheme–phoneme correspondences through complex orthographic patterns, as well as explain nuances involved in decoding and spelling words.

Terms and Definitions

Term	Definition	Example(s)
Affix	Morpheme attached to root/base word that alters meaning (e.g., prefix, suffix)	re-
Blend	Multiple sequential graphemes within a syllable, each corresponding to a phoneme	*spl*, *mp*
Clipped (stop) sound	Speech sound produced by stopping air flow	/t/
Continuous sound	Speech sound produced via continuous air flow that can be pronounced for multiple seconds	/m/
Digraph/trigraph	Two- or three-letter combination corresponding to one phoneme	*ch*, *ght*
Grapheme	Letter or letter combination corresponding to one phoneme	*ch*, *t*
Homograph	Words spelled the same but with different pronunciations and/or meanings	refuse
Lax vowel sound	Vowel sound requiring little tension in vocal cords, often referred to as short	/ŏ/
Morpheme	Smallest meaningful word part	re-, -s
Onset	Syllable/word part that precedes vowel sound (if any)	/t/ in "tool"
Phoneme	Individual speech sound	/t/
Rime	Syllable/word part that includes the vowel and any following consonant sounds and determines whether words rhyme	"-ox" in "box"
Syllable	Speech unit that contains one vowel sound	"box" in "toolbox"
Tense vowel sound	Vowel sound requiring tension in vocal cords, often referred to as long	/ā/

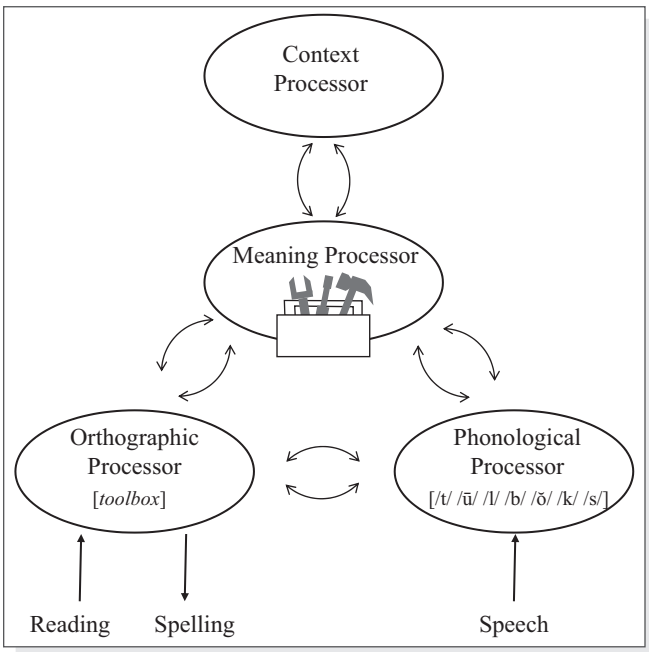
Reading Requires Building Connections Among Orthography, Phonology, and Semantics

Knowledge about the word reading process illuminates why phonological awareness and phonics instruction are important. Reading involves integration across the orthographic, phonological, and semantic systems. The Four Processors model (Adams, 2013; see Figure 1) is a useful heuristic that reflects scientific research and depicts how these systems interact to read (and spell[2]) words. The visual information of a printed word (i.e., letters) is received by the orthographic processor. Essentially, every letter is visually processed, as are all words within a text. For words that have been read many times, orthographic processing can directly activate the meaning processor, whereby the meaning of the word—and its morphemes—is accessed (semantic system).

For beginning readers, however, many words require the activation of the phonological processor to access meaning. The phonological processor translates the orthographic information to its phonological representation, based on grapheme–phoneme correspondences and larger, recognizable sound units (e.g., rimes, syllables, affixes). The phonological representation, in essence, reproduces the word's spoken pronunciation. The phonological processor, along with the orthographic processor, then activates the meaning processor to access the word's meaning. Notably, repeated simultaneous activation of all three processors—pairing the visual form of the printed word with its pronunciation and meaning (i.e., orthographic mapping; Ehri, 2014)—is what leads to automatic and fluent word reading or being able to read words "by sight."

