

CHAPTER  
3

Fluency





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# FLUENCY

## Executive Summary

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### Introduction

Fluent readers can read text with speed, accuracy, and proper expression. Fluency depends upon well developed word recognition skills, but such skills do not inevitably lead to fluency. It is generally acknowledged that fluency is a critical component of skilled reading. Nevertheless, it is often neglected in classroom instruction. That neglect has started to give way as research and theory have reconceptualized this aspect of reading, and empirical studies have examined the efficacy of specific approaches to teaching fluency. Here the National Reading Panel (NRP) will provide a summary of the evidence supporting the effectiveness of various instructional approaches that are intended to foster this essential ingredient in successful reading development.

The purpose of this report of the NRP was to review the changing concepts of fluency as an essential aspect of reading, and to consider the effectiveness of two major instructional approaches to fluency development and the readiness of these approaches for wide use by the schools. The first major approach that was analyzed includes procedures that emphasize repeated oral reading practice or guided repeated oral reading practice. These procedures include repeated reading (Samuels, 1979), neurological impress (Heckelman, 1969), radio reading (Greene, 1979), paired reading (Topping, 1987), and a variety of similar techniques aimed at developing fluent reading habits. The second major approach considered here includes all formal efforts to increase the amounts of independent or recreational reading that children engage in, including sustained silent reading programs (Hunt, 1970), the Accelerated Reader (Advantage Learning Systems, 1986), and various incentive programs (i.e., S. Shanahan, Wojciehowski, & Rubik, 1998).

There were a number of reasons why the NRP selected fluency for review and analysis. One is that there is growing concern that children are not achieving fluency in reading. Recently, the National Assessment of Educational Progress conducted a large study of the

status of fluency achievement in American education (Pinnell et al., 1995). That study examined the reading fluency of a nationally representative sample of fourth graders, and found 44% of students to be disfluent even with grade-level stories that the students had read under supportive testing conditions. And furthermore, that study found a close relationship between fluency and reading comprehension. Students who are low in fluency may have difficulty getting the meaning of what they read. Given this, it is not surprising that the National Research Council report, Preventing Reading Difficulties in Young Children (Snow, Burns, & Griffin, 1998), states “Adequate progress in learning to read English (or, any alphabetic language) beyond the initial level depends on sufficient practice in reading to achieve fluency with different texts” (p. 223), and that it recommended, “Because the ability to obtain meaning from print depends so strongly on the development of word recognition accuracy and reading fluency, both the latter should be regularly assessed in the classroom, permitting timely and effective instructional response when difficulty or delay is apparent” (p. 7).

### Background

There is common agreement that fluency develops from reading practice. What researchers have not yet agreed upon is what form such practice should take to be most effective. For example, one approach is to have students read passages orally with guidance and feedback. Programs in this category include *repeated reading*, *neurological impress*, *paired reading*, *shared reading*, and *assisted reading*, to note the most popular procedures.

Another, less explicit, but widely used approach, is to encourage students to read extensively on their own or with minimal guidance and feedback. Programs in this category include all efforts to increase the amounts of independent or recreational reading including sustained silent reading (SSR), Drop Everything and Read, Accelerated Reader (AR), and various incentive programs. Often these approaches have no formal name, but take the form of requirements that students engage



in unsupervised independent reading at school or home. This report examined the evidence concerning the effectiveness of both guided oral reading procedures and approaches that encourage students to read more.

## Methodology

### How Was the Analysis of the Research Literature Conducted?

The NRP conducted an extensive and systemic literature review on these two approaches to the development of fluency. Using the methodology and criteria developed for this purpose by the NRP, to reach its conclusions on the effectiveness of each approach, the Panel included only:

1. Studies that were experimental tests of the procedures under examination.
2. Studies that were conducted with students in kindergarten through grade 12.
3. Studies that had appeared in a refereed journal.
4. Studies that had been carried out with English language reading.

Each study which met these criteria was summarized and coded. Where appropriate, the studies were analyzed for their effect sizes, as this allowed the Panel to determine quantitatively the amount of difference such procedures made in children's reading development. Studies that could not be analyzed quantitatively were also examined in order to evaluate the consistency of their findings with those obtained from the quantitative studies.

