

WHY READING IS NOT A NATURAL PROCESS

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Nearly four decades of scientific research on how children learn to read supports an emphasis on phoneme awareness and phonics in a literature-rich environment. These findings challenge the belief that children learn to read naturally.

I am frequently asked why the National Institute of Child Health and Human Development (NICHD) conducts and supports research in reading, given that the NICHD is part of the National Institutes of Health, a federal agency that emphasizes basic biomedical science and health-related research. A primary answer is that learning to read is critical to a child's overall well-being. If a youngster does not learn to read in our literacy-driven society, hope for a fulfilling, productive life diminishes. In short, difficulties learning to read are not only an educational problem, they constitute a serious public health concern.

The NICHD has been studying normal reading development and reading difficulties for 35 years.

NICHD-supported researchers have studied more than 10,000 children, published more than 2,500 articles, and written more than 50 books that present the results of 10 large-scale longitudinal studies and more than 1,500 smaller scale experimental and cross-sectional studies. Many of the longitudinal research sites initiated studies in the early 1980s with kindergarten children before they began their reading instruction and have studied the children over time. Researchers have studied some children for 15 years, with several sites following the youngsters for at least 5 years. Additional research sites have joined within the past 3 years to investigate the effects of different reading instructional programs with kindergarten and 1st grade children. At most research sites, multidisciplinary research teams study cognitive, linguistic, neurobiological, genetic, and instructional factors related to early reading development and reading difficulties.¹

Reading Research and Scientific Tradition

The NICHD reading research has centered on three basic questions: (1) How do children learn to read English (and other languages)? What are the critical skills, abilities, environments, and instructional interactions that foster the fluent reading of text? (2) What skill deficits and environmental factors impede reading development? (3) For which children are which instructional approaches most beneficial, at which stages of reading development? Before summarizing findings related to these questions, I would like to explain the NICHD research process.

First, the NICHD reading research program is rooted in scientific tradition and the scientific method. The program rests on systematic, longitudinal, field-based investigations, cross-sectional studies, and laboratory-based experiments that are publicly verifiable and replicable. Second, the research integrates quantitative and

qualitative methods to increase the richness, impact, and ecological validity of the data. However, using qualitative research methods requires the same scientific rigor employed in quantitative studies. Third, the NICHD reading research program is only one of many programs dedicated to understanding reading development and difficulties. The U.S. Department of Education's Office of Research and Improvement, the Office of Special Education Programs, and the Canadian Research Council have supported many outstanding reading researchers (see Adams 1990 for a research review).

The cumulative work of federally and privately funded researchers illuminates how children develop reading skills, why some children struggle to learn to read, and what can be done to help all readers reach proficiency. Although much remains to be learned, many findings have survived scrutiny, replication, and extension.

The Critical Role of Phonemic Awareness

How do children learn to read English? Reading is the product of decoding and comprehension (Gough et al. 1993). Although this sounds simple, learning to read is much tougher than people think. To learn to decode and read printed English, children must be aware that spoken words are composed of individual sound parts termed phonemes. This is what is meant by phoneme awareness.

Phoneme awareness and phonics are not the same. When educators assess phoneme awareness skills, they ask children to demonstrate knowledge of the sound structure of words without any letters or written words present. For example, "What word would be left if the /k/ sound were taken away from cat?" "What sounds do you hear in the word big?" To assess phonics skills, they ask children to link sounds (phonemes) with letters. Thus, the development of phonics skills depends on the development of phoneme awareness.

Why is phoneme awareness critical in beginning reading, and why is it difficult for some children? Because to read an alphabetic language like English, children must know that written spellings systematically represent spoken sounds. When youngsters figure this out, either on their own or with direct instruction, they have acquired the alphabetic principle. However, if beginning readers have difficulty perceiving the sounds in spoken words--for example, if they cannot "hear" the /at/ sound in fat and cat and perceive that the difference lies in the first sound--they will have difficulty decoding or sounding out new words. In turn, developing reading fluency will be difficult, resulting in poor comprehension, limited learning, and little enjoyment.

We are beginning to understand why many children have difficulty developing phoneme awareness. When we speak to one another, the individual sounds (phonemes) within the words are not consciously heard by the listener. Thus, no one ever receives any "natural" practice understanding that words are composed of smaller, abstract sound units. For example, when one utters the word bag, the ear hears only one sound, not three (as in /b/-/a/-/g/). This is because when bag is spoken, the /a/ and /g/ phonemes are folded into the initial /b/ sound. Thus, the

acoustic information presented to the ears reflects an overlapping bundle of sound, not three discrete sounds. This process ensures rapid, efficient communication. Consider the time it would take to have a conversation if each of the words we uttered were segmented into their underlying sound structure.