The context processor helps ensure that what is read makes sense. For example, in the case of homographs (e.g., *refuse* meaning reject versus *refuse* meaning trash), the context processor provides extra activation to the meaning implied by the context of the sentence or paragraph. The context processor also selectively activates aspects of a word's meaning (e.g., connotation, related information in the word's semantic network) based on background knowledge and experience

Figure 1
The Four Processors Model. Adapted with permission from Adams, M. J. (2013). Modeling the connections between word recognition and reading. In D. E. Alvermann, N. J. Unrau, & R. B. Ruddell (Eds.), Theoretical models and processes of reading (6th ed., pp. 783–806). International Reading Association.
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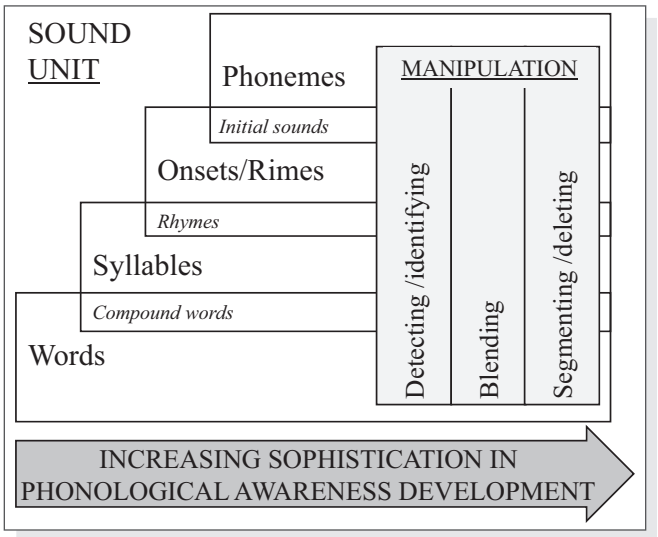
to ensure that relevant information is salient. One mistake that beginning readers may make is over-relying on the context processor. Research shows that skilled readers do not guess at words (Perfetti & Roth, 1981) and that attending to orthography and phonology are essential for automatic and fluent reading (Ehri, 2014; Petscher et al., 2020).

The Four Processors model demonstrates how phonological awareness and phonics instruction support the reading (and spelling) process. Phonological awareness instruction cues children to attend to the sound structures of words, thus supporting the phonological processor. Phonics instruction bridges the orthographic and phonological processors to help children map printed words to their pronunciations and thus access meaning (or, alternatively, use meaning, morphology, and pronunciation to derive the correct spelling). Phonics instruction also encourages children to attend to orthographic and phonological information in words, which is critical for orthographic mapping and fluency, and use context as a check on decoding and understanding rather than as a reading strategy.

Effective Phonological Awareness Instruction Guides Children toward Phonemic Awareness and Links with Graphemes

Phonological awareness includes being able to manipulate various sound units in different ways (see Figure 2). Initial instruction might focus on larger units of sound, which are generally easier than manipulating smaller units (Anthony et al., 2003) and may help children understand the task at hand. The goal, however, is to support development of phonemic awareness. Although teaching rhyming, for instance, is common in early childhood classrooms (Skibbe et al., 2016), rhyming shows the weakest association with later reading (National Early Literacy Panel, 2008). Emerging research also suggests that teachers need not wait for children to master manipulations of larger sound units before introducing phonemic awareness tasks (Ukrainetz et al., 2011). Ultimately, phonological awareness instruction should guide children toward being able to manipulate individual phonemes.

Figure 2
Children's Phonological Awareness Development. The sophistication of children's phonological awareness increases in terms of performing more complex manipulations on smaller sound units. Children do not necessarily master a particular sound unit before beginning to manipulate other sound units (i.e., development overlaps, represented by the overlapping boxes). The different manipulations apply within each sound unit



Phonemic awareness instruction is more impactful when provided early (National Early Literacy Panel, 2008; National Reading Panel, 2000), in preschool and kindergarten. Small doses (5–18 hours total) can be highly effective, and one study suggests that 4 hours of instruction was just as effective for kindergarteners as 11 hours (Ukrainetz et al., 2009). Of course, instructional duration and intensity depend on children's individual learning needs. Research supports providing phonemic awareness instruction in small groups as one particularly effective way to tailor instruction while monitoring children's progress (National Reading Panel, 2000).

The development of phonemic awareness in young children, depicted in Figure 2, can inform an instructional sequence. In addition to moving from larger to smaller sound units, children also develop in the types of manipulations that they can do (Anthony et al., 2003; Vloedgraven & Verhoeven, 2009). Detecting or identifying sounds (e.g., What is the first sound in "tool?") is easier than blending sounds (e.g., Guess the word: /t/ /ū/ /l/). In turn, blending is easier than segmenting (e.g., Tell me each sound in "box") and deletion (e.g., What word is "box" without /b/?). Although more research is needed regarding teaching sequences, instruction might mirror this progression, beginning with detecting or matching sounds and then quickly moving to blending and segmenting (Ukrainetz et al., 2011). Additionally, working with beginning sounds is easier than ending sounds (middle sounds are particularly challenging), and manipulating continuous sounds (e.g., /m/, /s/) is easier than clipped sounds (e.g., /t/, /k/), leading to suggestions that initial instruction focus on continuous sounds at the beginning of words and incorporate more difficult sounds over time (Gonzalez-Frey & Ehri, 2021).

