

TEACHING DECODING

BY LOUISA C. MOATS

AS IT HAS become increasingly apparent that substantial numbers of children are failing to become skilled readers, a consensus is emerging among reading researchers, practitioners, and policy makers concerning the critical role that decoding plays in the reading process (Snow, Burns, & Griffin, 1998). Cognitive scientists have shown beyond doubt that fluent, accurate decoding is a hallmark of skilled reading (Adams, Treiman, & Pressley, 1997; Fletcher & Lyon, 1998; Rack, Snowling, & Olson, 1992; Share, 1995; Stanovich & Siegel, 1994; Vellutino, Scanlon, & Sipay, 1997). Automatic word recognition, which is dependent on phonic knowledge, allows the reader to attend to meaning; likewise, slow, belabored decoding overloads short-term memory and impedes comprehension.

While this renewed interest in phonics is certainly a welcome development, we will make limited progress unless decoding instruction is grounded in what we know about the stages of reading development, the structure of the English language, and the strategies students employ to learn it. With rare exception, classroom practice is not informed by these principles. As we shall see, problems abound not only with the approaches to decoding typically found in whole-language and "literature-based" programs but also with programs associated with traditional phonics.

Align Decoding Instruction with the Stages of Reading Development

That decoding is learned early by good readers is established in studies of reading development (Chall, 1983; Cunningham & Stanovich, 1997; Ehri, 1994). The ability to sound out new words accounts for about 80

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percent of the variance in first-grade reading comprehension, and continues to be a major factor in text comprehension as students progress through the grades (Foorman, Francis, Shaywitz, et al., 1997). Moreover, a series of studies have traced how beginners learn to read and spell words (e.g., Ehri, 1994; Treiman, 1993; Wagner & Barker, 1994). The learner progresses from global to analytic processing, from approximate to specific linking of sound and symbol, and from context-driven to print-driven reading as proficiency is acquired. The instruction we deliver should be compatible with the emerging competence of the student.

Logographic reading

Young children, typically before mid-kindergarten, may learn to recognize a limited vocabulary of whole words through incidental cues such as a picture, color, or shape (Ehri, 1994; Gough, Juel, & Griffith, 1992), but in this beginning stage of reading, do not associate sounds with symbols. Children will string letters together when they write and assign changing messages to them, or will look to context to guess at what a word says. A printed word may be remembered for its unique appearance, as in "pizza" or "D'Antoine." If asked about the sound that begins "pizza," however, the student might say "hot" or "m m m m." This visual cue reading typically precedes the insight that alphabet letters correspond to speech sounds. Children at this level have not realized that words are composed of phonemes, that letters represent those speech sounds, and that words can be decoded by matching symbol to sound.

Appropriate activities at the pre-alphabetic level include phonological awareness tasks (carried out orally) such as rhyming; counting, adding, and deleting syllables; matching beginning consonants in words; recognizing odd sounds; substituting sounds and identifying that a sound exists in selected words (Adams, Treiman, & Pressley, 1997; Brady, Fowler, Stone, & Winbury, 1994; Foorman et al., 1997; Torgesen, Wagner, & Rashotte, 1997). In addition, the development of print awareness includes alphabet matching and letter naming, following print with the finger during read-alouds, and much



interactive engagement with appealing books. All these activities develop awareness of the alphabetic principle: that letters roughly represent segments of one's own speech.

Novice or early alphabetic reading

To progress in reading, children must develop the insight that alphabet letters represent abstract speech segments (phonemes) and must be able to compare the likeness and difference of similar-sounding words (Lieberman, Shankweiler, & Lieberman, 1989). Children begin to spell a few salient consonants in words when they write (KR/car; I L T G (I like to go); I LIK LAFFZ (I like elephants). Letter sounds and letter names such as /w/ and "Y", and /y/ and "U" may be confused. At this juncture, teaching affects the development of decoding strategies (Tunmer & Chapman, 1996); children may not develop the habit of sounding a word out unless they are taught how and are given sufficient practice. Instead, they may learn to rely excessively on pictures or context to decipher the pronunciation of unfamiliar words, a habit of doubtful utility (Adams, 1990; Iversen & Tunmer, 1993).¹

Once an association between sound and letter(s) is taught, children need cumulative practice building words with letters they know. Systematic programs begin with a limited set of sound-symbol correspondences—a few consonants (b, f, h, j, k, m, p, t) and one or two vowels (ā, ī)—so that words can be built right away. Other consonants and vowels are added gradually to those already known. Vowels may be represented in a different color. Coupled with practice dividing words into phonemes and blending them back into wholes, children can build words with letter cards and play "chaining" games in which one sound is changed at a time to make a new word (*hat, bat, bit, hit, him, hip, hap, map*). The core activity in systematic, explicit decoding instruction is blending single sounds into words. After the children have learned a

few sound-letter correspondences through a rhyme or other mnemonic, blending proceeds sequentially:

- T. (Writing letter h on the board.) What's the sound?
- S. /h/
- T. (Writing letter a on the board.) What's the sound?
- S. /ā/
- T. Blend it. (Sweeping hand under the letters).
- S. /hā/
- T. (Writing letter t on the board.) What's the sound?
- S. /t/
- T. Blend it. (Sweeping hand under the letters).
- S. /hāt/

After ten to fifteen words with known sound-symbol connections are blended, they are used immediately in sentences. Even if the written sentences are short, the teacher can ask the children to expand the sentences verbally, as in "Mat has a hat. Tell me what kind of hat he has!"