However, nature has provided a conundrum here: What is good for the listener is not so good for the beginning reader. Although spoken language is seamless, the beginning reader must detect the seams in speech, unglue the sounds from one another, and learn which sounds (phonemes) go with which letters. We now understand that specific systems in the brain recover sounds from spoken words, and just as in learning any skill; children understand phoneme awareness with different aptitudes and experiences.

Developing Automaticity and Understanding

In the initial stages of reading development, learning phoneme awareness and phonics skills and practicing these skills with texts is critical. Children must also acquire fluency and automaticity in decoding and word recognition. Consider that a reader has only so much attention and memory capacity. If beginning readers read the words in a laborious, inefficient manner, they cannot remember what they read, much less relate the ideas to their background knowledge. Thus, the ultimate goal of reading instruction--for children to understand and enjoy what they read--will not be achieved.

Reading research by NICHD and others reveals that "making meaning" requires more than phoneme awareness, phonics, and reading fluency, although these are necessary skills. Good comprehenders link the ideas presented in print to their own experiences. They have also developed the necessary vocabulary to make sense of the content being read. Good comprehenders have a knack for summarizing, predicting, and clarifying what they have read, and many are adept at asking themselves guide questions to enhance understanding.

Linguistic Gymnastics

Programmatic research over the past 35 years has not supported the view that reading development reflects a natural process--that children learn to read as they learn to speak, through natural exposure to a literate environment. Indeed, researchers have established that certain aspects of learning to read are highly unnatural. Consider the linguistic gymnastics involved in recovering phonemes from speech and applying them to letters and letter patterns. Unlike learning to speak, beginning readers must appreciate consciously what the symbols stand for in the writing system they learn (Liberman 1992).

Unfortunately for beginning readers, written alphabetic symbols are arbitrary and are created differently in different languages to represent spoken language elements that are themselves abstract. If learning to read were natural, there would not exist the substantial number of cultures that have yet to develop a written language,

despite having a rich oral language. And, if learning to read unfolds naturally, why does our literate society have so many youngsters and adults who are illiterate?

Despite strong evidence to the contrary, many educators and researchers maintain the perspective that reading is an almost instinctive, natural process. They believe that explicit instruction in phoneme awareness, phonics, structural analysis, and reading comprehension strategies is unnecessary because oral language skills provide the reader with a meaning-based structure for the decoding and recognition of unfamiliar words (Edelsky et al. 1991, Goodman 1996).

Scientific research, however, simply does not support the claim that context and authentic text are a proxy for decoding skills. To guess the pronunciation of words from context, the context must predict the words. But content words--the most important words for text comprehension--can be predicted from surrounding context only 10 to 20 percent of the time (Gough et al. 1981). Instead, the choice strategy for beginning readers is to decode letters to sounds in an increasingly complete and accurate manner (Adams 1990, Foorman et al. 1998).

Moreover, the view some whole language advocates hold that skilled readers gloss over the text, sampling only parts of words, and examining several lines of print to decode unfamiliar words, is not consistent with available data. Just and Carpenter (1987), among others, have demonstrated consistently that good readers rarely skip over words, and readers gaze directly at most content words. Indeed, in contrast to conventional wisdom, less-skilled readers depend on context for word-recognition. The word recognition processes of skilled readers are so automatic that they do not need to rely on context (Stanovich et al. 1981). Good readers employ context to aid overall comprehension, but not as an aid in the recognition of unfamiliar words. Whether we like it or not, an alphabetic cipher must be deciphered, and this requires robust decoding skills.

The scientific evidence that refutes the idea that learning to read is a natural process is of such magnitude that Stanovich (1994) wrote:

That direct instruction in alphabetic coding facilitates early reading acquisition is one of the most well established conclusions in all of behavioral science. . . . The idea that learning to read is just like learning to speak is accepted by no responsible linguist, psychologist, or cognitive scientist in the research community (pp. 285_286).