As children grasp the concept of phonemic awareness, linking instruction to letters is beneficial (National Early Literacy Panel, 2008; National Reading Panel, 2000). For example, as children can successfully identify initial phonemes (e.g., /s/ in "sun" and "silly"), teachers can teach the letter most commonly associated with that phoneme (e.g., /s/ is represented by *s*) and invite children to use letters in conjunction with sounds (e.g., "sun" "starts with /s/ and *s*; manipulating letter tiles during phonemic awareness tasks). At this point, phonemic awareness instruction begins to merge with phonics instruction.

Phonics Teaches the Patterns and Regularities of English Orthography

A substantial body of work supports phonics instruction as effective for learning to read (National Reading Panel, 2000; see Castles et al., 2018, for updated review). Phonics instruction takes advantage of the many regularities of English. English orthography is complex, but most words adhere to reliable grapheme–phoneme correspondences and orthographic patterns (Blevins, 2017). Even words often called "irregular" contain typical and predictable patterns (e.g., *have* includes the typical correspondences for *h* and *v*; the lax pronunciation of *a* is predictable because it reflects that words in English cannot end in *v* rather than the VCe pattern). Words fall along a continuum of regularity, which also depends on the orthographic and phonological knowledge of the reader (Miles et al., 2018). Phonics instruction is therefore helpful even for learning to read and spell less regular words and important for orthographic mapping of all words (Ehri, 2014).

Because English is complex, phonics instruction is intended to teach patterns and generalizations as opposed to hard and fast rules. For example, although phoneme correspondences for most consonants are stable (e.g., *b* almost always represents /b/), some consonants are associated with multiple phonemes (e.g., *c* representing /k/ or /s/) that depend on orthographic patterns and morphology. Vowels often represent many different phonemes. Ideally, phonics instruction not only helps children learn multiple correspondences and patterns, but also how to apply this knowledge flexibly and strategically. For example, a child who does not recognize the pronunciation of *toolbox* when sounding the *oo* as /o͝o/ in "book" might try again knowing that *oo* can also represent /ū/. Similarly, a child who initially applies the VCe pattern to *have* might then try the pronunciation with /ă/, recognizing that this word could follow the pattern of words like *give*.

Ultimately, the goal of phonics instruction is to equip children with knowledge and strategies to be used generatively; that is, for them to be able to read and spell words that they may not have encountered before in print and, through repeated exposure and orthographic mapping, add these words to their sight vocabularies. The goal of phonics instruction is not memorization of correspondences and spellings. Accordingly, phonics instruction need not involve only rote teaching methods. Contrary to criticisms that phonics instruction involves only "skill and drill," phonics instruction can and should involve children in higher level tasks such as reflecting on words, grapheme–phoneme correspondences, and orthographic patterns; analyzing how words sound and are spelled and how these relate to meaning; and evaluating their own decoding and spelling to see whether and why their attempts are successful or unsuccessful (for examples of ways to integrate such higher-level instruction, see Freeman et al., 2019; Ganske, 2016).

Phonics Begins with Alphabet Instruction

Young children begin to understand mappings between speech and print as they learn the alphabet. The alphabetic principle, or insight that printed letters represent spoken sounds in words, provides the foundation—and impetus—for learning grapheme–phoneme correspondences. This insight generally accompanies formal or informal alphabet instruction, in which children are taught to associate letter forms with letter names and the most common letter sounds (e.g., *c* is called "C" and represents the sound /k/).

In the United States, early alphabet instruction has often focused on letter names rather than sounds and followed a letter-of-the-week approach (Ellefson et al., 2009; Gerde et al., 2019). Research, however, suggests that such practices may not be the most effective. Children's letter sound knowledge is critical for successful reading and spelling (Hulme et al., 2012), and young children readily learn letter sounds when taught (Piasta et al., 2021; Roberts et al., 2019). Moreover, children benefit from teaching letter names and sounds simultaneously (Piasta et al., 2010; Roberts et al., 2018) and when these are introduced at a faster pace (e.g., three per week; Vadasy & Sanders, 2021). Notably, certain letter sounds are more difficult than others (e.g., *h*, *y*) and may require additional instructional intensity (Piasta, 2016).