Mature alphabetic stage

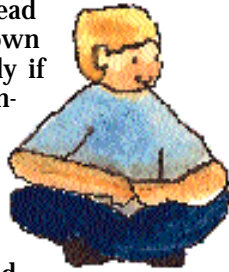
At the next stage of early reading, children know associations for the basic sound-spellings and can use them to decipher simple words. Well-taught first graders achieve this by mid-year. When associations to letter patterns are secure, children can decode most predictable syllables. Attention to the internal structure of words, in both speech and spelling, supports whole word identification; it is linguistic awareness, not rote visual memory, that underlies memory for "sight" words after children enter this stage (Ehri, 1994; Share, 1995). As they become more automatic and efficient, children quickly begin to recognize the redundant "chunks" of orthography. Phonograms (ell, ack, ame, old) and word endings (-ing, -ed, -est) are read as units.

Orthographic stage: syllables and morphemes

Knowledge of sound-symbol associations and lots of practice reading contribute to fluency in word recognition. As whole words, morphemes, and print patterns become increasingly familiar, knowledge of these larger units of print allows students to read efficiently

¹ Once words are pronounced, meaning must be attached. The process of word identification is supported by sound-symbol decoding; the process of learning a word's meaning is supported by contextual analysis.

and spend less and less attention on sounding words out letter by letter (Share, 1995). At this stage, students read new words by analogy to known words (*build, guild*) especially if their teachers model and reinforce this strategy (Gaskins, Ehri, Cress et al., 1996). Beyond phonics, the study of word structures comprises syllables and morphemes, the units from which our Latin- and Greek-derived words are created (Henry, 1997).



Fluency in reading is gained by digesting many books at the right level—not too hard, not too easy. Authors invented “series” books for students at this stage, endless sagas of boxcar children, horses, and prairie characters that hook children into independent reading for themselves.

Within the sequence of early reading development, many strategies for reading instruction can fit. Learning to read unfolds predictably: Phoneme awareness, letter recognition, and concepts of print allow a child to learn the written alphabetic code; knowledge of the alphabetic code, beginning with the elemental units, allows fast, automatic word recognition; fast and accurate word recognition allows fluency in reading connected text for meaning; and comprehension is most likely when children can name the words, interpret the words, and employ various reasoning strategies to understand what they are reading. The question regarding decoding can then be reframed: What components of instruction are most effective with learners at what stage with what kind of teaching in what context and in relation to what other components? This, in fact, is the overarching question for the intervention studies supported by the National Institute of Child Health and Human Development (Lyon & Moats, 1997). Phoneme awareness instruction may no longer be helpful for students who can spell words phonetically; word families may “work” when students have the underpinnings of sound-symbol correspondence; repeated readings for fluency may be less effective if students do not know basic phonics, and so forth. Scientific investigation, with deliberate testing of competing hypotheses, will eventually map best practice at each stage. Given what we already know about language and how students learn it, however, what are the principles by which we should teach children to read the print?

Align Decoding Instruction with the Structure of the English Language

Put the spelling system in historical perspective.

Our writing system is an amalgam of Anglo-Saxon, Latin, and Greek, and to a lesser extent, includes spellings from French, German, Italian, and Spanish. Each of these languages contributed spelling conven-

tions that within the language of origin were predictable but that violate the patterns of another. For example, *ch* is used to spell /ch/ in Anglo-Saxon words such as *chair*; *is* is used to spell /k/ in Greek-derived words such as *chorus*; and *sh* is used to spell /sh/ in French-derived words such as *charade* and *Charlotte*.

The Phoenicians and Greeks, over several centuries, invented the alphabet first to spell consonant phonemes and then, later, to include vowels. The

system they invented, when appropriated by the Romans and spread throughout Europe, was used creatively by scribes to accommodate evolutions in language pronunciation and the interweaving of several languages that became Modern English. Our brand of English has at least forty speech sounds or phonemes: twenty-five consonants and fifteen vowels. (The official count of phonemes is different in every linguistics textbook, evidence itself of the abstractness and difficulty of phoneme classification.)

Scribes who appropriated the Greco-Roman alphabet for Germanic Anglo-Saxon words were equipped with an insufficient number of letters for the phonemes, a problem they solved by combining letters to use as spelling units (graphemes), such as *wh, th, sh, ch, oi, ou,* and *aw*, and using letters for several jobs. The letter *y*, for example, has four spelling jobs: it spells a consonant /y/ at the beginnings of words such as *yes*, and spells three vowels—/ī/ in Greek-derived words such as *gym*; /ē/ at the ends of two-syllable words such as *baby*; and /ī/ at the ends of one-syllable words such as *cry, why,* and *by*. Further, the scribes gradually developed conventions for letter sequences. Certain spellings would be used for sounds in specified locations only. For example, when single-syllable words ended in /f/, /s/, /l/, or /z/, the consonant letters would be doubled, as in *stiff, mess, full,* and *jazz*. The sound /s/ could be spelled with *s* or *c* followed by *e, i,* or *y*. Although the possibilities for vowel spellings were more varied, those also were used within constraints. For example, *oi* was used only when the vowel occurred before a consonant (*toil, coin*); *oy* was used at the ends of words (*soy, cloy*).

The relational units of English orthography—the written symbols for sounds—are not simply single letters. English does not use a phonetic alphabet, wherein one letter represents a speech sound. It does use a deep alphabetic system that shows speech sounds and meaningful units, often in a somewhat complex and variant manner, directly related to the history of the English language.

Teach speech to print, not print to speech.