Why Some Children Have Difficulties Learning to Read

Good readers are phonemically aware, understand the alphabetic principle, apply these skills in a rapid and fluent manner, possess strong vocabularies and syntactical and grammatical skills, and relate reading to their own experiences. Difficulties in any of these areas can impede reading development. Further, learning to read begins far before children enter formal schooling. Children who have stimulating literacy experiences from birth onward have an edge in vocabulary development,

understanding the goals of reading, and developing an awareness of print and literacy concepts.

Conversely, the children who are most at risk for reading failure enter kindergarten and the elementary grades without these early experiences. Frequently, many poor readers have not consistently engaged in the language play that develops an awareness of sound structure and language patterns. They have limited exposure to bedtime and laptime reading. In short, children raised in poverty, those with limited proficiency in English, those from homes where the parents' reading levels and practices are low, and those with speech, language, and hearing handicaps are at increased risk of reading failure.

However, many children with robust oral language experience, average to above average intelligence, and frequent early interactions with literacy activities also have difficulties learning to read. Why? Programmatic longitudinal research, including research supported by NICHD, clearly indicates that deficits in the development of phoneme awareness skills not only predict difficulties learning to read, but they also have a negative effect on reading acquisition. Whereas phoneme awareness is necessary for adequate reading development, it is not sufficient. Children must also develop phonics concepts and apply these skills fluently in text. Although substantial research supports the importance of phoneme awareness, phonics, and the development of speed and automaticity in reading, we know less about how children develop reading comprehension strategies and semantic and syntactic knowledge. Given that some children with well developed decoding and word-recognition abilities have difficulties understanding what they read, more research in reading comprehension is crucial.

From Research to Practice

Scientific research can inform beginning reading instruction. We know from research that reading is a language-based activity. Reading does not develop naturally, and for many children, specific decoding, word-recognition, and reading comprehension skills must be taught directly and systematically. We have also learned that preschool children benefit significantly from being read to. The evidence suggests strongly that educators can foster reading development by providing kindergarten children with instruction that develops print concepts, familiarity with the purposes of reading and writing, age-appropriate vocabulary and language comprehension skills, and familiarity with the language structure.

Substantial evidence shows that many children in the 1st and 2nd grades and beyond will require explicit instruction to develop the necessary phoneme awareness, phonics, spelling, and reading comprehension skills. But for these children, this will not be sufficient. For youngsters having difficulties learning to read, each of these foundational skills should be taught and integrated into textual reading formats to ensure sufficient levels of fluency, automaticity, and understanding.

Moving Beyond Assumptions

One hopes that scientific research informs beginning reading instruction, but it is not always so. Unfortunately, many teachers and administrators who could benefit from research to guide reading instructional practices do not yet trust the idea that research can inform their teaching. There are many reasons for this lack of faith. As Mary Kennedy (1997) has pointed out, it is difficult for teachers to apply research information when it is of poor quality, lacks authority, is not easily accessible, is communicated in an incomprehensible manner, and is not practical. Moreover, the lack of agreement about reading development and instruction among education leaders does not bode favorably for increasing trust. The burden to produce compelling and practical information lies with reading researchers.

Most great scientific discoveries have come from a willingness and an ability to be wrong. Researchers and teachers could serve our children much better if they had the courage to set aside assumptions when they are not working. What if the assumption that reading is a natural activity, as appealing as it may be, were wrong and not working to help our children read? The fundamental purpose of science is to test our beliefs and intuitions and to tell us where the truth lies. Indeed, the education of our children is too important to be determined by anything but the strongest of objective scientific evidence. Our children deserve nothing less. *

¹ See Fletcher and Lyon (in press) and Lyon and Moats (1997) for reviews of NICHD reading research findings. Contact the author for a complete set of references of published research from all NICHD reading research sites since 1963.

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Constructing Meaning from Print

The ultimate goal of reading instruction, enabling children to understand what they read, appears to be based on several factors. Children who comprehend well, seem to be able to activate their relevant background knowledge when reading—that is, they can relate what is on the page to what they already know. Good comprehenders also must have good vocabularies, since it is extremely difficult to understand something you can not define. Good comprehenders also have a knack for summarizing, predicting, and clarifying what they have read, and they frequently use questions to guide their understanding. Good comprehenders are also good at using sentence structure within the text to enhance their comprehension.

Once children can read the words accurately and fluently, they can begin to construct meaning at two levels. At the first level, literal understanding is achieved. Next, they can begin to guide themselves through text by asking questions like, "Why am I reading this and how does this information relate to my reasons for doing so?", "What is the author's point of view?", "Do I understand what the author is saying and why?", "Is the text internally consistent?" It is this second level of comprehension that leads readers to reflective, purposeful understanding of what they have read.