In its work, the Panel searched two separate databases: PsycINFO and ERIC. The search using PsycINFO identified 1,260 potential articles on instructional PsycINFO approaches to teaching repeated oral reading. This number was deemed too large to search efficiently, so the Panel limited its search to articles that had been published since, and including, 1990. This reduced the number of articles for this topic to 346. A parallel search using ERIC identified 410 potential articles. Removing redundant articles between the two databases resulted in 364 unique articles. Review of each of these article's adherence to the NRP criteria resulted in a total of 77 articles that were coded for possible use in the final analysis.

A similar search process was carried out to identify and locate articles on the effectiveness of encouraging independent silent reading practice. Search of the PsycINFO database identified 478 articles, while the ERIC database identified 325 articles. Removing redundant articles resulted in 603 unique articles on instruction in the various approaches to encouraging independent reading practice. Review of each of the article's adherence to the NRP criteria resulted in the identification of 92 articles. Further careful analysis of these articles according to their adherence to the methodology of the NRP selection procedures resulted in further reduction, with a resulting 14 of which could be used in the meta-analysis to address the Panel's question of whether this instructional approach has proven to be effective in improving reading fluency. Additionally, this analysis was bolstered through a qualitative analysis of 37 other studies that also met these criteria but that could not be used in the meta-analysis for various reasons. These studies were checked for their consistency of findings with those analyzed in the meta-analysis.

As a result of the limitations of the number and quality of studies examining the effectiveness of encouraging independent reading, a meta-analysis was appropriate only in examining the effectiveness of repeated oral reading instructional approaches. In the meta-analysis, the primary statistic used was "effect size," indicating the extent to which performance of the treatment group is greater than performance of the control group. For example, an effect size of 1.0 indicates that the treatment group mean was one standard deviation higher than the control group mean, revealing a strong effect of guided oral reading instruction. In contrast, an effect size of 0 indicates that treatment and control group means were identical and that the treatment had no measurable effect on measured reading performance. In practice, the strength of an effect size can be gauged: a value of 0.20 is considered small; 0.50 is moderate, and 0.80 is large. When available, effect sizes were calculated to determine whether repeated oral reading improved children's accuracy, fluency, and comprehension.



## Results and Discussion

### What Do the Results of the Analysis of Studies on the Development of Fluency Show?

#### **Are guided repeated oral reading procedures effective in improving reading fluency and overall reading achievement?**

The answer was a clear yes. The analysis of guided oral reading procedures led to the conclusion that such procedures had a consistent, and positive impact on word recognition, fluency, and comprehension as measured by a variety of test instruments and at a range of grade levels.

#### **What do results of the meta-analysis of guided oral reading procedures show?**

Overall, the study found a weighted effect size average of 0.41, suggesting that guided oral reading has a moderate impact upon reading achievement. Analysis indicated that repeated reading procedures have a clear impact on the reading ability of non-impaired readers through at least grade 4, as well as on students with various kinds of reading problems throughout high school. All approaches were associated with positive effect sizes; however, the sample sizes were generally too small to carry out further analyses comparing one treatment to another within this category.

The interventions demonstrated somewhat differential effects on reading outcomes. The highest impact was on reading accuracy, with a mean effect size of 0.55; the next was on reading fluency, with a mean effect size of 0.44, and the least, but still impressive impact was on reading comprehension, where the effect size was 0.35. In studies where these reading outcome measures were aggregated, the mean effect size was 0.50. These data provide strong support for the supposition that instruction in guided oral reading is effective in improving reading.

#### **Is there evidence that encouraging children to read on their own is effective in increasing reading fluency and overall reading achievement?**

The NRP also examined the accumulated research literature on the effects of programs (for example, Sustained Silent Reading and Accelerated Reader) that encourage children to read on their own. The Panel was able to locate relatively few studies on this topic,

and these tended to address a narrow range of procedures. The studies examined the impact of encouraging independent reading on overall reading, rather than on reading fluency, per se. Most of these studies failed to find a positive relationship between encouraging reading and either the amount of reading or reading achievement. Furthermore, few of the studies actually monitored the amount of reading students did in the program; therefore, it is unclear whether the interventions led to more reading, or just displaced other reading that students might have done otherwise. Based on the existing evidence, the NRP can only indicate that while encouraging students to read might be beneficial, research has not yet demonstrated this in a clear and convincing manner.

## Conclusions

### What Conclusions Can Be Drawn From This Analysis of Fluency Development Studies?

#### **Can fluency be encouraged through instructional procedures?**

Yes. An extensive review of the literature indicates that classroom practices that encourage repeated oral reading with feedback and guidance leads to meaningful improvements in reading expertise for students—for good readers as well as those who are experiencing difficulties.