One of the most fundamental flaws found in almost all phonics programs, including traditional ones, is that they teach the code backwards. That is, they go from letter to sound instead of from sound to letter. Such programs disregard the fact that speech evolved at

least 30,000 years before writing. Alphabetic writing was invented to represent speech; speech was not learned from reading. Following the logic of history, we should teach awareness of the sound system (phonology) and anchor letters to it.

The print-to-sound (conventional phonics) approach leaves gaps, invites confusion, and creates inefficiencies.² The first problem with such a system is its incompleteness; it typically teaches only part of the code. This is because instruction follows from the alphabet sequence and the sounds of its 26 letters. However, if beginning instruction in decoding is organized around the alphabet letter-sounds, the identities of consonants /wh/, /th/ (voiceless), /th/ (voiced), /sh/, /ch/, /ng/, /zh/, and vowels /oi/, /ou/, /aw/, /oo/, and /j/ (schwa) are obscured because no single letters of the alphabet represent these phonemes. Twelve phonemes out of 40 remain “hidden” when the alphabet is the organizing basis of instruction. A few letters also have no defined job. The letter *c* is redundant for /k/ and /s/. The letter *q* is redundant for the sound of /k/, and the letter *x* redundant for the combination /ks/ or the phoneme /z/.

The alphabet-to-sound approach in phonics instruction also overlooks the fact that some letter names bear little relationship to the sounds the letters represent and interfere with learning the sounds. If the child learns letter names without a clear conceptual and associative emphasis on the sounds the letters symbolize, confusions in reading and/or spelling will occur. Consider these pairs:

Letter	Name	Sound	Typical Reading Errors	Typical Spelling Errors
Y	/wī/	/y/	will = yell	YL (will) BOU (boy)
U	/yū/	/ū/	use = us	UESTRDA/yesterday
W	/double yu/	/w/	when =	UEN
X	/eks/	/ks/ or /z/	exam =	ECKSAM
H	/aitch/	/h/	watch =	WOH

In the first example, the first grader who recently read me the word “yell” as “will” needed much more practice differentiating letter sounds from letter names. Likewise, the children who confused the name “Y” with the sounds of /w/ and /yū/ was unaware of the difference. The child who did not know how to spell /ch/ turned to the letter name that has that sound in it: “aitch” (H). In the phonics lesson, children would not have pronounced the first sound of “laugh” as “el” and the first sound of “fish” as “ef” if they had been clear about these associations. However, such responses are common unless children are routinely and explicitly expected to distinguish letter names from sounds, especially during the early alphabetic stage of reading.

The alphabet orientation to phonics underlies the “word wall” idea that has proliferated in primary classrooms. Alphabet letters are posted along a colorful bulletin board; under each are high-frequency words for which children are to develop automatic recognition. The resulting array typically includes lists of words under the vowel letters such as:

² A point developed in great detail by Dianne McGuinness (1997).

Aa	Ee	Ii	Oo	Uu
apple	egg	it	orange	under
and	eight	is	of	use
away	eat	in	on	us
all	end	I’m	out	united
are			once	
			open	
			off	

What can a child conclude who is shown that words starting with the letter “o” begin with as many as six different sounds, including the /w/ in *one* and *once*? Any observant child would surmise that letters are irrelevant to sound and must be learned by some magical memory process. The display directs children away from a sound-symbol connection and toward a rote, visual-cue orientation, like that taken by my student whose decoding approach was to “look harder at the word.” Sight words do need to be learned, gradually and cumulatively, but bulletin board space can be used to better advantage for predictable patterns and correspondences.

How much easier and more logical to teach children each sound, then anchor the sound to a grapheme (letter, letter group, or letter sequence) with a keyword mnemonic (see chart below). This mimics the way alphabetic writing was invented. The sound /s/, then, would be associated first with “snake” and the letter *s*, and later with the *ci* and *ce* combinations (*city*, *race*). With an instructional goal of teaching eighty to 120 spellings for forty phonemes, and then moving to syllables and morphemes, teachers can teach the whole system in a comprehensive, clear, logical sequence over several years. Instruction can begin with high-utility, low-complexity consonant and vowel units, and move gradually to less common, conditional, and more complex graphemes. Spelling units of several letters (-tch, -igh, -mb, ce-, -ough) will be treated as the blocks from which words are built, rather than as mysterious combinations of “sounded” and “unsounded” letters.

Consonant spellings, sound-to-symbol organization:

/p/	/b/	/t/	/d/	/k/	/g/
pot	bat	tent walked	dime stayed	cup kettle deck school oblique	go ghost fatigue
/f/	/v/	/th/	/s/	/z/	/sh/
fish phone stiff tough	very	thin then	see fuss city science	zoo jazz Xerox rose	shop sure Chicago -tion, -sion
/ch/	/j/	/m/	/n/	/ng/	/h/
cheer batch	judge wage gent, gym gist	man tomb autumn	net knight sign	king lanky	hair who
/l/	/r/	/y/	/w/	/wh/	
lake tell	run wrist	yes use	want one	whistle	

With the sound to spelling approach, spelling units (graphemes) are used to represent the forty sounds and often are more than one letter. For example, “eight” has two phonemes and two graphemes—the vowel /ā/ spelled *ei*gh (also in *weigh*, *weight*, *sleigh*) and the consonant /t/. Teachers are less likely to try to “blend” /t/ + /h/ to make /th/ or /s/ + /h/ to make /sh/ if the letter combinations are understood to operate as symbolic units known as digraphs. I taught for years before a linguist showed me that *ng* stood for one nasal speech sound that shared features with /m/ and /n/ but was different from each. Surprise: it was not a blend of /n/ + /g/! The word *thank* included this phoneme, spelled with the letter *n*.

