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8

Teaching Phonemic Awareness and Phonics

An Explanation of the National Reading Panel Meta-Analyses

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Teaching beginners to read is complex. Effective instruction is needed on many fronts. My colleagues and I on the National Reading Panel (NRP) reviewed the findings of many experiments to assess the contribution of two alphabetic components of beginning reading instruction, teaching phonemic awareness and teaching systematic phonics. The statistical technique meta-analysis was used to reach conclusions. The purpose of this chapter is to summarize our approach, our findings, and their implications for beginning reading instruction. (For the complete reports, see Ehri, Nunes, Stahl, & Willows, 2001; Ehri, Nunes, Willows, et al., 2001; National Institute of Child Health and Human Development [NICHD], 2000.)

HOW ALPHABETIC KNOWLEDGE CONTRIBUTES TO READING ACQUISITION

Instruction in phonemic awareness and systematic phonics is thought to be essential for learning to read in English and many other languages because their writing systems are alphabetic. Beginners cannot become skilled readers if they do not know the system. Letters and combinations of letters (graphemes) in the spellings of words represent the smallest units of sound (phonemes) in the pronunciations of words. Phonemic awareness instruction teaches beginners to analyze and manipulate phonemes in speech, for example, how

to break the spoken word *teach* into three phonemes, /t/-/i/-/č/,[1] or how to blend these phonemes to say the whole word. Systematic phonics instruction teaches beginners letter–sound (grapheme–phoneme) correspondences and how to use these to decode and spell words. Because the writing system in English is more complex and variable than the writing systems in some other languages, it is harder to learn. This makes alphabetics instruction even more important to teach because children will have difficulty figuring out the system on their own.

A primary goal of alphabetics instruction is to teach students to read words in or out of text. There are several ways to read words (Ehri, 1991, 1994), all of which require knowledge of the alphabetic system. Unfamiliar words may be read by decoding, that is, by converting letters into sounds and blending them to form recognizable words, for example, pronouncing the three graphemes *sh*, *i*, and *p* and blending them to say "ship," or pronouncing the onset (initial consonants) and rime (vowel and following consonants) *sl* and *eep* and blending them to say "sleep." Another way to read unfamiliar words is by analogy, that is, by applying knowledge of the sounds of familiar words to read unfamiliar words, for example, applying the known word *rock* to read the new word *smock* by blending *sm* with the shared ending *-ock*. Another way to read unfamiliar words in context is by prediction using letters plus information in the text; for example, in the sentence, *For breakfast, he poured milk on his c . . .*, the final word might be *cereal, corn flakes*, or *Cheerios*. Guessing words based on partial letters, however is less reliable than and often inaccurate as compared with processing letters fully to identify words. Systematic phonics programs teach students to read words by attending to all of the letters as they represent the word's pronunciation.

Whereas unfamiliar words may be read in one of these ways, familiar words are read from memory by sight, which involves looking at the word and immediately recognizing it because it has been read before and stored in memory. People used to think that readers learned to read sight words by memorizing their visual shapes. However, research has led to a rejection of this idea. Now researchers know that sight word learning depends upon the application of letter–

[1]In this chapter, phonemes are represented by International Phonetic Alphabet symbols. For more information, go to the web site of the International Phonetic Association: http://www.arts.gla.ac.uk/IPA/ipa.html.

sound correspondences. These provide the glue that holds the words in memory for quick reading (Ehri, 1992). Becoming a skilled reader of sight words requires knowledge of phonemic segmentation, letter–sound correspondences, and spelling patterns to bond the complete spellings of specific words to their pronunciations and meanings in memory (Ehri, 1980, 1992, 1998; Perfetti, 1992; Rack, Hulme, Snowling, & Wightman, 1994; Reitsma, 1983; Share, 1999). For example, readers learn *brush* by forming connections between the graphemes *b-r-u-sh* and corresponding phonemes in the word's pronunciation along with the word's meaning. A skilled reader is able to read familiar words accurately and quickly because all of the letters have been secured in memory. In contrast, a weak reader reads words less accurately and more slowly and may even misread similarly spelled words such as *short, shirt,* and *sheet* because only some of the letters are connected to phonemes in memory. Words remain poorly connected when readers habitually guess words from partial letters and contextual cues without analyzing how all of the letters in spellings match up to phonemes in pronunciations (Ehri & Saltmarsh, 1995; Stanovich, 1980).

