The Science of Reading: A Handbook

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PART VII

Teaching Reading

Chapter 26

Teaching Children to Read: What Do We Know about How to Do It?

Catherine E. Snow and Connie Juel

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Editorial Part VII

Undoubtedly the most important application for The Science of Reading, is to reading instruction. If we understand how people read, and how this skill develops, this will certainly have important implications for how best to teach people to read. Though it is common to talk about reading development (cf. language development, motor development, or perceptual development), it is important to remember that reading is a skill that is culturally determined, and above all else, a skill that is directly taught at school. Indeed, in much of the English-speaking world, learning to read is seen as one of the most important attainments of the first several years of formal education.

The two chapters in Part VII deal with the teaching of reading. Snow and Juel give an overview of current knowledge about how best to teach children to read. As they point out, historically the major methods for teaching reading have been around for at least a century, and disputes about how best to teach reading have focused on two issues. First, the size of unit that should be used to teach children the rules of reading (large units [words] or small units [letter-sound correspondences]). Second, the extent to which explicit instruction is needed (does reading have to be taught, or will it be caught, given adequate exposure). Based on a thorough review of the evidence, Snow and Juel come down firmly in favour of the need to teach children explicitly about letter-sound correspondences in reading, but while not forgetting about the importance of reading for meaning. They also emphasize, however, the considerable evidence showing that the quality of teaching has a larger effect on children's reading skills than the nature of the curriculum that is followed. So simply prescribing an evidence-based approach to teaching reading is far from enough – how such an approach is implemented, by teachers in the classroom, is critical.

The importance of good teaching appears to be much more critical for children with dyslexia than for children whose cognitive skills make them well prepared to learn to read. Torgesen reviews studies that have attempted to remediate the reading difficulties of children with dyslexia. These children have severe and specific difficulties in learning to rec-

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ognize words accurately and quickly. The studies reviewed in this chapter document that it is possible, using explicit instruction in phonemic awareness and phonemically based decoding strategies, to bring about large improvements in reading accuracy in children with dyslexia; but intensive and highly expert teaching will be necessary. It also appears that improving reading fluency in such children may be more difficult to accomplish, and that this, in turn, may be critically dependent upon extensive practice.

In summary, the two chapters in Part VII demonstrate some of the practical fruits of The Science of Reading. We now know a great deal about how to teach reading to typically developing children, and how best to help children with dyslexia to overcome their difficulties. A major practical challenge is how to put such hard-won knowledge into practice – many policy issues regarding how best to make these advances widely available to the children who need them remain to be solved.

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Teaching Children to Read: What Do We Know about How to Do It?

Catherine E. Snow and Connie Juel

Many of the chapters in this volume focus on literacy development. Typically they discuss the complexities of learning to read: the problem of the alphabetic principle, which requires learning how to segment speech into sounds represented by graphemes; the problem of English orthography, which requires going beyond simple phoneme–grapheme links to represent the morphemic, historical, and etymological information preserved in the writing system; and the problem of comprehension, which requires building a representation of textual and situational information. In contrast, this chapter considers the issue of literacy pedagogy: what constitutes good teaching and curriculum in the domain of literacy?

Of necessity our focus is limited to the English-speaking world, and within that largely to the US. Issues of reading pedagogy are delightfully minimized in many parts of the world. In Korea, for instance, educators worry little about reading pedagogy, as the Korean alphabetic system is rarely a source of learner difficulties. In Japan, where "lesson study" absorbs considerable time and energy among teachers (Stigler & Hiebert, 1999), the lessons studied are all mathematical. Literacy lessons in Japan are not seen as problematic.

In the US and the UK, on the other hand, the initial teaching of reading is a major source of worry and the focus of attention from many directions. In the US, primary grade teachers commit the bulk of their serious teaching time to reading; many of the comprehensive school reform plans prescribe a 90- to 150-minute literacy block. In the UK, each child receives one hour of literacy instruction each day through the elementary grades (Department for Education and Employment, 1998). Textbook publishers, curriculum developers, and purveyors of professional development also devote enormous amounts of time, attention, and resources to early reading, and of course reap even more enormous benefits from their investments.

In this chapter, we attempt to explain why issues around reading pedagogy have attracted so much time and attention in the English-speaking world. We offer a brief his-

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torical orientation to the teaching of reading, highlighting the nineteenth century antecedents of the various positions staked out in current controversies about teaching methods. We then summarize the curricular recommendations that have achieved consensus at the beginning of the twenty-first century, and some of the challenges to turning research directly into improved practices.

Controversies about Teaching Reading

History of the reading skirmishes

There has been a long history of conflict about the best way to teach English-speaking children how to read and write. In 1908, for example, E. B. Huey in his book *The psychology and pedagogy of reading* started the section on pedagogy with the following sentence: "The methods of learning to read that are in common use to-day may be classed as alphabetic, phonic, phonetic, word, sentence, and combination methods" (Huey 1908/1979, p. 265).

He went on to describe these different methods, noting that the alphabetic method (focusing on teaching letter names and letter recognition) was "now chiefly of historical interest." The various phonic and phonetic methods Huey reviewed typically addressed the issue of orthographic depth by introducing adapted alphabets in which different sounds represented by a single letter were differentiated using diacritics, invented symbols, or alternative spellings.

One of the most popular phonic series in the late 1800s was the McGuffey readers. A lesson began with a review of words that contained taught letter sounds and an introduction to new letter sounds. By the third lesson, "short a" is already being reviewed along with some previously taught consonants in common phonograms, and the letter *f* is introduced. Children see, with a diacritical mark over the *a*, indicating it is short, and a line through the *c*, indicating it should be pronounced as /k/, the words *Nat*, *hat*, *fan*, and *can*. They then read the text:

> Ann and Nat.
> Ann has a fan.
> Nat has a hat.
> Ann can fan Nat. (McGuffey, 1879)

One method that incorporated no novel symbols was described by Huey as "purely phonic, almost arrogantly so." Pollard's *Synthetic method of reading and spelling* (n. d.) offered techniques highly reminiscent of some used today to create vivid memories of letter-sound associations; /h/, for example, is introduced as a "pant" and the child is instructed "you may think little *h* is the picture of the chair Bess sits in when she is very tired. As she sits down she breathes very hard, *h*, *h*, *h*." Further information in Pollard's narrative introduction of letter sounds prefigures the Lindamood-Bell articulatory techniques (Lindamood & Lindamood, 1998) as well:

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> There are pigeons in the barn, mama. What letter stands for the sound they make?
> This one: d = D. It is a sound made by young pigeons. . . .
> This sound presses the tongue up, near its point, a little harder than *n*. Try the two together, *n*, *d*, *n*, *d*.