A few orthographic rules or patterns are somewhat arbitrary and do not relate to sound. For example, no words in English can end in *v* or *j*. Thus, all words ending in /v/, regardless of the vowel sound preceding the /v/, must have an *e* on the end (*love*, *dove*, *shove*, *live*, *give*, *grieve*, *leave*). Unfortunately, many words such as *give* are taught to children as “sight” or “outlaw” words, in spite of the fact that they are completely regular by orthographic rule. Similarly, all words ending in /j/ must spell it *ge* or *dge*; *dge* occurs only after accented short vowels (*dodge*, *wedge*, *badge*, *ridge*, *fudge*). A word such as *Raj* is clearly non-English for this reason.

Teach word study beyond second grade.

Understanding word structure for reading, vocabulary and spelling necessitates knowledge of syllable patterns and morphology, grist for the fourth-grade mill and beyond. Good readers will learn to parse longer words into segments, if necessary, supply accent, and relate familiar word parts to meaning when possible. Each level of orthography—sounds, syllables, and morphemes—has its own organization, and each of those levels will differ according to the language from which a word was derived. Thus, the comprehensive domain of word structure (Henry, 1989, 1997; Bear, Templeton, Invernizzi, & Johnson, 1996) will be part of language teaching through at least sixth grade.

Learning the structure of words at the syllable and morpheme levels supports word recognition, spelling, and vocabulary development (Nagy & Anderson, 1984). About 60 percent of the words in English running text are of Latin or Greek origin (Henry, 1997). The meaningful parts (morphemes) of these words are often recombined with others in compounds and affixed forms and are thus extremely productive; many words can be deciphered from a few familiar parts. Roots such as *scribe*, *rupt*, *struct*, and *port* are each found in scores of related words. For example, students who know that *rupt* means *to break* will find it much easier to add words such as *erupt*, *corrupt*, *disrupt*, *interrupt*, *rupture*, and *bankrupt* to their vocabulary.

Children learn all of these patterns in a more or less predictable sequence (Templeton & Bear, 1994). Syllables without consonant blends are easier than syllable structures that include consonant blends (e.g., *am*, *Sam*, *slam*, *lamp*, *clamp*, *scram*, *cramps* represent progressive levels of complexity). Patterns within words are learned before the patterns of syllable combination. Inflectional morphemes (word end-

ings) are learned before derivational morphemes (Latin roots, prefixes, suffixes). If word study lessons include a hodge-podge of thematically related but structurally unrelated words (*weather*; *cloudy*, *pre-*

LAYER OF LANGUAGE	Sound	Syllable	Morpheme
Anglo-Saxon	<u>Consonants</u>		
	single	closed	compounds
	blends	open	(<i>highlight</i> ; <i>scatterbrain</i>)
	digraphs	v-c-e	inflections
	<u>Vowels</u>	r-control	(<i>-ed</i> , <i>-s</i> , <i>-ing</i> , <i>-er</i> , <i>-est</i>)
	short	c-le	
	long (v-c-e) teams diphthong r-control	vowel team (schwa)	
Romance (Latin)			prefixes (<i>mis</i> ; <i>in</i>) suffixes (<i>-ment</i> ; <i>-ary</i>) roots (<i>-fer</i> ; <i>-tract</i>) plurals (<i>curricula</i> ; <i>alumnae</i>)
	Greek	/ī/ = y (<i>gym</i>)	combining forms:
		/k/ = ch (<i>chorus</i>)	(<i>biography</i> , <i>micrometer</i>)
		/f/ = ph (<i>photo</i>)	plurals (<i>crises</i> , <i>meta-</i> <i>morphoses</i>)

cipitation, *solar*, *atmosphere*), children will not be exposed to enough examples of structural relationships in the orthography (as in *solar*, *insolation*) to internalize them.

Teach the Code the Way Children Learn It Most Easily

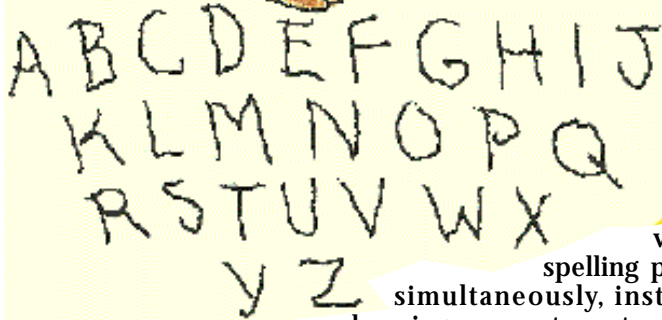
Teach explicitly and systematically.

Systematic, explicit instruction leaves little to chance and thus ensures the success of most children. The phonic elements are taught in a logical order, simple to complex, informed by the structure of language itself. Predictable, common correspondences are taught before the variant, less common correspondences. One linguistic concept at a time, a sound or a spelling, is spotlighted in a lesson and constitutes the organizing principle of the lesson. That component of language is then contrasted with others that are potentially confusable (*yell/well*; *yak/whack*) based on catalogues of typical children’s errors (Treiman, 1993). The sound-symbol unit is then read and spelled in words; those words, in turn, are couched in sentences; and the sentences, in turn, are placed in simple stories. Automatic association of symbol with sound is the outcome, the foundation of fluent reading for meaning.