## Implications for Reading Instruction

### Is It Important to Increase Fluency?

Teachers need to know that word recognition accuracy is not the end point of reading instruction. Fluency represents a level of expertise beyond word recognition accuracy, and reading comprehension may be aided by fluency. Skilled readers read words accurately, rapidly and efficiently. Children who do not develop reading fluency, no matter how bright they are, will continue to read slowly and with great effort.

### Are These Results Ready for Implementation in the Classroom?

Yes, the NRP found that a range of well-described instructional approaches to encouraging repeated oral reading result in increased reading proficiency. These approaches are well documented and referenced here.



In contrast, the NRP did not find evidence supporting the effectiveness of encouraging independent silent reading as a means of improving reading achievement.

The results of this study indicate that teachers should assess fluency regularly. Both informal as well as standardized assessments of oral reading accuracy, rate and comprehension are available and referenced in the full report.

The demonstrated effectiveness of guided oral reading compared to the lack of demonstrated effectiveness of strategies encouraging independent silent reading suggests the importance of explicit compared to more implicit instructional approaches for improving reading fluency.

### Directions for Further Research

The National Reading Panel's extensive review demonstrated good reason to provide instruction encouraging the development of fluency and overall reading proficiency, and indicated which specific approaches the evidence supports as being most effective in increasing fluency. However, this review reveals important gaps in our knowledge. Future research is necessary to address some of these questions.

Research is needed to address the question of the relationship between guided oral reading instruction and the development of fluency. What elements of instructional practice are most responsible for improved

fluency? Research is needed to attempt to disentangle the particular contributions of components of guided reading, such as oral reading, guidance, repetition, and text factors. And it is important to know for which children, at what level of reading ability and in what setting and by whom (teachers, classroom aides, peers, parents) and for how long do different approaches to guided oral reading work best?

Research is needed over longer time spans to provide information about the emergence of fluency and its relationship to specific instructional practices. And where along the development of reading are what specific approaches to encouraging fluency most effective?

Research is needed to study in more analytic and rigorous ways, the impact of independent reading on a range of reading outcomes. Since encouraging independent reading is so intuitively appealing and so frequently recommended, it is critical to clarify in a more definitive way the relationship between programs that encourage independent reading and reading development. There is a clear need for rigorous experimental research on the impact of programs that encourage reading on different populations of students at varying ages and reading levels using several different reading outcomes, including amount of reading and specific components of reading achievement, and where the amount of independent reading is carefully monitored.



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# FLUENCY

## Report

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The purpose of this report of the NRP is to review the changing concepts of fluency as an essential aspect of reading and to consider the effectiveness of two major instructional approaches to fluency development and the readiness of these approaches for wide use by the schools: first, procedures that emphasize repeated oral reading practice or guided repeated oral reading practice; and second, all formal efforts to increase the amounts of independent or recreational reading that children engage in, including sustained silent reading programs. Because of the fundamental differences in these two approaches, and because of the differing amounts and nature of the articles in these two areas, the Panel was able to perform meta-analysis only on studies relevant to the first topic, repeated oral or guided reading. There were too few experimental studies of the variety of approaches to silent reading for such an analysis; therefore, the Panel performed a more informal analysis of these studies, but felt that some discussion of the studies was nonetheless important.

As a result of these different types of analyses, this report is organized in a slightly different way from the other subreports by the Panel. First, an overall introduction addresses the importance of the development of fluency in reading and provides background for two subsections. From that point, the report is organized in two major sections, with individual methods, results and discussion, implications for reading instruction and directions for future research. Finally, the Panel offers overall conclusions on extant research addressing reading fluency.

### Introduction

Fluency, the ability to read a text quickly, accurately, and with proper expression, has been described as the “most neglected” reading skill (Allington, 1983), and with good reason. For much of the 20th century, researchers and practitioners alike assumed that fluency was the immediate result of word recognition proficiency, so efforts were directed towards the development of word recognition, whereas fluency itself was largely ignored. That neglect has started to give way during the past three decades as research and

theory have reconceptualized this aspect of reading performance. Research has increasingly turned towards considerations of how instruction and reading experience contribute to fluency development.