Early dissenters to these popular approaches voiced concern about the potential for boredom in such texts, and the inappropriateness of turning children into "little phoneticians." The force of science was also raised in objection. Both gestalt psychology/philosophy and scientific experiments were considered to refute phonic methods. In 1842 the renowned educator Horace Mann wrote:

> When we wish to give to a child the idea of a new animal, we do not present successively the different parts of it – an eye, an ear, the nose, the mouth, the body, or a leg; but we present the whole animal as one object. And this would be still more necessary if the individual parts of the animal with which the child had labored long and hard to become acquainted, were liable to change their natures as soon as they were brought into juxtaposition, as almost all the letters do when combined in words. (Cited in Mathews, 1966, p. 80)

This holistic view foreshadows that later espoused by Frank Smith (1973), who argued that readers do not identify individual letters in words. Rather, the printed gestalt functions like a Chinese logogram. In Smith's words, "we can read as efficiently as most of us do only because we treat our written language as if it were ideographic" (p. 118). As such, of course, it would be foolish to teach children phonics. "Readers do not use (and do not need to use) the alphabetic principle of decoding to sound in order to learn or identify words" (p. 105).

The gestalt view was buttressed by the first scientific experiments on word recognition, conducted by James McKeen Cattell (1886). In Cattell's classic experiment, subjects were briefly exposed to words or letters and asked to report what they saw. Subjects were better reporting words than even single letters! Cattell concluded, "We do not therefore perceive separately the letters of which a word is composed, but [rather we perceive] the word as a whole" (Cattell, 1886, p. 74). Cattell's *word superiority effect* was ignored during the early twentieth century, but engendered renewed investigation in the 1960s and 1970s. In general the finding was replicated (Reicher, 1969). Later technical advances in eye-movement tracking and computer simulations would challenge Cattell's interpretation – that processing is too fast for readers to process every letter in a word. Today we know that readers do indeed routinely process every letter in every word, but they do so by parallel processing of letter groups. Processing of letters within words can be enhanced by knowledge of orthographic patterns; this is why pseudowords are also apprehended more readily than single letters. (See Lupker, this volume, for a review of this research.). But in the late nineteenth century, before such interpretations were available, the word superiority effect contributed to dooming the phonic readers by undermining their foundation in science.

The whole-word method, which Huey described as in general use but almost always in combination with other approaches, was clearly visible in the curricular materials of the early twentieth century. Sometimes popular texts such as nursery rhymes, poems,

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songs, and folktales were read. Other times texts were created that emphasized the repetition of phrases and words, as in this play designed to be read at the beginning of first grade in the Silver Burdett series:

The Apple Man
The Girl
The Apple Man is coming
down the street!
The Apple Man is coming
down the street!
The Boy
The Apple Man is coming
down the street!
The Apple Man is coming
down the street!
The Apple Man is coming!
The Apple Man is coming! (Coleman, Uhl, & Hosic, 1925)

Phrase and sentence repetition were sometimes reduced to an emphasis on repetition of what were thought to be high-frequency words. The whole-word method reached its zenith with texts like those in the Scott Foresman series:

Oh, Father.
See Spot.
Look, Father, look.
See Spot play.
Oh, oh, oh. (Robinson, Monroe, & Artley, 1946).

The Scott Foresman series dominated the reading field for decades, just as the McGuffey readers had a half-century before.

The sentence method relied on child-generated sentences about a topic or a picture, transcribed by the teacher on the board, and used as the text in teaching reading. Cited advantages of this method were the interest and motivation it generated, and its use of natural, childlike language structures, in sharp contrast, in Huey's view, to the unnatural, boring, and meaningless sentences found in phonics primers, which he decried as "sentence-hash." The sentence method shares much with initial literacy methods still in use, for example, the Language Experience approach in which teachers transcribe child utterances, typically recording a shared experience or the outcome of a group discussion. The text, made up of accumulated child sentences, transcribed by the teacher, then becomes the source of lessons about letter-sound correspondence.

From Huey we learn that all the various approaches to teaching reading current today had been developed by 1870, and that complaints standard today about quality of the texts used in teaching reading and about effectiveness of instruction were voiced in response to every reform of reading methods. Huey avoided endorsing specific methods by recommending as the best model for classroom reading pedagogy the activities of the literate household, in which encounters with print were frequent and always meaningful.

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Nature of the conflict

The conflict about how to teach reading, in its various specific forms at different historical moments, has always centered around two major issues: Using what unit of language should the rules of reading and writing be taught? And to what degree can we trust children to induce an adequate understanding of the system themselves, without explicit instruction about its character?

Although these two issues are in principle independent of one another, in fact the positions pedagogical theorists have adopted on the two questions are highly correlated. Theorists who have argued for a focus on large, meaningful units in teaching reading have also argued that children can rely on induction to a very large degree – that the processes of learning to read are, in Byrne's (this volume) terms *learner dependent*. In contrast, theorists who have argued for a focus on small, analytic, meaningless units have also in general argued that children need a fairly structured and teacher-supported introduction to reading – Byrne's *environment-dependent* process. Ironically, though, those who express the greatest faith in children's capacity to induce the rules for translating print into language relatively autonomously have also become identified with the movement to professionalize teaching and to honor practitioner knowledge (Adams and Bruck, 1993; see e.g. Goodman, 1965, 1993), whereas insistence on the need for a substantial role for the teacher in providing instruction has often been paired with techniques (e.g., scripting of lessons, prescriptiveness about sequencing of topics, and time use) that take control out of the hands of teachers.