Systematic, explicit instruction contrasts with inci-



dental, implicit instruction. In incidental teaching, sound-symbol elements are taught without intention to follow a sequence from easier to more difficult. A phonic element or pattern may be pointed out by a teacher in the context of words in a book (e.g., find the /ē/ in *James and the Giant Peach*). The student would not learn that *ea* is a less predictable spelling than *ee* and would be exposed to many



vowel spelling patterns simultaneously, instead of learning one or two at a time in

order of predictable to variant. In implicit teaching, the sound stays embedded in whole words, not sounded in isolation or contrasted with other vowels. For example, a student might be asked to infer that the middle sound of *peach* is /ē/ and that it is spelled with *ea*, but for implicit instruction to result in learning, the child must already be able to do what the task presumably teaches: to match a phoneme with a grapheme and differentiate it from others.

The “mini-lesson” approach, whereby a phonic element is illustrated after reading has been practiced, is often incidental and implicit (Cooper, 1997). Without very strong preparation, teachers who teach phonics as a supplement may provide disconnected drills that provide too little information about the system being learned and too little practice with each component. If a teacher runs her first graders through the list *bug, tug, hug, mug, hum, drum, such, tuck, duck, stuck, and much*, without ever identifying the vowel in contrast to others, spelling the words, blending the sounds together, or reading the words in books, the activity may be a write-off. If students learn this way, it may be in spite of the way we teach them.

In systematic code instruction, decodable books are used that are aligned with the sound-symbol association taught in the lesson. These books, created to make independent reading possible for a beginner, are a device to provide practice reading words that have specific spelling patterns or letter-sound correspondences and to encourage sounding words out. Many children can retain new sound-spelling patterns only with cumulative, distributed practice. Several recent studies have shown an advantage for early reading programs that include decodable texts (Felton, 1993; Foorman et al., 1998; Iversen & Tunmer, 1993; Juel & Roper-Schneider, 1985), and at least one shows a disadvantage for “predictable” books that are not organized to provide

practice with phonic patterns (Johnston, 1998).

Decodable text includes a high percentage of words with the phonic associations already taught and a few high-frequency sight words that make the sentences less stilted. Contrary to the negative stereotype “Dan Can Fan the Man,” decodable text can be appealing. Adult distaste for decodable books fails to respect the child’s need to exercise a skill: Children want to be self-reliant readers and are delighted when they can apply what they know. Creative solutions to contrived language patterns include interspersing text for an adult to read with text for the child to read, using attractive illustrations, and developing a good story line.

Of course, the use of decodable text should never replace oral reading of quality literature in a comprehensive reading program. Indeed, this is a good juncture at which to point out that, while this article discusses the decoding aspect of reading, a comprehensive reading program attends to meaning and comprehension from the start. Oral language development, vocabulary development, the steady building of background knowledge, extensive exposure to quality children’s literature, discussion and retelling and dramatization of stories should begin with the earliest years of preschool. At each succeeding level, students can learn and practice simple comprehension strategies that will help secure their understanding of text. And at every stage of their schooling, children should be surrounded by books and take part in a wide and engaging array of print experiences.

Teach pattern recognition, not rule memorization.

Most individuals learn to decode words in print because they accumulate explicit and tacit knowledge of linguistic patterns—phonological, orthographic, and morphological. Any audience of literate adults can be cajoled into displaying their unconscious knowledge of orthographic constraints. Ask a group to spell “throige.” The majority will use *oi*, not *oy*, although many will have trouble explaining that *oi* is used in the middle of words for /oi/, and *oy* is used at the end of words. Most will also use *ge* instead of *dge*, because a diphthong (vowel with a glide) is never followed by “dge.” If a group is asked to read a nonword such as “pertollic,” the middle syllable will be stressed and the vowel /ō/ will be short. Readers of English know intrinsically that in the Latin layer of the language, the root is usually stressed, not the prefix or suffix, and a doubled consonant following a vowel causes it to be short.

Awareness and use of such organizational patterns, not memorization of rules, facilitates learning; the goal of insight is to read more fluently, not to recite orthographic trivia. Sometimes critics of phonics instruction lament that there are too many rules to teach, the rules don’t always apply, or the rules are too complicated to be taught. This criticism is apt if the correspondence system is conceived as a series of letter sequence rules, instead of a layered system for representing both sound and meaning. Examples abound:³

³These are from Lapp & Flood, but many others can be found.

If a vowel letter is at the end of the word, the letter usually stands for the long sound.

W is sometimes a vowel and follows the vowel digraph rule.

The letter *a* has the same sound when followed by *l*, *w*, and *u*.

These observations, among many others, obscure what is at work in speech-to-print correspondence and are not what children should be asked to learn. With reference to the first of these “rules,” children can simply sort, read, and spell groups of words that share a single-letter, long-vowel spelling: *me*, *he*, *she*, *we*, *be*; *go*, *so*, *no*, and *yo-yo*. With reference to the second, the letter W is never a vowel; it is used in vowel digraphs *aw*, *ow*, *ew*. As for the third, it makes more sense to explain that *aw* and *au* are two spellings for /aw/ and give students practice sorting, reading, and writing many examples to discover the system. *Au* is used internally in a syllable (*applaud*, *laundry*, *taut*), and *aw* is used in word-final position and before word-final /n/ and /l/ (*saw*, *thaw*; *brawn*, *brawl*; *drawn*, *drawl*). Part of teaching decoding well is to select what is useful, understandable, and applicable and represent it as directly and logically as possible.