Explicit alphabet instruction—in which the teacher shows the letter and provides the corresponding name and sound—is most impactful for letter sound learning (Roberts et al., 2019). One promising strategy is using embedded mnemonics (embedding the letter shape into a picture that also reflects the letter sound, such as an *f* embedded into a flower; Ehri et al., 1984; Roberts & Sadler, 2019; Shmidman & Ehri, 2010). Notably, although multisensory approaches to alphabet instruction are common, evidence concerning the effects of such approaches is currently limited; see Piasta (2022) for review of this and other alphabet instruction practices.

Effective Phonics Instruction is Explicit and Systematic and Requires Application

Effective phonics instruction is explicit and systematic (Castles et al., 2018). Explicit instruction involves clearly explaining a concept, modeling its application, and allowing for guided practice with frequent feedback. Systematic instruction follows a specified scope and sequence that builds upon prior learning and moves from simpler to more complex tasks (Blevins, 2017; Duke & Mesmer, 2019). Explicit, systematic instruction should not be misconstrued to imply lockstep progression through a one-size-fits-all curriculum. Rather, phonics instruction should be informed by an assessment–instruction cycle and tailored to meet children's individual learning needs (Watts-Taffe et al., 2012). Although 30–60 minutes of daily phonics instruction is typically recommended (Duke & Mesmer, 2019), children in the same classroom will vary in the instructional intensity required and the pace at which they progress through the scope and sequence. Similar to phonemic awareness instruction, small-group phonics instruction is an effective way to meet these varying needs (National Reading Panel, 2000).

Phonics instruction may involve analytic (part-to-whole) or synthetic (whole-to-part) approaches. Synthetic phonics instruction explicitly teaches grapheme–phoneme correspondences and how to blend sounds together to form words. For example, children might learn the grapheme–phoneme correspondences for /t/, /p/, and /i/ and how to blend these to decode and spell words like *tip* and *pit*. Analytic phonics instruction begins with whole words and teaches children to segment and attend to word parts. For example, children might analyze *mat*, *sat*, and *hat* to derive the phoneme represented by *a* or the common rime, with these correspondences or patterns then explicitly identified and used to decode and spell new words. Research currently supports both approaches as effective when implemented explicitly and systematically (Castles et al., 2018).

Research has identified specific phonics (and phonological/phonemic awareness) programs as effective (e.g., see the What Works Clearinghouse, https://ies.ed.gov/ncee/wwc/). In terms of general strategies, recent research suggests benefits of connected phonation—not pausing between phonemes but continually producing sound (e.g., /mmmăăănnn [man] as opposed to /m/-pause-/ă/-pause-/n/)—when demonstrating how to blend and decode words (Gonzalez-Frey & Ehri, 2021). Children may also benefit from being taught articulatory gestures (i.e., how the mouth and vocal cords produce specific phonemes; Boyer & Ehri, 2011) and both single-letter grapheme–phoneme correspondences (e.g., *t*, *p*) and common digraphs (e.g., *sh*, *oo*) early, rather than exclusively focusing on basic letter–sound correspondences (Vadasy & Sanders, 2021; see also Savage et al., 2020). Morphological instruction has been proposed as a promising way to support decoding of multisyllabic words (Kearns, 2020) but remains to be tested.

Importantly, converging research supports integrating phonics instruction with reading, spelling, and writing

applications such that children apply knowledge of taught grapheme–phoneme correspondences and orthographic patterns to decode and spell (Mesmer, 2005; Savage et al., 2018; Weiser & Mathes, 2011). Controlled or decodable texts, selected to align with the scope and sequence of phonics instruction, may be helpful for beginning readers but this remains a topic of research (Castles et al., 2018). Overall, although it is clear that explicit and systematic phonics instruction is necessary, many questions about how to best provide such instruction remain (Shanahan, 2020b).

Phonological Awareness and Phonics Instruction Require Consideration of Linguistic Diversity

Many children speak language varieties at home that differ from the General American English used in US classrooms and academic texts (Ludwig et al., 2019; Washington & Seidenberg, 2021). These children may be English Learners or speak a variety of English (e.g., African American English, Southern English). Speaking multiple languages confers many advantages to these children (Barac & Bialystok, 2010), but also necessitates attention to linguistic diversity during phonological awareness and phonics instruction.

Children who speak language varieties benefit from explicit, systematic phonological awareness and phonics instruction (Ludwig et al., 2019; Pittman et al., 2014), particularly when this leverages their existing knowledge and skills as strengths, recognizes language differences, and meets individual needs. Notably, some early literacy skills—including phonological awareness—transfer across languages (Ludwig et al., 2019; Pittman et al., 2014; Richards-Tutor et al., 2016). English Learners, in particular, benefit from instruction that simultaneously supports their oral language and literacy skills (e.g., preteaching new vocabulary words used during phonemic awareness and phonics instruction) and builds on similarities between languages (e.g., activities involving phonemes common to both English and the home language; Cárdenas-Hagan et al., 2007; Helman, 2004).