Interestingly, the rationales offered by those taking directly opposing positions on the issue of unit size have been remarkably similar. Those who prefer direct teaching of analytic units, that is, how letters represent sounds, invoke the complexity of English orthography, and the resultant difficulty of using processes of induction to arrive at an understanding of the alphabetic principle as it applies to English. Those who, on the other hand, promote rich exposure to and involvement with literate representations of meaningful units argue that the orthographic system of English is too complicated to teach directly. It would require, it is argued, too many rules and too many exceptions, so it is better to let children just figure it out, as they do (it is claimed) for oral language. In both cases, orthographic depth is the villain of the piece.

In the 1800s, and continuing well into the twentieth century, adapted alphabets were expected to solve the problem of orthographic depth. By rendering the orthography "regular," it was expected that children would more readily grasp the alphabetic principle. EVNING HIM, from the *Furst Fonetic Redur*, begins: *Jizos, ten'der Shep'erd* (Longley, 1852). About a hundred years later, the Initial Teaching Alphabet (Masurkiewicz & Tanyzer, 1963) included texts like the one presented in figure 26.1. These adapted alphabets, however, never gained general popularity. Their failure to survive has cast the burden back onto the shoulders of either the teaching (teacher, curriculum, method) or the child learner, depending on one's view of the basic conflict.

Phonics programs put the burden on curriculum. The active child learner was seen as central in whole-language approaches (Smith, 1973). Contextual knowledge was invoked as the key predictor of good reading, because it helped readers cope with difficult English orthography, and because reading development was seen as just like language develop-

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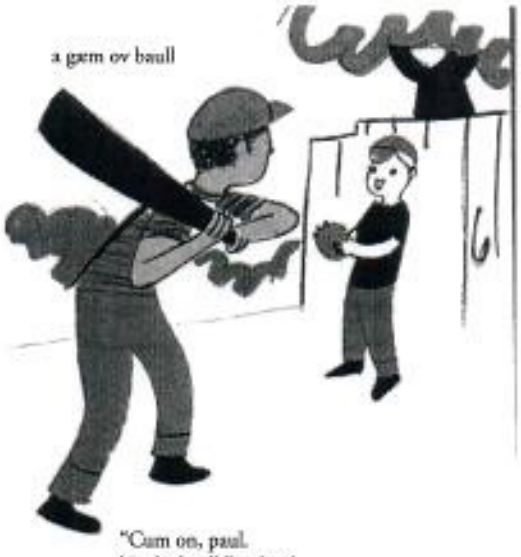

Figure 26.1 A page from ⟨Early-to-read: i/t/a/program⟩, an adapted-alphabet reader by Masurkiewicz and Tanyzer (1963).

ment – a natural process. Smith (1971, 1973, 1978) and Goodman (1967, 1968) saw readers as actively predicting their way through text. The reader formed guesses about upcoming content/words based on knowledge of the meaning of a text. The reader sampled sparsely from orthographic information to confirm such predictions. "Skill in reading involves not greater precision, but more accurate first guesses based on better sampling techniques, greater control over language structure, broadened experiences and increased conceptual development" (Goodman, 1976, p. 504). Smith clearly minimized the role that orthographic information played in reading:

> The more difficulty a reader has with reading, the more he relies on the visual information; this statement applies to both the fluent reader and the beginner. In each case, the cause of the difficulty is inability to make full use of syntactic and semantic redundancy, of nonvisual sources of information. (1971, p. 221)

Two views of Goodman and Smith in particular had a tremendous influence on the teaching of reading: that readers used multiple cueing systems, and that novice and expert readers processed text similarly.

The reader was presumed to use multiple cues in normal word recognition. The cues provided by context, that is, by semantics and syntax, were considered as helpful as those provided by orthography (see Adams, 1998, for a history of the cueing notion). Generations of teachers were trained to do "miscue" analysis: a rather elaborate classification of

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reader's oral reading errors into syntactic, semantic, and visual/graphic-based causes. For example, reading "big" for "large" is a semantic-based miscue, indicating understanding. The extension of this notion was that teachers would encourage children to make best guesses in reading based on meaning, even covering up words with tape or their fingers to promote thinking about meaning and guessing the word. Looking at the spelling was the last resource.

Early on the multiple cuing systems approach was questioned by reading researchers, for example Charles Perfetti:

> The main failing of this approach [Goodman's 1968 "psycholinguistic guessing game"] is that it does not recognize that one of the "cueing systems" is more central than the others. A child who learns the code has knowledge that can enable him to read no matter how the semantic, syntactic, and pragmatic cues might conspire against him. No matter how helpful they are to reading, these cues are not really a substitute for the ability to identify a word. (1985, p. 239)

There is now abundant evidence that the prediction model of reading is incorrect. Eye-movement studies indicate skilled readers do not use context to reduce processing of graphic information (see Rayner, this volume). Numerous studies in the 1980s indicated use of context for word identification is both inefficient and minimally useful. At best, for example, adult readers can accurately predict one out of four words in text, and the most accurate predictions are of function words (Gough, Alford, & Holley-Wilcox, 1981). Skilled readers can only accurately predict one in ten content words, and predicting words takes longer than just looking at the word (Gough, 1983).

The second notion that took hold was that beginning readers and skilled readers used the same processes in reading (Goodman & Goodman, 1979; see discussion in Juel, 1991). That is, good readers differ from poor readers primarily in better prediction-making skills, and increased knowledge of the world and of language. All views of reading would agree this is true for comprehension; the "psycholinguistic guessing game" described it as true of word reading. The better reader used syntactic and semantic information to form hypotheses about the content of text, with minimal orthographic input. Language-rich texts promote better readers because they promote better predictions. The whole-language movement blossomed, with the emphasis on authentic children's literature and the minimizing of phonics or phonics-influenced texts.