What does worthwhile practice entail, beyond phoneme awareness, sound-symbol linkage, and sound blending? Many teaching strategies apply. Words can be analyzed in a student-teacher dialogue so that their structures are discovered and then generalized to new words; patterns may be sorted so that groups of words are compared and classified (see Templeton, Bear, Invernizzi, and Johnson, 1996); phonic concepts may be applied to reading “foreign” words, names, low frequency words, or nonwords; and sentence completion exercises can require students to make fine discriminations of words that look or sound alike in text reading. Writing words after reading them reinforces pattern knowledge. Some children with significant reading impairments need to be taught every code element explicitly, but others will begin to generalize independently if they have a solid basis from which to proceed (Share, 1995). Thus, we teach the major spellings for /k/ as a beginning decoding skill (*c*, *k*, *ck*), but wait to highlight the Greek *ch* and the French *-que* until entries from those languages are considered as an etymological group (*chorus*, *orchestra*, *school*, *chlorox*, *pachyderm*; *antique*, *pique*, *mystique*).

Encourage active, constructive exploration.

Workbooks are great for independent practice when concepts have been well taught. They are not categorically despicable, just often misused as a substitute for teaching. Concepts, however, should be developed in the context of student-teacher interaction and activities designed to encourage reflection about language form. The brain responds to novelty and sensory involvement; that’s why we learn better by doing than by listening. Some powerful approaches to phonological awareness, for example, emphasize

mouth position and the ability to compare how words feel when they are spoken. Some decoding programs ask children to stand at the chalkboard and write words as they are analyzed, sounded out, and explained. Others use manipulative letters and trays. Still others give children small lap slates to write words as they are created, dictated, or illustrated on an overhead. Letter cards can be manipulated in personal pocket charts that are made with manila folders. Hand gestures are employed for sweeping through sounds and blending them into words. All of these active techniques require the learner to select, classify, and consciously manipulate sounds and letters so that more thorough word learning occurs.

Anticipate, prevent, and correct confusions.

Sound representation. Organizing and sequencing the content is only the beginning of good decoding instruction. Ensuring that code associations become useful for children is yet another challenge, one for which few teachers are well prepared because our training did not emphasize the specifics (Moats, 1995). Just speaking the phonemes can be tricky. Phonemes combined in words are not what they become in isolation. Coarticulation—the folding of speech sounds into one another in natural speech—makes the identity of single phonemes an abstract exercise for the learner. But the closer the teacher gets to producing a “pure” form of the phoneme, a prototype that can be used for classification, the easier it is for the learner to establish a point of reference. When teachers ask the class to blend “kuh, a, ruh” only the lucky students will recover “car.” On the other hand, if they say /k/ - /ar/, blending can result in “car.” If the teacher says “fuh, a, tuh” only the children who can already spell are likely to blend “fat.” /f/ /ă/ /t/, however, is closer to the real thing.

Knowing the basics of language structure can boost any teacher’s effectiveness. For example, let’s look at consonant features. What phonics books seldom tell us is that nine consonant pairs in English differ only in a feature called voicing. The consonants are spoken in the same manner but one of the pair is quiet (voiceless) and the other is vocalized (voiced). The pairs, and words that contrast because of those consonants, are:

/p/, /b/	pest, best
/t/, /d/	tide, died
/k/, /g/	cut, gut
/f/, /v/	ferry, very
/θ/, /ð/	bath, bathe
/s/, /z/	fussy, fuzzy
/sh/, /zh/	fission, vision
/ch/, /j/	batch, badge
/wh/, /w/	whether, weather

Children learning to decode and spell often confuse these consonant pairs. An excerpt from Samantha’s composition in third grade included the words HOSPITAL/hospital, UNGL/uncle, EFRY/every, and LONJ/lunch. Clearly, no one had been clear with her about the voicing feature of consonants. A knowledgeable instructor could ask Sam to articulate the phonemes, look in a mirror, feel her own throat for res-

onance, and ask Sam to identify which sound was spoken in target words. Sam should read and spell contrasting pairs of words designed to highlight the distinctions before she practices them in context to be sure the speech basis for spelling is established.

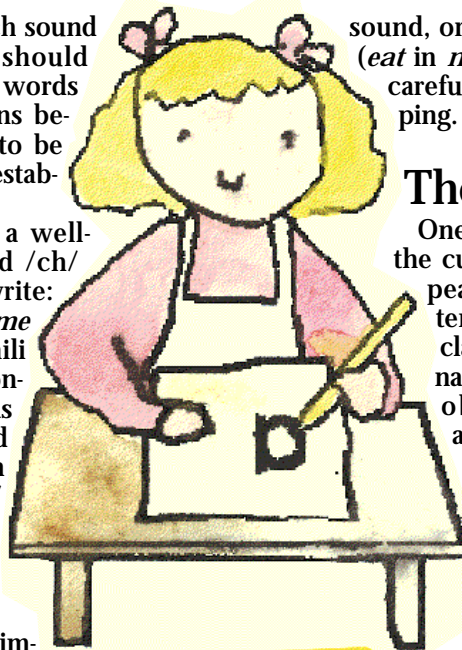
Ryan, in first grade, sat through a well-taught lesson on the speech sound /ch/ and then returned to his desk to write: *Chuck lix to ent some jele and some joclet.* (Chuck likes to eat some chili and some chocolate). Rather than confusing /ch/ with the fricative /sh/, as the teacher anticipated, he confused it with its voiced equivalent, /j/. Ryan needed to be shown again that /ch/ is quiet and /j/ is noisy or sounded, and needed practice reading and spelling words with each of these sounds.

It is because children do confuse similar speech sounds that their features may need to be spotlighted. Accurate word learning requires identification of the sounds and letters in the word. Without such clarity, meanings are harder to learn; *build*, *built*, and *bill* differ only by one phoneme, as do *bruise* and *breeze*, and *goal* and *gold*. One of my fifth graders, years ago, was sure for weeks that the Gold Rush had something to do with soccer (“goal rush”), a semantic confusion directly tied to phonological unawareness.