Sounds, grapheme–phoneme correspondences, and orthographic patterns that differ across language varieties (see Blevins, 2017; Washington & Seidenberg, 2021) may require additional instructional time and intensity, including ample practice opportunities (Cárdenas-Hagan, 2018). For example, dropping the final consonant sound of a word is a common feature of African American English. Therefore, phonemic awareness and phonics instruction focused on ending sounds may be important for some African American English-speaking children (Pittman et al., 2014). Likewise, sounds that do not exist in children's home languages (e.g., Spanish does not include /j/; Vietnamese does not include /w/ or /sh/) likely require extra attention. The amount of time and practice necessary likely depends on the extent

More to Explore

Specialized knowledge for teaching reading	Resource(s)
Content knowledge regarding language structures	Moats, L. C. (2020). *Speech to print*: *Language essentials for teachers* (3rd ed.). Paul H. Brookes.
Content knowledge regarding reading components, processes, and development	Castles, A., Rastle, K., & Nation, K. (2018). Ending the reading wars: Reading acquisition from novice to expert. *Psychological Science in the Public Interest*, *19*(1), 5–51. https://doi.org/10.1177/1529100618772271
Pedagogical knowledge of effective phonological awareness and phonics instructional practices	Institute of Educational Sciences. (2016, September 14). *Video 15*: *Phonemes linked to letters* [Video]. https://youtu.be/6wjU03hjOvs Institute of Educational Sciences. (2016, September 14). *Video 18*: *Word building* [Video]. https://www.youtube.com/watch?v=4Tm2U2zOQ_M
Pedagogical content knowledge to support teaching reading to diverse learners	Cárdenas-Hagan, E. (2020). *Literacy foundations for English learners*: *A comprehensive guide to evidence-based instruction*. Brookes. Lambert, S. (Host). (2021, October 6). Linguistic variety and dialects: Difference, not error: Julie Washington (Season 4, episode 3) [audio podcast episode]. In *Science of Reading*: *The Podcast*. https://podcasts.apple.com/us/podcast/s4-07-linguistic-variety-and-dialects-difference-not/id1483513974?i=1000537698380

to which children's home language use and their language varieties differ from General American English (Washington & Seidenberg, 2021). Thus, just as for monolingual speakers, phonological/phonemic awareness and phonics instruction should be informed by an assessment–instruction cycle and tailored to meet these children's learning needs (Helman, 2005).

Phonemic Awareness and Phonics Instruction are Necessary but Insufficient

As we have reviewed, phonemic awareness and phonics are critical components of early reading and spelling instruction. Word-level reading and spelling skills are absolutely necessary for successful reading and writing; these provide the foundation for accessing and using print to convey meaning. Enacting effective phonemic awareness and phonics instruction—as aligned with the Science of Reading and the learning needs of individual children—requires highly knowledgeable teachers. Early childhood and elementary teachers who possess specialized knowledge about language structures; reading components, processes, and development; and effective practices are well positioned to support children's early literacy development.

We conclude with the caveat, however, that providing phonemic awareness and phonics instruction serves the greater goals of understanding and communicating effectively via text. Thus, while high-quality phonemic awareness and phonics instruction are critically necessary, focusing on these aspects alone is insufficient. Reading and writing are complex processes that involve many components (e.g., word-level skills, comprehension, motivation; Castles et al., 2018), all of which can be supported through high-quality instruction and knowledgeable teachers.

Conflict of Interest

None

ENDNOTES

[1] Although syntax (the system of rules that govern how words can be combined into sentences) and pragmatics (the system of conventions pertaining to how language is used in social contexts) are also important for literacy, we do not focus on these in this article.

[2] Spelling involves the inverse process of that described for reading. The pronunciation of a word is activated in the phonological processor, along with its meaning—and morphology—in the meaning processor. The pronunciation is translated into its orthographic representation via known grapheme–phoneme correspondences and orthographic patterns, as informed by meaning and morphology.

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TAKE ACTION!

1. Identify other local early childhood and elementary teachers interested in improving their phonological awareness and phonics instruction.
2. Determine the aspect(s) of knowledge related to phonological and phonics about which the group wants to deepen their understanding.
3. Choose relevant resources, such as those provided in the More to Explore or by the What Works Clearinghouse, to review.
4. Discuss how the resources build your specialized knowledge and can inform your classroom practice.

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