We now have reams of studies that show that good and poor readers differ not in the use of context to make better predictions, but in the swift and efficient identification of words (see chapters by Perfetti et al., and Vellutino & Fletcher, this volume). Nonetheless, until recently, this research and its message had not reached classrooms. Rather, it was the "psycholinguistic guessing game" model that held sway. Its power among practitioners no doubt derived in part from its admirable insistence on teacher professionalism and teacher autonomy, in contrast to many phonics methods, which impose curricular control. Furthermore, there is no doubt that the rich and varied literacy materials whole-language teachers relied on were more attractive and engaging than phonics texts, with their controlled vocabulary and often-insipid language. Furthermore, whole-language practitioners would argue that they do teach letter-sound correspondence – when needed

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and appropriate, embedded in meaningful encounters with texts. Two questions remained: whether such unsystematic methods were adequate to ensure all children learned the alphabetic principle, and whether all teachers were well enough prepared to design their own methods for letter-sound teaching.

The Introduction of Science and Orthodoxy into Pedagogical Decision Making

Ironies in the history of the conflicts about teaching reading abound. The irony in the US is that, in the face of unprecedented commitments to improving reading outcomes and a rich research basis for improving pedagogy, political forces are playing such a large role in determining how children are taught. The political forces involved, though no doubt well-intentioned, force oversimplifications and orthodoxies into a system that is trying to present itself as research-based.

Key publications on reading instruction

Efforts to systematize what the research base can tell us about improving reading outcomes have occurred regularly since the mid-1960s. In 1966, Mitford Mathews published a book called *Teaching to read*, in which he took an historical perspective on the long-standing controversies about methods for teaching reading. Mathews recounted the historical alliance between the preference for using larger units and progressive education, an association rooted in the personal relationship between Colonel Francis Parker, an extremely effective proponent of the whole-word method, and John Dewey. Though his book was primarily historical, Mathews's concluding chapter reviewed the then contemporary research on the relative effectiveness of various reading methods. He concluded unequivocally that early attention to letters and sounds was much more productive than an exclusive focus on larger units in teaching children to read.

Two landmark events happened in 1967. The Cooperative Research Program in First Grade Reading Instruction published its first comprehensive report (Bond & Dijkstra, 1967) and Jeanne Chall first published a report written for the Carnegie Corporation of New York, called *Learning to read: The great debate*. The so-called First Grade Studies compared the basal programs of the era – programs all characterized by controlled vocabulary, teaching sight words first, and a relatively casual treatment of phonics – with five enhancements to basals. The Bond and Dijkstra report concluded that, in general, the basal-plus methods performed better than the basal-only programs, and that letter knowledge at first-grade entry was the best predictor of word reading outcomes. The results were complex, though, and actual outcomes varied enormously across sites and classrooms.

Chall's report comprised an interpretive review of the literature on various reading methods and their effectiveness, information collected from authors and publishers of

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reading curricula about their sources of information, and an analysis of the content of widely used reading programs. The debate focused on in the first edition of the report was that between whole-word and phonics methods, which was raging in those decades. In a sense, then, Chall's 1967 book was the academic version of Rudolf Flesch's enormously popular and influential 1955 treatise *Why Johnny can't read*.

By 1983, when the second and updated edition of Chall's *The great debate* appeared, whole-language methods had risen to occupy the large-unit learner-dependent pole of the debate – signaling an important change in reading methods, and the decline of word-based methods. Chall's updated introduction to the 1983 edition made clear her view that an explicit focus on the alphabetic principle early in the process of teaching reading was to be preferred over any method that endorsed meaning over code. She also challenged the proponents of the then relatively new whole-language methods to provide comparative studies showing their methods produced better reading outcomes than code-focused methods.

In 1990 Marilyn Adams wrote *Beginning to read*, a comprehensive review of cognitive and psycholinguistic, as well as instructional, research about reading. Adams's research led her to conclusions identical to Mathews's and Chall's concerning the importance of early and explicit exposure to the alphabetic code in the successful acquisition of reading. Both Chall's and Adams's volumes had considerable influence (in fact, in the 1983 edition Chall documented changes in reading curricula that she attributed to the impact of the 1967 report), but practices in the field of reading instruction continued to be influenced by eclecticism more than by science. Furthermore, since one of the consequences of strictly phonics-based programs is the wide use in early instruction of relatively boring, strictly controlled, texts, programs using more attractive and authentic texts maintained their appeal. In fact, in 1996 Chall published a third edition documenting the decline of attention to phonics in newly published reading curricula.

Thus, conflicts about the best methods for teaching reading continued to rage, but gained greater urgency as worries about standards increased worldwide towards the end of the twentieth century.

Preventing reading difficulties

In 1995 the National Research Council (NRC) established a committee to write a report on the topic of Preventing Reading Difficulties in Young Children. It was felt that a report produced through the consensus process intrinsic to a committee-authored product, and that had gone through rigorous review overseen by the National Academies, might have more influence on practice than individually authored volumes. The charge to the Committee on Preventing Reading Difficulties went beyond answering questions about reading instruction. Reading was implicitly defined as an expectable outcome for children in a rich, highly literate, country with universal schooling. Thus, a public health, rather than a purely educational, perspective was adopted, a perspective that dictated identifying the sources of reading difficulties in order to guide the direction of resources to those placed at the highest risk of failure. Furthermore, a developmental perspective that

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placed the beginning of reading well before first exposure to formal instruction was endorsed, acknowledging the huge body of work showing relationships between preschool accomplishments (letter knowledge, phonological awareness, vocabulary, familiarity with the functions of written language) and later reading success (see Bowey, this volume). Research on the characteristics of skilled reading was also reviewed, as a guide to the components of effective instruction.

The NRC report (1998) included a wide array of recommendations, of which only a small subset were directed to issues of reading instruction. These instructional recommendations addressed the mechanics of reading (providing practice with letters and sounds in kindergarten, providing explicit instruction and practice with spelling-sound correspondences in first grade, teaching children strategies for focusing on print in identifying unknown words in later grades, assessing word reading accuracy and fluency regularly), comprehension (building linguistic and conceptual knowledge orally from kindergarten on, including explicit instruction on comprehension strategies either during reading aloud or student reading, and assessing both conceptual knowledge and comprehension strategy use regularly), writing (encouraging the use of invented spelling to promote both phonological awareness and writing for communication, teaching spelling explicitly and holding children accountable for correct spelling of taught words, requiring daily writing), as well as reading practices and motivation (providing daily opportunities for reading a self-selected text at an appropriate level, providing opportunities for daily assisted or supported reading, and promoting independent reading).