Alphabetics instruction is thought to help students not only recognize words but also comprehend text. Readers must be able to read most of the words in a text to understand its meaning. Although necessary, being able to read all of the words may not be sufficient because comprehending a text requires other abilities such as knowing the meanings of words, possessing relevant world knowledge, and being able to remember the text already read. Thus, word reading skill is one of several factors influencing comprehension.

Alphabetics instruction enables students to write words. Unfamiliar words may be written by creating spellings that represent sounds in the words. Familiar words are written by retrieving correct spellings from memory. As students acquire phonemic segmentation skill, knowledge of grapheme–phoneme correspondences, and familiarity with common spelling patterns and as they practice reading and writing words, they become better able to remember correct spellings (Griffith, 1991).

In sum, alphabetic instruction is thought to contribute in helping students learn to read because it teaches them phonemic awareness and use of letter–sound relations to read and spell words. Researchers have found that phonemic awareness and letter knowledge are the two best school-entry predictors of how well children will learn to read during the first 2 years of instruction (Share, Jorm,

Maclean, & Matthews, 1984). Let us take a closer look at experimental evidence regarding the effectiveness of these forms of instruction.

META-ANALYSIS OF PHONEMIC AWARENESS INSTRUCTION

What Is Phonemic Awareness Instruction?

Phonemes are the smallest units composing *spoken* language. English consists of about 41–44 phonemes, depending upon one's dialect. Phonemes combine to form syllables and words. Some words, such as *a* or *oh*, are made up of only one phoneme. Most words are blends of phonemes, such as *go* with two phonemes or *stop* with four phonemes. Phonemes are different from graphemes, which are units of *written* language that represent phonemes in the spellings of words (Venezky, 1970, 1999). Graphemes may consist of one letter, such as *p*, *t*, or *e*, or multiple letters, such as the digraphs *ch*, *-ck*, and *ea* or the trigraph *-igh*; each grapheme symbolizes one phoneme.

Phonemic awareness (PA) is the ability to focus on and manipulate phonemes in spoken words (Liberman, Shankweiler, Fischer, & Carter, 1974). Simply discriminating phonemes in words, for example, recognizing that *tan* sounds different from *Dan*, is not PA. The following tasks have been used to assess children's PA (the first six are quoted from NICHD, 2000, p. 2-10):

1. Phoneme *isolation*, which requires recognizing individual sounds in words, for example, "Tell me the first sound in *paste*" (/p/)
2. Phoneme *identity*, which requires recognizing the common sound in different words, for example, "Tell me the sound that is the same in *bike*, *boy*, and *bell*" (/b/)
3. Phoneme *categorization*, which requires recognizing the word with the odd sound in a sequence of three or four words, for example, "Which word does not belong? *bus*, *bun*, *rug*" (rug)
4. Phoneme *blending*, which requires listening to a sequence of separately spoken sounds and combining them to form a recognizable word, for example, "What word is /s/ /k/ /u/ /l/?" (*school*)

5. Phoneme *segmentation*, which requires breaking a word into its sounds by tapping . . . or counting the sounds or by pronouncing and positioning a marker for each sound, for example, "How many phonemes in *ship*?" (3 phonemes: /š/ /ı/ /p/)
6. Phoneme *deletion*, which requires recognizing what word remains when a specified phoneme is removed, for example, "What is *smile* without the /s/?" (*mile*)
7. *Onset–rime* manipulation, which requires isolation, identification, segmentation, blending, or deletion of onsets (the single consonant or blend that precedes the vowel in a syllable) or rimes (the vowel and following consonants), for example, *j-ump, st-op, str-ong*

PA instruction entails teaching beginners to perform one or several of these tasks. Students may be taught to manipulate spoken phonemes only (e.g., "Say the separate sounds in *jump*"), or students may be taught to manipulate phonemes using letters (e.g., "Say and write the separate sounds in *jump*"). Sounds are ephemeral, short-lived, and hard to grasp, whereas letters provide concrete, visible symbols for phonemes. Because of this, one might expect children to have an easier time acquiring PA when they are given letters to manipulate. Also, because letters bring children closer to the transfer tasks of applying PA in reading and spelling, one would expect transfer to be greater when PA is taught with letters.