The development of reading comprehension skills, like the development of phoneme awareness, phonics, and reading fluency, needs to be fostered by highly trained teachers. Research shows that teachers must arrange for opportunities for students to discuss what they have read and explore any difficulties they had when reading. Children's reflections on what they have read can be directly fostered through instruction in comprehension strategies. These sorts of discussions and activities

should be conducted throughout a range of literacy genres, both fiction and nonfiction, and should be a regular component of the language arts curriculum throughout the children's school years.

Other Factors that Influence Learning to Read

Learning to read is a relatively lengthy process that begins very early in development. Children who receive stimulating literacy experiences well before they enter formal schooling appear to have an edge when it comes to vocabulary development, understanding the goals of reading, and developing an awareness of print and literacy concepts. Children who are read to frequently at very young ages become exposed in interesting and exciting ways to the sounds of our language, to the concept of rhyming, to other word and language play activities that serve to provide the foundation for the development of phoneme awareness, and the ability to recognize and discriminate letters. They will have less to learn upon school entry and will be better oriented to the alphabetic principle of how letters and sounds connect.

Ultimately, children's ability to understand what they are reading is inextricably linked to their background knowledge. Very young children who are provided opportunities to learn, think, and talk about new areas of knowledge will gain much from the reading process. With understanding comes the desire to read more and to read frequently, ensuring that reading practice takes place.

Difficulties Learning to Read

Difficulties learning to read result from a combination of factors. In general, children who are most at-risk for reading failure are those who enter school with limited exposure to language and, thus, less prior knowledge of concepts related to phonemic sensitivity, letter knowledge, print awareness, the purposes of reading, and general verbal skills, including vocabulary. Children raised in poverty, youngsters with limited proficiency in English, children with speech and hearing impairments, and children from homes where the parent's reading levels are low are clearly at increased risk of reading failure. Likewise, youngsters with sub-average intellectual capabilities have difficulties learning to read. However, it is very important to note that a substantial number of children from highly literate households and who have been read to by their parents since very early in life also have difficulties learning to read.

Deficits in Phoneme Awareness and Developing the Alphabetic Principle

Difficulty linking letters with sounds is the source of reading problems for many children. Their reading is hesitant and characterized by frequent starts and stops and multiple mispronunciations. If asked about the meaning of what has been read, they frequently have little to say because they take far too long to read the words,

taxing their memory and leaving little energy for remembering and understanding what they have read.

Unfortunately, there is no way to bypass this decoding and word recognition stage of reading. A deficiency in these skills cannot to any meaningful extent be offset by using context to figure out the pronunciation of unknown words. While one learns to read for the fundamental purpose of deriving meaning from print, the key to comprehension starts with the immediate and accurate reading of words. There are some children who can read words accurately and quickly yet do have difficulties comprehending, but they constitute a very small portion of those with reading problems.

If the ability to gain meaning from print is dependent upon fast, accurate, and automatic decoding and word recognition, what factors hinder the acquisition of these basic reading skills? The main culprit appears to be a deficit in phoneme awareness-the understanding that words are made up of sound segments called phonemes. Whether genetic or neurobiological in origin, or whether attributable to a lack of exposure to language patterns and usage during infancy and the preschool years, children who lack phoneme awareness have difficulties linking speech sounds to letters-their decoding skills are labored and weak, resulting in extremely slow reading. This labored access to print renders comprehension nearly impossible.

In studying approximately 10,000 children over the past 15 years, NICHD research has documented the importance of phonemic awareness in the development of phonics skills and fluent and automatic word reading. We have learned that:

1. Phonemic awareness skills assessed in kindergarten and first grade serve as potent predictors of difficulties learning to read. With a test that takes only 15 minutes to administer, we have learned how to measure phonemic awareness skills as early as the beginning of kindergarten, and over the past decade we have refined these tasks so that we can predict with approximately 92 percent accuracy who will have difficulties learning to read.
2. The average cost (including materials) of assessing each child during kindergarten or first grade with the predictive measures is approximately \$10 to \$15.
3. The development of phonemic awareness is a necessary, but not sufficient, condition for learning to read. Children must integrate phonemic skills into the learning of phonics principles, must practice reading so that word recognition is rapid and accurate, and must learn how to actively use comprehension strategies to enhance meaning.
4. Genetics are involved in learning to read, and this knowledge may ultimately contribute to early identification efforts through the assessment of family reading histories. We have also learned that the environment plays a major role in learning to read and that environmental and genetic factors interact in complex ways yet to be fully understood.