These instructional recommendations were endorsed by the International Reading Association, which interpreted them as consonant with their commitment to balanced reading instruction, and were simultaneously dismissed by others who characterized them as *wishy-washy*. To clarify the instructional implications, thus, the preface to the third printing of the NRC report made the following explicit statement:

> The committee's position has often been presented as one endorsing "balance" or "some phonics and some whole language." "Balance" is not the right metaphor to carry our message, and we certainly did not suggest an approach that involved "a little of this and a little of that." "Balance" could mean splitting one's time evenly across activities designed to practice the alphabetic principle and activities designed to support comprehension. "Integration" means precisely that these opportunities to learn these two aspects of skilled reading should be going on at the same time, in the context of the same activities, and that the choice of instructional activities should be part of an overall, coherent approach to supporting literacy development, not a haphazard selection from unrelated, though varied, activities. (1998, pp. vii–viii)

This kind of integration is, of course, no easy task. It is clearly much easier to select ten phonics activities followed by ten comprehension activities; and, overall, for the beginning reader, this "balance" is likely better than 0 of one and 20 of the other. But there are at least two compelling reasons brought to us by research for striving for integration: (1) much is required to "learn" a word, and (2) coherent approaches to literacy development must take into consideration a particular child's literacy skills.

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"Learning" a word

Most researchers would argue that the development of detailed orthographic representations is vital to the automatization of word recognition. On the road to fully specified orthographic representations, the beginner slowly "amalgamates" information (see Ehri, this volume). So, the child with limited orthographic knowledge may link letter names to their phonological cues and recall *bee* because of the letter name for *b* or *e*. The word "moon" may be recalled because it has two moons in the middle of it, or is on the page with the picture of the moon, or simply because its first letter, *m*, is recalled with the knowledge that a few letters come after it. As long as the meaning of the word is known, then what may be amalgamated at first to get meaning is something like "the letter 'm' on a certain page signals a lunar sphere." And, the child will say *moon* when approximating its location on the page. Incomplete orthographic information will likely not enable the recognition of the printed "moon" in another book and may yield the spelling of "moon" as simply *m* in a child's early writing. But with the aid of knowledge of the letter-sound connection *m* to /m/, and other connections, as well as having read enough text to see *soon* and *moo* and *boo* and *moon* several more times, a complete orthographic representation of "moon" will be established. That orthographic representation then also becomes a resource for reading other words – *noon*, *loon*, *loom*, *vroom*, and so on. It also becomes a resource, though perhaps not a perfect one, in reading *good*, *stood*, and *look*.

Many phonics programs try to help children by actually teaching the "two" sounds of *oo*. The 1963 Lippincott first-grade reader, for example, instructs children about the "long and the short *oo*," then presents a text about *Ronny Hooper's encounter with Hoot Tooter, the Oogle-Google Goblin* (McCracken & Walcutt, 1963). The lengthy and language-rich (if slightly unconvincing) story goes on to state that *Hoot* lived in *Ronny Hooper's* drain because their names shared oo's. Some children may need such explicit instruction, but many probably do not. Once children have read words like "too," "boo," and "moon" often enough, they may be operating with both complete orthographic information about specific words (like *moon*), and/or enough generalized knowledge of orthography (e.g., *oo*) to be able to apply it to novel words like *gloom*, to pseudowords like *oogle*, and to words with slightly different vowels like *shook*.

The Lippincott phonics program was distinguished from most others by its very heavy vocabulary load and use of relatively sophisticated words (Chall, 1967). In this it differed from most phonics approaches, which used simpler vocabulary on the assumption that "sounding out" would enable a child to retrieve words already in their oral vocabularies. The assumption that first graders all know a particular list of words, though, is clearly wrong. Many children come to school with limited oral vocabularies – not just non-native speakers of English entering reading instruction with only a few dozen English vocabulary words at their disposal, but also children like those in the lowest income group studied by Hart and Risley (1995b). Their "word poverty" (Moats, 2001) is precisely why an integrated approach is so needed for many children. In this respect, we concur with Gough's statement:

> I conclude that Goodman is dead wrong about what separates the skilled adult from the beginning reader, and hence about what must be accomplished in reading acquisition. The

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> most conspicuous difference between good and poor readers is found in the swift and accurate recognition of individual words, in decoding, and the mastery of this skill is at the heart of reading acquisition (cf. Gough & Hillinger, 1980). But it should not be inferred from this that I completely disagree with Goodman's views on reading instruction. I believe that Goodman's insistence on reading for meaning is exactly right. Our problem is to find a way to teach the child to decode while doing just that. (1981, p. 95)

Individualizing instruction

The second argument for integration in early reading instruction is that children bring different knowledge and abilities to a classroom (Byrne, this volume). Some children may have extensive oral vocabularies and just need help with decoding, such as that provided in phonics. Some children may not have sufficiently developed phonological awareness to benefit from phonics unless that instruction includes specific attention to elongating phonemes and to blending them together. Some very unfortunate children may have such difficulty with phonemic awareness they cannot profit from phonics unless it is highly individualized or, perhaps, at all (see Torgesen, this volume). Some children may have limited ability to generalize; they may need the "oo" instruction or multiple, extensive exposures to short vowel sounds. Other children will quickly induce the orthography and their learning curve will accelerate so that each new spelling-sound pattern is learned more quickly than the last. Byrne (this volume) clearly explicates this point of view when he says there are really many theories of learning to read, not just one. Of course, these many requirements – knowing what children need to learn, assessing children's skills across those various domains, and knowing what to do for those lagging in one or more domains – all require very high levels of teacher knowledge.