Phonemic Awareness Meta-Analysis

We searched electronic databases and reference lists to locate all of the experimental studies testing the effectiveness of PA instruction. Studies had to exhibit several properties to qualify for our meta-analysis: They had to teach some form of PA to one group of students and had to include a control group that did not receive PA instruction; they had to measure the impact of PA instruction on reading; and they had to be published in peer-reviewed journals that utilized other researchers to screen articles for quality. We sought guidance from a previous meta-analysis (Bus & van IJzendoorn, 1999).

The final set of studies numbered 52. From these, 96 cases comparing PA instruction with a control condition were derived. When a study examined effects separately for different age or grade levels

or compared different types of PA instruction with a control group, we treated these as separate comparison cases.

Characteristics Analyzed We were interested in whether PA instruction helped students acquire PA and whether this affected their reading and spelling ability. Several measures were combined to assess reading, including word reading, pseudoword reading, reading comprehension, oral text reading, reading speed, and miscues. The spelling measure combined scores on invented spelling and correct spelling tests. Some studies examined whether PA instruction affected students' performance in math. Showing that math scores did not improve would indicate that any benefits of PA instruction were not explained by Hawthorne effects, that is enhanced performance resulting from the motivating effects of receiving special attention and trying harder on all tasks.

To determine whether PA instruction helped different types of students under different conditions, three reader groups were distinguished: typically achieving readers who did not have any reading problems; children below second grade who were at risk for developing reading difficulties as indicated by low PA, low reading, or low SES; and low-achieving readers in second through sixth grades who were reading below grade level.

Studies varied in the way that instruction was delivered. Some studies taught single forms of PA, such as blending or segmenting, whereas other studies taught combinations of PA skills. Some studies taught children to manipulate phonemes using letters, whereas other studies limited instruction to spoken phonemes. The instructional delivery unit varied across studies. Students were tutored individually or were taught in small groups (i.e., two to seven students) or in whole classrooms. The instructors were classroom teachers, researchers or their assistants, or computers. Also, the length of instruction varied across comparisons.

We recorded how rigorously each study was designed and conducted: whether treatment groups were assigned randomly, whether fidelity to treatment was checked, whether control groups received an alternative treatment or were left untreated, and how many students were sampled. In addition, we used assessments of design rigor published by another researcher (Troia, 1999).

Effect Sizes To see whether instruction with PA was more effective than instruction without PA, we calculated a statistic called

effect size by subtracting the mean of the control group from the mean of the PA treatment group and dividing by a pooled standard deviation. The DSTAT statistical package (Johnson, 1989) was used to determine weighted effect sizes and to test the influence of moderator variables. Effect sizes of studies with larger numbers of students were weighted more heavily.

Effect size tells one whether the treatment group achieved a higher score than the control group. It presents the effect of PA instruction as a number. Figure 8.1 portrays how to interpret this statistic. If the effect size is zero, there was no effect. The PA group and the control group read equally well at the end of instruction. If the effect size is a positive number, the PA group read better than