To be able to analyze children’s confusions and errors, teachers need to know sounds, spellings, and syllables. Otherwise selection of appropriate examples is impossible. Creative but pointless strategies abound, especially in vowel instruction. “Egg” is not a great keyword for /ē/. *Edward*, *echo*, *etch*, and *bed* are all better bets. Chanting “long vowels, short vowels, rah rah rah” with wild hand gestures, as I have seen, might build enthusiasm but not reading skill. The word “arm” does not have a “long a” in it. The abbreviation *Mrs.* is not a consonant-vowel-consonant configuration, as a national reading expert was recently seen to claim. And *kiss* is not a two-syllable word. Poor examples arise from forcing vowels into two arbitrary categories rather than teaching the whole system of vowel production and representation. Programs that define vowels as 6 letters are missing the essence: Vowels are 15 open sounds around which syllables are organized. Every syllable has one vowel sound, even though print does not correspond as directly as we would like.

Corrective feedback. Children’s misperceptions can often be resolved quickly and effectively if feedback leads to insight about how language works. Targeted feedback, however, requires understanding of language and confidence that, armed with good strategies, children can figure out new words. If a child reads “net” and the word is “neat,” the first comment from the teacher might be “ea says /ē/ in this word; now try to blend it.” Such feedback supports the learner and reinforces the idea that sounding out is generally possible if context is used as a backup. Asking children to say the letters they see, refer to a keyword mnemonic for a

sound, or recognize a familiar part of a word (*eat* in *neat*) all reinforce the habit of looking carefully at words before guessing or skipping.



The Current Trend

One of the most ironic consequences of the current trend in publishing is the reappearance of workbooks and readers intended to “supplement” whole-language classroom reading programs. The original design of many programs omitted or obscured instruction in phoneme awareness, letter recognition, sound-symbol association, blending and word attack, spelling, and the application of phonics in reading decodable text. Millions of dollars were invested by schools in the literature-based basals of the early 1990s and they will not be discarded lightly. Districts will be tempted to spend money on gap-filling phonics, phoneme awareness, and spelling kits that will have to be taught as separate components of a language arts block rather than as integrated parts of a coherent lesson. Fragmentation of instruction is a likely consequence—the very problem that whole-language programs were designed to combat.

One of the consequences of fragmentation in lesson design and curriculum is inefficiency. It will take longer to teach children what they need to learn; it will be less likely that all children who are capable will learn to read well. Although needed skills may be addressed if combinations of core programs and their supplements are used, the whole process may take longer than necessary and result in superficial learning. Better results are obtained if the necessity of code instruction is confronted early, directly, and wisely.

Summary

Decoding instruction might be termed the “technical” part of teaching reading. It requires knowledge of language, including phonology and the structure of orthography; knowledge of how children learn language; and strategies for teaching a writing system incrementally even as the purpose of reading is kept in focus.

In a well-designed and executed program, decoding is taught in relation to the student’s stage of reading development. The inherent structure of language provides the scaffold for program organization. Teaching itself is explicit, systematic, and connected to meaning. It respects the ways that children learn language, through active extraction of patterns and successive approximations. Selected linguistic elements are highlighted in a lesson. The lesson teaches a sound-symbol pattern within the context of many examples applied to reading and writing single words, sentences, and texts. Blending sounds in words is emphasized.

Students learn to rely on what they know about speech-print connections. They develop fluency and independence in word recognition with sufficient practice. Instruction in component skills, practice ap-

plying those skills in controlled texts, and reinforcement in games and workshops is balanced with listening to and reading literature of all kinds.

If they are taught with care, children can gain sufficient reading skill by the end of first grade to read many books independently. Competence is reinforcing; those who can read are more likely to read. Those who do read are more likely to be educated. And therein lies our responsibility: to teach with knowledge, skill, and artistry the alphabetic invention that makes all this possible. □