National reading panel report

Shortly before the publication of the NRC committee report in 1998, a panel of researchers, practitioners, and parents was invited by the National Institute of Child Health and Human Development to carry out a review of the literature focused specifically on the issue of effective reading pedagogy. This second group, called the National Reading Panel (NRP), reviewed experimental and quasi-experimental literature only, and conducted a quantitative meta-analysis for domains where enough studies were found. The criteria established by the NRP for its literature review emphasized domains that were easily subject to intervention studies. Random assignment studies of entire literacy programs or curricula are very difficult to carry out, so such studies have been infrequent. But it is rather easy to introduce a phonological awareness or vocabulary intervention into a classroom, or to add the teaching of comprehension strategies to ongoing literacy instruction. Thus, the literature available to the NRP for review addresses some aspects of literacy instruction more satisfactorily than others (as the lists of gaps and unaddressed research questions included in the report itself richly acknowledge).

The NRP (2000) found a basis in research findings for endorsing instruction in five areas: phonological awareness, phonics, fluency, vocabulary, and comprehension strate-

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gies. At the first level, the recommendations were simply to attend to these five areas in reading instruction. For some of the domains, though, it was possible to make somewhat more specific recommendations about the type or appropriate length of such instruction. In the domain of phonological awareness, for example, the literature reviewed suggested that instruction was most effective before second grade, that 5–20 hours total instruction had the maximum effect, that focusing on a few phonological awareness skills was better than trying to cover them all, and that linking phonological awareness instruction to letters made it more effective. The literature on early code teaching reviewed suggested that systematic instruction in phonics was more effective than allowing children to induce letter-sound relationships, but did not support the recommendation of one particular approach to teaching letter-sound relationships over any other. For example, there was no evidence that working with the smallest analytic units (phonemes) was better than working with slightly larger analytic units (onset-rime), or that synthetic approaches (focusing on blending) were better than analytic approaches (focusing on word families). In the domain of fluency, evidence was found to support the effectiveness of oral guided reading, though the research base was insufficient to draw any conclusions about the value of sustained silent reading. In support of comprehension, the recommendations included paying attention to both explicit and implicit teaching of vocabulary, using read-alouds and student independent reading to promote opportunities for vocabulary growth, and ensuring repeated exposures to target vocabulary items. In addition, specific support was found for the use of seven comprehension strategies: comprehension monitoring, cooperative learning, graphic and semantic organizers, question answering, question generation, and summarization. On the other hand, there are not recommendations for exactly when, how, or how long any of these comprehension supports should be taught.

Given these fairly nonspecific conclusions from the NRP report, it is not surprising that all the major American publishers of reading curricula found it possible within a few months of the report's appearance to advertise that their products addressed all five "research based" instructional domains. Comparison across various programs reveals considerable variety in how such components as phonics instruction, vocabulary instruction, or strategy instruction are actually implemented, but every publisher has introduced these topics as headings in student workbooks, in teacher manuals, and in their scope and sequence charts. Some of the curriculum overviews seem to suggest that these five components added together constitute their instructional program. In fact, as is well attested in the prose of the full NRP report and in the interpretations of the report provided by the Partnership for Reading, a collaboration including the US Department of Education (2001), these five instructional domains need to *be incorporated into* a reading instructional program, but they do not by themselves constitute such a program.

Problems with Horse Race Studies

Most of the work that we have reviewed so far has focused on curriculum – the sequence and composition of activities in a reading program and the texts to be used. The studies that have compared reading programs, though, all suggest that differences across

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curricula explain only a small portion of the variance in reading outcomes (Bond & Dijkstra, 1967; Tivnan & Hemphill, 2004). The quality of implementation of programs turns out to be much more important in explaining outcomes than the nature of the program.

Solving reading difficulties through the curriculum is an attractive option, but there are many reasons why comparisons of programs or curricula are an inadequate basis for improved practice. These reasons include at least the following: the role of the teacher and teacher knowledge is clearly key but difficult to quantify; the level of information available to guide classroom level implementation of curriculum is typically inadequate; how the instructional experiences actually get translated into learning, and thus what aspects of them are most important, is often obscure; different instructional strategies may be optimal for different children, yet instruction is typically described at the classroom- rather than dyad- or small-group-level; and effects of site, school, and district often interact with the program.

Role of the teacher

There are considerable data suggesting that teacher qualifications make a difference in outcomes no matter what program or curriculum is in place. Effective teacher practices reviewed and summarized by Taylor, Pearson, Clark, & Walpole (2000) include spending more time on academic tasks, making learning goals clear and providing feedback to students, maintaining a warm, cooperative atmosphere, and responding to individual differences among students with individualized amounts and kinds of instruction. Pressley and his colleagues, in a significant program of research on effective instruction (e.g., Bogner, Raphael, & Pressley, 2002; Pressley et al., 2001), have found that the students of highly effective first-grade teachers spent more time engaged in literacy activities, in part because the teachers had excellent management skills. Even in first grade, effective literacy teachers teach comprehension strategies, vocabulary, and writing as well as word reading skills. In other words, the most effective practices could occur in conjunction with a wide variety of specific programs, if teachers are ensuring that the several elements of literacy instruction all receive attention.

Tivnan and Hemphill (2004) conducted a study of early literacy instruction in a school district serving children at high risk of educational difficulties. The district had required each school to choose one of four literacy programs: *Balanced Early Literacy*, *Developing Literacy First*, *Literacy Collaborative*, or *Success for All*. At the end of first grade, there were no differences across programs in word reading, pseudoword reading, spelling, or vocabulary, though *Developing Literacy First* was significantly better than *Success for All* in comprehension, and *Literacy Collaborative* better than *Success for All* or *Balanced Early Literacy* in writing outcomes. Furthermore, the majority of children in all programs were scoring at levels below grade expectation, particularly on the comprehension assessment. Despite these circumscribed program effects, differences among teachers were enormous; in only 8 of the 36 classrooms were more than 50% of the children scoring at or above expected level, while in 4 of the classrooms fewer than 25% of the children achieved expected scores for their grades. In the other 24 classrooms 30 to 45% of the children achieved

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the reading comprehension levels expected of them, and prerequisite to future success. Neither the group of eight teachers with greater success nor the four with very low outcomes clustered within any of the programs. But the most successful teachers used the practices described by Taylor, Pressley, and Pearson above as characteristic of effective teachers, including responding with explicit instruction to children in need, promoting independent reading, organizing lively engaging discussions about texts being read, holding children accountable for reading with meaning, asking open-ended questions, and holding high expectations.