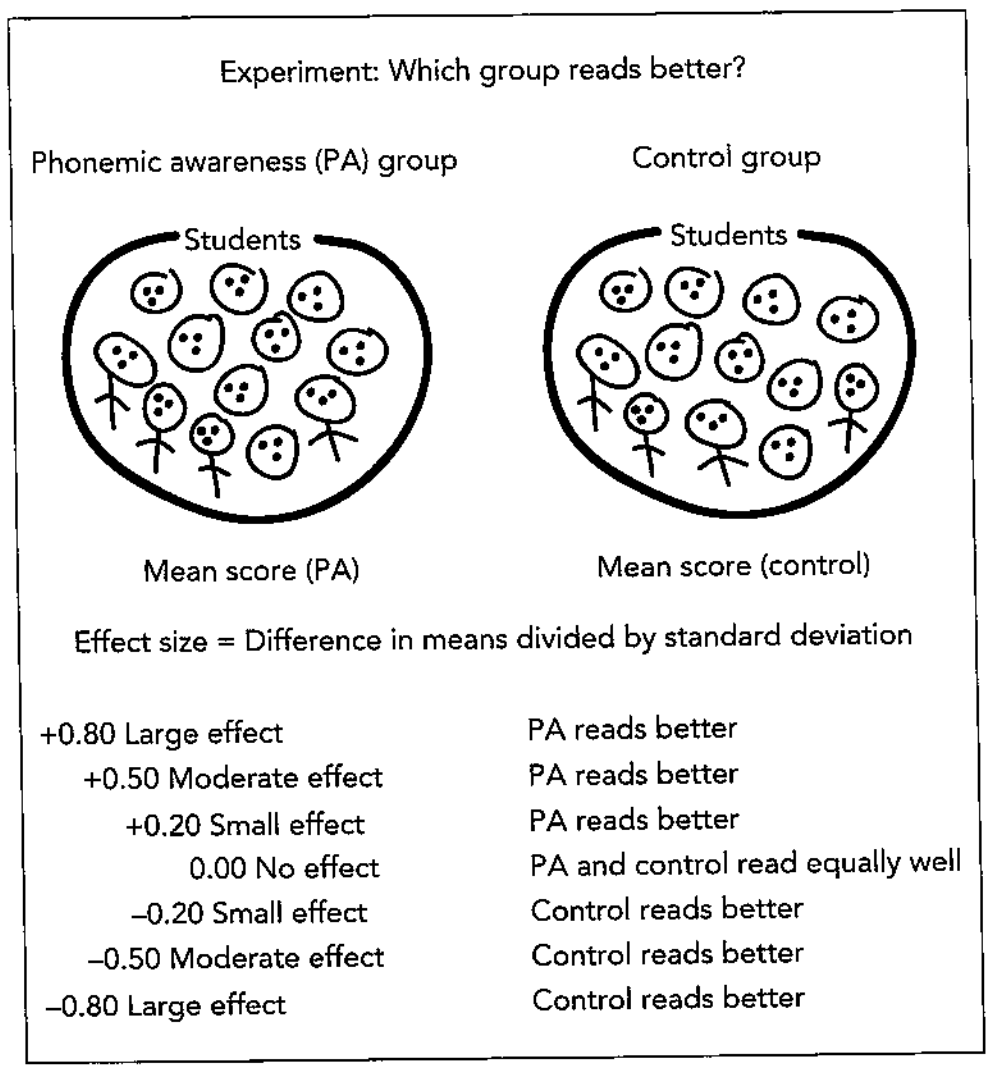

Figure 8.1. How to interpret effect size statistics.

the control group. If the effect size is a negative number, the PA group did worse than the control group. Researchers interpret 0.20 as a small effect, 0.50 as a moderate effect, and 0.80 as a large effect (Cohen, 1988).

Effect sizes were calculated on three types of measures taken after PA instruction ended: 1) PA measures to verify that PA was taught effectively, 2) reading measures to see whether PA skills helped children read, and 3) spelling measures to see whether PA skills helped children spell. In this chapter, I focus primarily on reading outcomes and report only selected effect sizes involving PA and spelling outcomes. (See Ehri, Nunes, Willows, et al., 2001, for the complete report.)

Findings Table 8.1 displays the entire pool of reading effect sizes across all studies in the database. The great majority of effect sizes were positive, indicating that students receiving PA instruction showed higher reading scores than the control group in most studies. The mean effect size was +0.53. This was statistically greater than zero and falls in the moderate range. We concluded that PA instruction helps children learn to read more effectively than no PA instruction.

Positive effects were also obtained on the other two outcomes. The mean effect size on posttests measuring PA was large, +0.86, indicating that instruction was highly effective in teaching PA. The mean effect size on spelling was +0.59, indicating that PA instruction moderately boosted spelling ability. In contrast, the mean effect size on math performance was close to zero and not significant (+0.03). This shows that the benefits of PA instruction were limited to literacy outcomes and are not explained by Hawthorne or halo effects.