REFERENCES

- Adams, M. (1990) *Beginning to read: Thinking and learning about print*. Cambridge, MA: MIT Press.
- Adams, M., Treiman, R. & Pressley, M. (1997). Reading, writing, and literacy. In I.E. Sigel and K.A. Renninger, eds., *Handbook of Child Psychology, 5th edition, Vol 4: Child Psychology in Practice*. (pp. 275-355). New York: Wiley.
- Bear, D.R., Templeton, S., Invernizzi, M., & Johnston, F. (1996). *Words their way: Word study for phonics, vocabulary, and spelling instruction*. Englewood Cliffs, NJ: Merrill.
- Brady, S., Fowler, A., Stone, B., & Winbury, N. (1994). Training phonological awareness: A study with inner-city kindergarten children. *Annals of Dyslexia*, 44, 26-102.
- Chall, J. (1983). *Stages of reading development*. New York: McGraw-Hill.
- Cooper, J.D. (1997). *Literacy: Helping children construct meaning*. Boston: Houghton Mifflin.
- Cunningham, A.E. & Stanovich, K.E. (1997) Early reading acquisition and its relation to reading experience and ability ten years later. *Developmental Psychology*, 33 (6), 934-945.
- Ehri, L. (1994). Development of the ability to read words: Update. In R. Ruddell, M. Ruddell, & H. Singer (eds.), *Theoretical models and processes of reading* (4th ed., pp. 323-358). Newark, DE: International Reading Association.
- Felton, R.H. (1993). Effects of instruction on the decoding skills of children with phonological processing problems. *Journal of Learning Disabilities*, 26, 583-589.
- Fletcher, J. & Lyon, R. (1998). Reading: A research-based approach. In W. Evers (Ed.), *What's Gone Wrong in America's Classrooms* (pp. 49-90). Stanford, CA: Hoover Institution Press.
- Foorman, B. R., Francis, D. J., Fletcher, J.M., Schatschneider, C., & Mehta, P. (1998). The role of instruction in learning to read: Preventing reading failure in at-risk children. *Journal of Educational Psychology*, 90, 1-15.
- Foorman, B.R., Francis, D.J., Shaywitz, S.E., Shaywitz, B.A., & Fletcher, J.M. (1997). The case for early reading intervention. In B. Blachman (ed.) *Foundations of reading acquisition and dyslexia* (pp.243-264). Mahwah, NJ: Lawrence Erlbaum.
- Gaskins, I., Ehri, L., Cress, C., O'Hara, C. & Donnelly, K. (1996). Procedures for word learning: Making discoveries about words. *The Reading Teacher*, 50, 312-327.
- Gough, P. Juel, C. & Griffith, P. (1992). Reading, spelling, and the orthographic cipher. In P. Gough, L. Ehri, & R. Treiman (eds.), *Reading Acquisition* (pp. 35-48). Hillsdale, NJ: Lawrence Erlbaum.
- Henry, M. (1989). Children's word structure knowledge: Implications for decoding and spelling instruction. *Reading and Writing: An Interdisciplinary Journal*, 2, 135-152.
- Henry, M. (1997). The decoding/ spelling continuum: Integrated decoding and spelling instruction from pre-school to early secondary school. *Dyslexia*, 3, 178-189.
- Iversen, S. & Tunmer, W. (1993). Phonological processing skills and the Reading Recovery program. *Journal of Educational Psychology*, 85, 112-126.
- Johnston, F.R. (1998) The reader, the text, and the task: Learning words in first grade. *The Reading Teacher*, 51, 666-675.
- Juel, C. (1988). Learning to read and write: A longitudinal study of 54 children from first through fourth grades. *Journal of Educational Psychology*, 80, 437-447.
- Juel, C. & Roper-Schneider, D. (1985). The influence of basal readers on first grade reading. *Reading Research Quarterly*, 20, 134-152.
- Lapp, D. & Flood, J. 1992. *Teaching reading to every child*, 3rd ed. New York: Macmillan.
- Lieberman, I.Y., Shankweiler, D., & Liberman, A.M. (1989). The alphabetic principle and learning to read. In D. Shankweiler & I.Y. Liberman (eds.), *Phonology and reading disability: Solving the reading puzzle* (IARLD Research Monograph Series). Ann Arbor: University of Michigan Press.
- Lyon, G.R. (1998). Why learning to read is not a natural process. *Educational Leadership*, March, 14-18.
- Lyon, G.R. & Moats, L.C. (1997). Critical conceptual and methodological considerations in reading intervention research. *Journal of Learning Disabilities*, 30, 578-588.
- McGuinness, D. (1997). *Why our children can't read and what we can do about it*. New York: The Free Press.
- Moats, L.C. (1995) The missing foundation in teacher preparation. *American Educator*, 19, 9, 43-51.
- Nagy, W.E. & Anderson, R.C. (1984). How many words are there in printed school English? *Reading Research Quarterly*, 19, 304-330.
- Rack, J., Snowling, M., & Olson, R. (1992). The nonword reading deficit in developmental dyslexia: A review. *Reading Research Quarterly*, 27, 28-53.
- Share, D. (1995). Phonological recoding and self-teaching: Sine qua non of reading acquisition. *Cognition*, 55, 151-218.
- Snow, C.E., Burns, S.M., & Griffin, P. (eds.) 1998. *Preventing Reading Difficulties in Young Children*. Washington, D.C.: National Academy Press.
- Stanovich, K. & Siegel, L.S. (1994). The phenotypic performance profile of reading-disabled children: A regression-based test of the phonological-core variable-difference model. *Journal of Educational Psychology*, 86, 24-53.
- Templeton, S. & Bear, D. (1992). Teaching the lexicon to read and spell. In S. Templeton and D. Bear (eds.), *Development of orthographic knowledge and the foundations of literacy: A memorial Festschrift for Edmund H. Henderson* (pp. 333-352). Hillsdale, NJ: Lawrence Erlbaum.
- Torgesen, J.K., Wagner, R., & Rashotte, C. (1997) Approaches to the prevention and remediation of phonologically based reading disabilities. In B. Blachman (ed.), *Foundations of Reading Acquisition and Dyslexia: Implications for Early Intervention*. (pp. 287-304) Mahwah, NJ: Lawrence Erlbaum.
- Treiman, R. (1993). *Beginning to spell*. New York: Oxford University Press.
- Tunmer, W. & Chapman, J. (1996) Language prediction skill, phonological reading ability, and beginning reading. In C. Hulme & R.M. Joshi (eds.), *Reading and Spelling: Development and Disorder*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Wagner, R. & Barker, T. (1994). The development of orthographic processing ability. In V. Berninger (ed.), *The varieties of orthographic knowledge I: Theoretical and developmental issues* (pp. 243-276). Dordrecht, The Netherlands: Kluwer.
- Vellutino, F.R., Scanlon, D.M., & Sipay, E.R. (1997). Toward distinguishing between cognitive and experiential deficits as primary sources of difficulty in learning to read: The importance of early intervention in diagnosing specific reading disability. In B. Blachman (ed.), *Foundations of reading acquisition and dyslexia* (pp. 347-379). Mahwah, NJ: Lawrence Erlbaum.