The NRC report on the Prevention of Reading Difficulties in Young Children (1998) devoted four recommendations to aspects of professional training and development, arguing that the complexities of preventing reading difficulties for all children dictate that teachers be both widely knowledgeable and well supported in their practice. Those recommendations were further developed in a book based on the NRC report, entitled *Preparing our teachers* (Strickland et al., 2002). The NRP also reviewed research on teacher education and concluded that, while the accumulated evidence supported the effectiveness of teacher preparation and professional development in changing teachers and in improving their students' outcomes, the research basis was insufficient to make recommendations about the specific content or organization of teacher preparation programs.

Thus, though we have little basis to make claims about the specific preparation teachers need, we have considerable basis for identifying teacher skill and the specifics of teacher practices as factors influencing students' reading outcomes.

Describing the classroom instruction adequately

It is difficult to come to a consensus about the interpretation of classroom studies, and to elicit from these studies useful information about what teachers should be doing, at least in part because of the difficulty of capturing sufficient information about classroom instruction. Even in programmatic comparisons, methods are often confounded with factors that accompany the method. The kinds of texts read (Juel & Roper/Schneider, 1985), time spent reading, the social setting for instruction, structured versus less-structured curricula, and the patterns of teacher and student interaction are examples of such factors. As Lauren Resnick noted in 1979, the success of phonics may be attributable to factors less related to its content than to its direct instruction delivery.

Most studies have provided only relatively general descriptions of program and student characteristics. So we learn which programs affect mean classroom or school performance overall, but these average descriptors may misrepresent what instruction really looks like for specific groups of children. This is particularly the case for early elementary classes, where the most salient aspects of reading instruction likely occur in small groups. Mean values reflecting whole-class instruction may be far from what any one group or child actually experienced.

In short, very few studies have documented in sufficient detail the form of instruction, the characteristics of texts being read, amount of phonemic awareness instruction, amount of time spent on writing, or degree of fit of texts to children. The level at which instruction needs to be defined goes far beyond "phonics or not." Phonics can be done

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many ways, with many different kinds of materials, many different types and number of texts, and badly or well.

Understanding how instruction functions

While research since the time of Resnick's comment has continued to point to the importance of the content itself, we are left uncertain how precisely the content functions to generate learning, and thus how much of that content actually matters. The actual spelling-sound relations used by readers may bear little or no resemblance to what is taught in phonics (Gough & Hillinger, 1980). The rules of phonics presented to children are explicit, few in number, and slow in application, whereas identification of spelling-sound patterns by skilled readers is implicit, requires considerable orthographic information, and is very fast. Phonics programs rarely provide direct instruction on more than 90 phonics rules, whereas many more than that – perhaps 500 spelling-sound relations – are needed to read (Gough & Hillinger, 1980; Juel, 1994). And, as connectionist models of reading have indicated, skilled readers may ultimately be responding to the specific orthography of individual words (see Plaut, this volume). So, phonics may be useful to children not because of the specific letter-sound relations taught, but because a phonics approach gives children the chance to discover the alphabetic principle, and provides practice looking closely at word spelling.

In other words, phonics instruction may simply point children in the direction of looking deeply into the printed form of the word as they attach sound to it, rather than looking for clues outside the printed word. Indeed, each time the child skips over scrutinizing the internal structure of a printed word in favor of using contextual cues or illustrations to identify the word, the child loses an opportunity to imprint the orthography (Harm, McCandliss, & Seidenberg, 2003). If children basically learn to read by developing some phonological awareness, learning some letter-sound patterns that help them approach print, and then phonologically recoding a specific printed word a few times, as has been suggested by the self-teaching hypothesis (Share, 1995; Share & Stanovich, 1995; Torgesen & Hecht, 1996), then phonics probably helps the child both by developing phonological awareness and by focusing the child on orthography. However, other forms of instruction, such as writing for sounds in modeled spelling or fostering invented spelling by elongating the sounds in words, might do just as well (or better) to promote phonological awareness and enough letter-sound knowledge to actualize self-teaching (Dahl, Scharer, Lawson, & Grogan,1999).

Child-specific and developmental effects

It is crucial to consider what instruction is effective for whom. This is a widely mentioned issue, but not one that any researcher has addressed to complete satisfaction. In 1967 the First Grade Studies analyses considered the possibility of differential effects for children scoring high versus low on IQ, letter knowledge, and phonological discrimination tests,

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but no effects were found for groups differentiated this generally. Chall (1967) emphasized the importance of direct instruction and phonics approaches in particular for low-SES (socioeconomic status) children, those with lower vocabularies and less previous exposure to literacy. Juel and Minden-Cupp (2000) looked at the effect of different instructional emphases on children with different profiles; their findings indicated, for example, that phonics approaches were best for children entering first grade with very weak letter-sound knowledge. Torgesen (this volume) has considered appropriate instruction for children with delays or difficulties in the early grades. But most of the studies comparing programs have not carefully differentiated which instruction works best for which children.

Deciding which instruction is well adapted to which child also requires assessing how instruction changes as children learn more. Perhaps the key feature of classroom instruction ensuring that one child learns to read is systematic progress through a long list of letter-sound correspondence rules, whereas for another child the key feature is teaching just a few phonics rules but providing lots of interesting and increasingly difficult books for practice and self-teaching. How does a brief classroom-level observation capture both the differentiation and the developmental sensitivity of this teacher's approach?

School and district effects

The Center for the Improvement of Early Reading Achievement (CIERA) carried out a "Beat the Odds" study, focused on schools doing much better than their student demographics would predict. The schools beating the odds had coherent, cross-grade instructional programs, and involved parents effectively. They had school-wide assessment systems and mechanisms to use assessment-generated data. The teachers spent more time in small-group instruction, "coached" students rather than telling them, asked more high-level questions, and had students read more independently (Pearson & Taylor, 1998) – in part because of a school-wide commitment to certain kinds of instruction. The kindergarten and first-grade teachers in these schools used rhymes, writing, and other motivating contexts to promote phonemic awareness and letter name knowledge, and carefully monitored student progress to ensure that students with more serious needs received more instructional time (Sulzby, 1998), again reflecting school-wide instructional policies and professional development opportunities.