5. The brain itself appears to carry out different steps of the reading process. We can now see the actual neural systems used when both good and poor readers try to sound out novel words. Differences between neural patterns in these groups of readers may provide new insights into more precise and effective intervention strategies.
6. Specific teaching methods change reading behavior and changes in the brain appear to emerge as reading develops. As we continue to conduct this type of research, we are hopeful that this information may help us understand how to best tailor specific teaching strategies to individual children.
7. Just as many girls as boys have difficulties learning to read. The conventional wisdom has been that many more boys than girls had such difficulties. Now, females should have equal access to screening and intervention programs.
8. For 85 to 90 percent of poor readers, prevention and early intervention programs that combine instruction in phoneme awareness, phonics, spelling, reading fluency, and reading comprehension strategies provided by well-trained teachers can increase reading skills to average reading levels. However, we have also learned that if we delay early intervention until nine-years-of-age, (the time that most children with reading difficulties first receive services), approximately 75 percent of these children will continue to have difficulties learning to read throughout high school and their adult years. The wasted time and expense of waiting is so enormous compared to what is required to teach them when they are five or six years old.
9. No single method, approach, or philosophy for teaching reading is equally effective for all children. Rather, the key to ensuring that all children reach their potential in learning to read rests with the formal training and experiences that teachers receive in assessing individual differences during preschool, kindergarten, and primary grade years.

Teachers who have in-depth knowledge about reading development and difficulties have a clear understanding of the skills that are critical for learning to read and reading to learn, and have a depth and breadth of knowledge that will allow them to tailor reading programs for those children who do not respond to reading methods selected by state, local, or school authorities are the answer. In short, teacher preparation is the key to teaching our nation's children to read, to learn from reading, and to enjoy reading.

Deficits in Acquiring Reading Comprehension Strategies

Some children encounter obstacles in learning to read because they do not derive meaning from the material that they read. Deficits in reading comprehension are related to: (1) inadequate understanding of the words used in the text; (2) inadequate background knowledge about the context of the text; (3) a lack of familiarity with the semantic and syntactic structures that help predict the relationships between words; (4) a lack of knowledge about different writing conventions (humor, explanation, dialogue, etc.); (5) a deficit in the verbal reasoning

ability which would enable the reader to "read between the lines"; and (6) a lack of the ability to remember verbal information.

If children are not provided early and consistent experiences that are explicitly designed to foster these skills, reading failure will occur no matter how well developed word recognition skills are.

Our current understanding of how to develop many of these critical language and reasoning capabilities related to reading comprehension is not as well developed as the information related to phoneme awareness, phonics, and reading fluency. Our knowledge about the causes and consequences of deficits in syntactical development is sparse. A good deal of excellent research has been conducted on the application of reading comprehension strategies, but our knowledge of how to help children use these strategies in an independent manner and across context is just emerging.

Deficits in Developing and Maintaining the Motivation to Learn to Read

A major factor that limits the amount of improvement children may make in reading is related to motivation. Difficulties in learning to read are very demoralizing to children. In the primary grades, reading constitutes the major portion of academic activities undertaken in classrooms, and children who struggle with reading are quickly noticed by peers and teachers. Although most children enter formal schooling with positive attitudes and expectations for success, those who encounter difficulties learning to read attempt to avoid engaging in reading behavior as early as the middle of the first grade year. It is known that successful reading development is predicated on practice reading, and obviously, the less children practice, the less developed the various reading skills will become.

Deficits in Effectively Preparing Teachers

As evidence mounts that reading difficulties originate in large part from difficulties in developing phoneme awareness, phonics, spelling skills, reading fluency, and reading comprehension strategies, the need for informed instruction for the millions of children with insufficient reading skills is an increasingly urgent problem. Unfortunately several recent studies and surveys of teacher knowledge about reading development and difficulties indicate that many teachers are underprepared to teach reading. Most teachers receive little formal instruction in reading development and disorders during either undergraduate and/or graduate studies, with the average teacher completing only two reading courses. Surveys of teachers taking these courses consistently show that very few have ever observed professors demonstrating instructional reading methods with children. They also report that their course work is largely unrelated to actual teaching practices, that the theories they learn are rarely linked to the actual instruction of children, and that the supervision of student teaching and practicum experiences is frequently lacking in consistency and depth.