The next step in the analysis was to pull out subsets of studies from the larger pool and calculate average effect sizes at the end of training for these studies. This allowed us to see whether the benefits of PA instruction held under more specific conditions, called *moderator variables.* Table 8.2 lists effect sizes on reading outcomes for the moderator variables and the number of comparisons contributing to each subset. Of course, the greater the number of comparisons in the subset, the more reliable is the effect size because it represents the average of a greater number of studies. In Table 8.2, an asterisk indicates that the effect size was statistically greater than zero,

Table 8.1. Pool of mean effect sizes of phonemic awareness (PA) instruction on reading outcomes ($N = 96$) examined in the National Reading Panel report (NICHD, 2000)

Levels of effect sizes	Observed effect sizes (at end of instruction)
4.3	4.33
4.2	4.21
3.6	3.60
2.2	2.29
2.1	2.10, 2.17
1.6	1.61, 1.61, 1.64, 1.67
1.5	1.53, 1.56, 1.58
1.4	
1.3	1.30
1.2	1 .22, 1.22
1.1	1.11, 1.17, 1.17, 1.18
1.0	1.00, 1.05, 1.06, 1.07, 1.09
0.9	0.90, 0.92, 0.96, 0.97, 0.97, 0.98, 0.99
0.8	0.82, 0.86
0.7	0.71, 0.71, 0.71, 0.72, 0.73
0.6	0.60, 0.62, 0.62, 0.65, 0.67, 0.68
0.5	0.50, 0.51, 0.52, 0.52, 0.53, 0.54, 0.56, 0.57
0.4	0.42, 0.42, 0.42, 0.44, 0.47, 0.47, 0.47, 0.48, 0.49, 0.49
0.3	0.30, 0.31, 0.33, 0.35, 0.35, 0.39
0.2	0.20, 0.21, 0.22, 0.22, 0.23, 0.27, 0.27, 0.27, 0.28, 0.28
0.1	0.11, 0.13, 0.13, 0.14, 0.15, 0.17, 0.18, 0.19
+0	0.05, 0.07, 0.08
–0	–0.05, –0.05, –0.06
–0.1	–0.10, –0.19
–0.2	
–0.3	–0.37

whereas *ns* means that the effect size was not statistically greater than zero.

In interpreting effects of the moderator variables, some caution is needed. When effect sizes are larger for some levels of a moderator than for others, concluding that the moderator caused the difference remains tentative. This is because hidden factors may be confounded with the moderator and may explain the difference. Another caution involves the comparisons contributing to any effect size. Moderator effects are calculated on only some of the studies, only those in which they occurred or those that reported the involvement of the

Table 8.2. Mean effect sizes produced by phonemic awareness (PA) instruction on reading outcomes except where specified

Moderator variables and levels	Number of cases	Mean effect size
Characteristics of reading outcomes		
Time of posttest		
End of training	90	0.53*
First follow-up	35	0.45*
Second follow-up	8	0.23*
Test of word reading		
Experimenter devised	58	0.61*
Standardized	37	0.32*
Test of pseudoword reading		
Experimenter devised	47	0.56*
Standardized	8	0.49*
Reading comprehension	20	0.34*
Other outcomes		
Phonemic awareness	72	0.86*
Spelling	39	0.59*
Math achievement	15	0.03 ns
Characteristics of participants		
Grade		
Preschool	7	1.25*
Kindergarten	40	0.48*
First grade	25	0.49*
Second through sixth grade	18	0.49*
Reading level		
Normally achieving	46	0.47*
At risk	27	0.86*
Low achieving	17	0.45*
Socioeconomic status		
Low	11	0.45*
Mid- to high	29	0.84*
Language of instruction		
English	72	0.63*
Other	18	0.36*
Characteristics of PA instruction		
Skills taught		
One skill	32	0.71*
Two skills	29	0.79*
Three or more skills	29	0.27*
Blend and segment only	19	0.67*
Use of letters		
Letters manipulated	48	0.67*
Letters not manipulated	42	0.38*

Moderator variables and levels	Number of cases	Mean effect size
Delivery unit		
Individual child	32	0.45*
Small groups	42	0.81*
Classrooms	16	0.35*
Length of instruction (hours)		
1–4.5	17	0.61*
5–9.3	23	0.76*
10–18	19	0.86*
20–75	25	0.31*
Characteristics of instructors		
Classroom teachers	22	0.41*
Researchers and others	68	0.64*
Computers	8	0.33*
Characteristics of study design		
Random assignment	46	0.63*
Fidelity checked	31	0.43*
Control group		
Treated controls	54	0.65*
Untreated controls	36	0.41*
Troia overall ranking of rigor		
High (1–12)	19	1.00*
Middle (13–24)	14	0.61*
Low (25–36)	23	0.58*

Source: Ehri, Nunes, Willows, et al., 2001.
Note: * indicates that effect size was statistically greater than zero at $p < .05$; ns indicates that effect size was not statistically greater than zero.

moderators, not all of the studies. This means that different studies may have contributed to effect sizes for different moderators, so one cannot assume that the same studies are being compared when moving to a different moderator.