Perhaps the best-documented example of a district-wide success at literacy reform is New York City's District 2 (Stein & D'Amico, 2002). District 2 developed its own model of Balanced Literacy, supplemented with one-on-one tutoring for students who struggled. The reforms in District 2 reflected commitment to shared understandings of how to teach reading, how to improve teachers' practice, and how to promote meaningful literacy engagement. Strengths of the District 2 approach include its coherence across the grades and the schools within the District; achieving this required considerable shared learning and collaboration across all the district teachers, but it ensured that children could move ahead relatively seamlessly even as they changed grades, teachers, or schools within the district.

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Back to the Reading Skirmishes

In our view, then, the findings from a wide array of sources – studies of reading development, studies of specific instructional practices, studies of teachers and schools found to be effective – converge on the conclusion that attention to small units in early reading instruction is helpful for all children, harmful for none, and crucial for some. This finding is richly supported in studies done both in the US (NRP, 2000) and the UK (Hatcher, Hulme, & Snowling, 2004). In light of this convergence, it is perhaps puzzling that there remains any conflict about methods for teaching initial reading. There are, in our view, four major reasons why conflicts, though somewhat less virulent than at times in the past, nonetheless persist.

Emphasizing the differences

The first of these reasons has to do with the strong tendency of participants in discussions about reading methods to be operating defensively, taking positions that might be characterized as intellectual affirmative action. No proponent of phonics, however insistent on the need to teach children letters and sounds as the basis for reading, would deny the need to teach some sight words, or would exclude authentic children's literature from the kindergarten or first-grade classroom, or would preclude the use of clues to pronunciation or spelling from meaningful units like the names of classmates, or would prevent children from attempting to spell words using spelling patterns not yet taught. And no proponent of whole language, however insistent that reading is a naturally developing and intrinsically social activity, would deny that children benefit from having their attention brought to letter-sound correspondences, or that they need explicit instruction in spelling, or that simple, repetitive, predictable texts are a better basis for teaching initial reading than more literary texts. When engaged in face-to-face conversations, adherents of different sides in the reading wars can, in fact, be shamed into admitting that they agree on almost everything. But when not in dialogue, scholars on both sides, seemingly overcome by mistrust, overemphasize their own favorite aspects of reading instruction, in order to be sure those components are not overlooked by practitioners, curriculum publishers, and whoever is keeping score.

Active child learners

Another source of the deep gulf between proponents of opposing views on reading instruction is the apparent link between those views and deeply held beliefs about human nature and the nature of education. As noted above, reliance on large meaningful units in early reading instruction has been linked historically and philosophically to progressive education, to notions of active child learners who can figure things out for themselves. We would argue that providing structured exposure to phonological segmentation, to the nature of the alphabetic principle, and to a variety of spelling rules in no way conflicts with belief

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in the autonomy of the child learner. In fact, as argued earlier in this chapter, structured phonics instruction never covers all the spelling rules of English; many children "get the point" after having had only a few spelling-sound correspondences taught explicitly, and most are reading independently well before all the rules have been taught. Nonetheless, teaching phonics is often seen as in conflict with constructivist views of learning.

Teacher roles

Another source of ongoing conflict arises from the paradox concerning beliefs about literacy instruction and beliefs about teacher roles. The paradox here is that those whose views of literacy development define a central, crucial, instructional role for the teacher are more likely to be aligned with approaches to teaching reading that deprofessionalize teachers by dictating their moves and scripting their lines. There is no epistemological imperative for this alignment; nonetheless, those most insistent on structured phonics approaches are also most likely to despair that teachers have the knowledge base necessary to deliver instruction adequately (Moats 2001). Thus, it is not surprising that many practitioners see whole-language methods, which are explicitly associated with the values of teacher autonomy and teacher professionalism, as liberating and empowering. We argue that doing a good, responsive job of explicit phonics teaching, based in a rich understanding of children's strengths and weaknesses, and integrating teaching about the code with teaching for meaning requires very high levels of teacher skill, which will only develop with extensive pre-service and in-service support. Many of our colleagues, though, insist that scripted curricula constitute a safer approach.

The nature of reading

Finally, apparent conflicts in approaches to teaching children to read derive from radically different views about what reading is. One view of reading is the print-driven one – a definition of reading that emphasizes the transfer to the reader's cognition of information encoded by the writer. This view of reading places accuracy of word reading, fluency, and correct analysis of syntactic and discourse structures at the center of the enterprise. Another view of reading sees it as an essentially interpretive process – one in which the reader can never exactly reproduce the cognitions of the writer, in which true comprehension is defined as establishing opinions and cognitions in reaction to what one has read. It is obvious that these two views of reading would dictate somewhat different emphases in reading instruction and very different practices in assessing reading outcomes, and thus have considerable potential to lead to conflict.

We would argue, though, that these views are not in conflict. They represent, first, approaches to different kinds of texts. When reading a recipe it is important not to misread "tablespoon" for "teaspoon," and interpretation is rarely called for (at least from the novice cook). When reading literature, on the other hand, interpretive skills are more important than memory for details. When reading political opinion, a critical or reactive stance is crucial to comprehension.

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The two views of reading represent, further, perspectives that should receive different levels of emphasis at different points of reading development. Accurate and fluent reading is a challenge for young readers, and they have few cognitive resources to devote to reaction or interpretation while still struggling with the challenges of decoding. They are, of course, fully capable of reacting and interpreting – but to texts that are read aloud, not to those they are reading themselves. Furthermore, interpretation and reaction are irresponsible if applied to texts that have been only semi-accurately read, and are themselves skills that need to be nurtured and taught throughout the school years.

Thus, the issues of early reading pedagogy focused on in this chapter, although they have received much attention from researchers, practitioners, and policymakers, represent only a small portion of the challenges involved in actually teaching children to read.