At present, motivated teachers are often left on their own to obtain specific skills in teaching reading by seeking out workshops or specialized instructional manuals. Many teachers report that they are tied to "packaged" reading programs, regardless of the quality of the programs or their usefulness for all children, because they do not understand the reading process well enough to augment the programs or to select different instructional strategies for different children. As we survey teachers' perceptions of their preparation, we find consistently that they are "method-driven" rather than conceptually prepared to teach the range of skills required to learn to read.

Clearly, teachers of youngsters who display reading difficulties should be thoroughly trained to assess and identify problem readers at early ages and be well versed in understanding the conditions that must be present for these children to become efficient readers. Unfortunately, many teachers and administrators have been caught between conflicting schools of thought about how to teach reading and how to help students who are not progressing. They are limited by a "one size fits all" philosophy that emphasizes either a "whole language" or "phonics" orientation to instruction. This parochial type of preparation places many children at continued risk for reading failure since it is well established that no reading program should be without all the major components of reading instruction (phoneme awareness, phonics, spelling, fluency, and reading comprehension). The real question is, "which children need what, when, for how long, with what type of instruction, and in what type of setting?"

It is hard to find disagreement in the educational community that the direction and fabric of teacher education programs in language arts and reading must change. However, bringing about such change will be difficult. How teaching competencies and certification requirements are developed and implemented will have to become more thoughtful and systematic. In many states, the certification offices within state departments of education do not maintain formal and collaborative relationships with academic departments within colleges of education. Thus, the requirements that a student may be expected to satisfy for a college degree may bear little relationship to the requirements for a teaching certificate. Even more alarming, many of the requirements are not based upon the best research related to reading development and disorders. Fundamental changes must occur in the type and depth of knowledge that teachers have if we are to ensure literacy for all.

How Can We Help Children To Learn?

Learning to read is a lengthy and difficult process for many children, and success in learning to read is based in large part on developing language and literacy-related skills very early in life.

A massive effort needs to be undertaken to inform parents, and the educational and medical communities, of the need to involve children in reading from the first days of life; to engage children in playing with language through nursery rhymes, storybooks, and writing activities; and, as early as possible, to bring to children

experiences that help them understand the purposes of reading, and the wonder and joy that can be derived from it. Parents must become intimately aware of the importance of vocabulary development and the use of verbal interactions with their youngsters to enhance grammar, syntax, and verbal reasoning.

Young preschool children should be encouraged to learn the letters of the alphabet, to discriminate letters from one another, to print letters, and to attempt to spell words that they hear. By introducing young children to print, their exposure to the purposes of reading and writing will increase and their knowledge of the conventions of print and their awareness of print concepts will increase.

Reading out loud to children is a proven activity for developing vocabulary growth and language expansion, and plays a causal role in developing both receptive and expressive language capabilities. Reading out loud can also be used to enhance children's background knowledge of new concepts that may appear in both oral and written language. However, we must have a clear understanding that reading aloud to children is a necessary, but not sufficient means to teaching reading skills. Again, the ability to read requires a number of skills that, in most children, must be developed via direct and informed instruction provided by properly prepared teachers.

Kindergarten programs should be designed so that all children will develop the prerequisite phonological, vocabulary, and early reading skills necessary for success in the first grade. Children should acquire the ability to recognize and print both upper and lowercase letters with reasonable ease and accuracy, develop familiarity with the basic purposes and mechanisms of reading and writing, and develop age-appropriate language comprehension skills.

Beginning reading programs should allot sufficient instructional time to the teaching of phonemic awareness skills, phonics skills, the development of spelling and orthographic skills, the development of reading fluency and automaticity, and the development of reading comprehension strategies. All of these components of reading are necessary, but not sufficient, in, and of, themselves. For children demonstrating difficulty in learning to read it is imperative that each of these components be taught in an integrated context and that ample practice in reading familiar material be afforded.

A major impediment to serving the needs of children demonstrating difficulties learning to read is current teacher preparation practices. Many teachers lack basic knowledge and understanding of reading development and the nature of reading difficulties. Major efforts should be undertaken to ensure that colleges of education possess the expertise and commitment to foster expertise in teachers at both pre-service and in-service levels. Strong competency-based training programs with formal board certification for teachers of reading should be developed.

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