Inspection of the column of mean effect sizes associated with moderator variables in Table 8.2 reveals that the vast majority (those marked with an asterisk) were significantly greater than zero. This suggests that PA instruction was effective across a variety of conditions and characteristics.

From Table 8.2, it is apparent that PA instruction affected reading not only when measured at the end of instruction but also beyond, with follow-up tests ranging from 2 to 30 months. PA instruction improved various types of reading on standardized tests and tests

created by researchers. Reading skills showing positive effects included the ability to read words and pseudowords and to comprehend text.

The effects of PA instruction on reading were examined at various grade levels (see Table 8.2). Most of the second- through sixth-grade comparisons (i.e., 14 of 18) involved low-achieving readers, so findings apply mainly to these students rather than to second through sixth graders in general. The impact of PA instruction on reading was similar for kindergartners, first graders, and second through sixth graders. The effect size for preschoolers was much larger statistically, but it was based on fewer comparisons, only seven, and in these cases reading was assessed with very simple word recognition tests.

The benefits of PA instruction for various types of students were also examined. Students at risk of becoming poor readers and students with low achievement in reading are known to have greater difficulty manipulating phonemes in words than are typically achieving readers (Bradley & Bryant, 1983; Juel, 1988; Juel, Griffith, & Gough, 1986). We examined whether PA instruction improved these students' PA. Results were positive. All three groups showed significant effects on outcome measures of PA skill: typically achieving readers (+0.93), at-risk readers (+0.95), and low-achieving readers (+0.62). Transfer of PA instruction to reading also occurred in all three groups as shown in Table 8.2. Children at risk showed statistically larger transfer effects on reading than typically and low-achieving readers, whose effect sizes were moderate.

Transfer of PA instruction to spelling differed among the reader groups. Effect sizes were large and did not differ statistically for at-risk readers (+0.76) and typically achieving readers (+0.88), indicating that PA instruction strongly benefited spelling for these students. However, the effect size was small and not statistically different from zero for low-achieving readers (+0.15), indicating that more than PA instruction is needed to improve their spelling.

Socioeconomic status (SES) made a difference. Large effect sizes on the PA outcome measures were observed among low SES (+1.02) and middle to high SES groups (+1.07). Also, reading outcomes benefited from PA instruction at both SES levels, although the effect size was statistically greater among the middle to high SES students (see Table 8.2). Because most studies of low-achieving readers did not report students' SES, these results pertain mainly to typically developing and at-risk readers.

Studies of PA instruction were conducted not only in English-reading countries but also in countries reading languages other than English. Results revealed that PA instruction exerted a much larger impact on English-reading students (see Table 8.2). One possible reason may be that the writing system of English is not as transparent in representing phonemes as are the writing systems of many of the other languages, so explicit PA instruction may make a bigger contribution to clarifying phoneme units and their linkage to graphemes in English.

Studies varied in the particular PA skills that were taught. Some studies taught one type of PA, whereas others taught two PA skills or more than two skills. On both PA and reading outcomes, instruction in one or two skills produced statistically greater effect sizes than instruction in more than two skills (see Table 8.2). Of special interest were effects of blending and segmentation instruction, both of which are thought to play a central role in learning to read and spell words. Blending phonemes helps children decode unfamiliar words. Segmenting words into phonemes helps children form connections to remember how to read and spell words. A number of studies taught children to blend and segment phonemes. As evident in Table 8.2, teaching these two PA skills produced greater benefits in reading than a multiple-skills approach did. These findings support the special value of blend-and-segment instruction.

Another feature expected to enhance the effectiveness of PA instruction involved the use of letters (graphemes) to teach PA. In some studies, children learned to manipulate phonemes using tokens marked with letters, whereas in other studies, children only spoke the sounds or they manipulated phonemes with blank tokens. Letters were expected to improve children's acquisition of PA because, as mentioned previously, they provide concrete, lasting symbols for sounds that are short-lived and hard to grasp. To test this expectation, we restricted the analysis to younger children and excluded older lower-achieving readers. This was because almost all studies with older readers taught PA with letters, thus precluding a fair comparison of the effects of letters versus no letters with these students. Results showed that the younger children acquired PA better with letters than without letters, supporting expectations. Teaching PA with letters was also expected to help children in reading more than teaching PA without letters because reading requires the processing of letters and sounds. From Table 8.2, it is apparent that PA instruction with letters produced an effect size that was almost twice as

large as the effect size without letters on reading outcomes. These findings support the importance of including letters to teach PA.

It is commonly believed that tutoring is the most effective way to deliver instruction because tutors can tailor their teaching to individual needs. Results of our analysis, however, did not support this. Findings showed significantly greater effect sizes when PA was taught to small groups than when it was taught to individual students or classrooms (see Table 8.2). This was true for both PA and reading outcomes. Small groups may have been more effective because students paid more attention, because they wanted to do as well as their peers, or because their learning was helped by watching their peers.

It is common wisdom that the more time spent teaching a skill, the greater the learning. Time spent teaching PA varied across comparisons, from 1 hour to 75 hours. We grouped the comparisons into four time blocks to determine whether longer proved better. Results failed to support expectations. Effect sizes were significantly smaller in studies in which the most time was spent teaching PA (i.e., 20–75 hours) than in studies in which moderate amounts of time were spent (i.e., 5–18 hours). This was true for both PA and reading outcomes. These findings suggest that PA instruction does not need to be lengthy to exert its strongest effect on reading.

Classroom teachers are the primary purveyors of reading instruction, so it is important to verify that they can teach PA effectively. Results showed that the effect sizes produced by classroom teachers were large on PA outcomes (+0.78) and moderate (+0.41) on reading outcomes. Very likely this underestimates the impact of PA instruction on reading in actual classrooms. In these experiments, reading was only measured as an outcome. Teachers did not intervene to help children use their PA skills to read. If transfer to reading occurred, it was unassisted. This contrasts with normal classroom instruction, in which teachers not only teach PA but also teach children how to apply it in their reading and give their students practice doing this. Under the latter circumstances, much bigger effects on reading would be expected.

Another question of interest was whether effects of PA instruction were evident in the most rigorously designed experiments, that is, those using random assignment, those checking teachers' fidelity to instruction, and those giving the control group a special treatment rather than no instruction. In all cases, mean effect sizes were significantly greater than zero and moderate to large in size (see Table 8.2). This shows that the best-designed experiments yielded strong effects.

Troia (1999) published a critique of PA instruction studies in which he rated the methodological rigor of 28 of the 52 studies in our database. We adopted Troia's rigor rankings and grouped the studies into high, middle, and low rankings. We found that effect sizes for the most rigorous studies were statistically larger than effect sizes for the less rigorous studies (see Table 8.2). These findings again confirm that the best-designed experiments yielded the strongest effects.

In sum, findings of the meta-analysis were positive. The benefits of PA instruction were replicated multiple times across experiments and thus provide solid support for the claim that PA instruction is more effective than alternative forms of instruction or no instruction in teaching PA and in helping students learn to read and spell. Effects of PA instruction were greater under some circumstances than under others. These findings support the value of teaching PA to students.

META-ANALYSIS OF SYSTEMATIC PHONICS INSTRUCTION

What Is Systematic Phonics Instruction?

Phonics is a method of instruction that teaches students correspondences between letters in written language and phonemes in spoken language and how to use these correspondences to read and spell words. Phonics instruction is *systematic* when all of the major letter–sound correspondences are taught and are covered in a clearly defined sequence. This includes short and long vowels and vowel and consonant digraphs consisting of two letters representing one phoneme, such as *oi, ea, sh,* and *th.* Also, phonics instruction may include blends of letter sounds that represent larger subunits in words such as consonant pairs (e.g., *st, bl*), onsets, and rimes.

Over the years educators have disagreed about how beginning reading should be taught. Some have advocated starting with a systematic phonics approach, whereas others have argued for a whole word approach or a whole language approach. Disagreement has centered on whether teaching should begin with explicit instruction in letter–sound correspondences; whether it should begin with memorizing whole words; or whether initial instruction should be meaning centered, with letter–sound correspondences taught incidentally in context as needed.