The purpose of this report is to review the changing concepts of fluency as an essential aspect of reading and to consider the effectiveness of two major instructional approaches to fluency development and the readiness of these approaches for wide use by the schools. The first major approach that will be analyzed here includes procedures that emphasize repeated oral reading practice or guided repeated oral reading practice. These procedures include repeated reading (Samuels, 1979), neurological impress (Heckelman, 1969), radio reading (Greene, 1979), paired reading (Topping, 1987), and a variety of similar techniques aimed at developing fluent reading habits. The second major approach considered here includes all formal efforts to increase the amounts of independent or recreational reading that children engage in, including sustained silent reading programs (Hunt, 1970), the Accelerated Reader (Advantage Learning Systems, 1986), and various incentive programs (i.e., Shanahan, Wojciehowski, & Rubik, 1998).

Why is fluency important and how well are students doing in achieving fluency? The National Assessment of Educational Progress conducted a large study of the status of fluency achievement in American education (Pinnell et al., 1995). That study examined the reading fluency of a nationally representative sample of 4th graders and found 44% of students to be disfluent even with grade-level stories that the students had read under supportive testing conditions. Moreover, that study found a close relationship between fluency and reading comprehension. Students who are low in fluency may have difficulty getting the meaning of what they read. Given this, it is not surprising that the National Research Council report, *Preventing Reading Difficulties in Young Children* (Snow, Burns, & Griffin, 1998), states “Adequate progress in learning to read English (or any alphabetic language) beyond the initial level depends on sufficient practice in reading to achieve fluency with different texts” (p. 223), and that it recommends,



“Because the ability to obtain meaning from print depends so strongly on the development of word recognition accuracy and reading fluency, both should be regularly assessed in the classroom, permitting timely and effective instructional response when difficulty or delay is apparent” (p. 7).

### Changing Concepts of Fluency

Over the past three decades, our understanding of what is involved in reading fluency has been altered and enlarged. One finds, for example, in the 1974 LaBerge and Samuels’ article on automatic information processing in reading, an emphasis on word recognition. This same focus persists in the *The Literacy Dictionary definition* (Harris & Hodges, 1995) that states that fluency is “freedom from word identification problems.” More recent conceptualizations of fluency, however, have been extended beyond word recognition and may embrace comprehension processes as well (Thurlow & van den Broek, 1997).

In its early conception, it was recognized that fluency requires high-speed word recognition that frees a reader’s cognitive resources so that the meaning of a text can be the focus of attention. However, it is now clear that fluency may also include the ability to group words appropriately into meaningful grammatical units for interpretation (Schreiber, 1980, 1987). Fluency requires the rapid use of punctuation and the determination of where to place emphasis or where to pause to make sense of a text. Readers must carry out these aspects of interpretation rapidly—and usually without conscious attention. Thus, fluency helps enable reading comprehension by freeing cognitive resources for interpretation, but it is also implicated in the process of comprehension as it necessarily includes preliminary interpretive steps.

### Early Research on Expertise and Fluency

Recognition of the importance of automatic processes and reading fluency is not new to psychology or education. During the last century, and certainly in the last 30 years, there has been interest in skills acquisition and expertise. Many early investigations of expertise focused on perceptual-motor skills. For example, the *Principles of Psychology* (James, 1890) explained the importance of practice and repetition in the development of the skills that enabled someone to

perform complex acts with ease, and the Bryan and Harter (1899) studies described how telegraph operators learned to send and receive Morse code accurately in larger and larger units.

Not all research was carried out during this early period addressed psychomotor behavior, however. Huey’s (1905) book on the reading process became a classic in the field in part because it summarized the research findings of the 1800s on word recognition and eye movements during reading and in part because it was the harbinger for what would later develop into the cognitive psychology paradigm. In that work, Huey made the following perceptive observation about the development of fluency:

Perceiving being an act, it is, like all other things that we do, performed more easily with each repetition of the act. To perceive an entirely new word or other combination of strokes requires considerable time, close attention, and is likely to be imperfectly done, just as when we attempt some new combination of movements, some new trick in the gymnasium or new “serve” at tennis. In either case, repetition progressively frees the mind from attention to details, makes facile the total act, shortens the time, and reduces the extent to which consciousness must concern itself with the process (p. 104).

From about 1910 until the middle of the 1950s, during what we now designate as the period of “Behaviorism,” little research was done on automaticity or reading fluency. Researchers who worked within psychology’s behavioral paradigm tended to shy away from research on reading as a psychological process. But, by the 1970s, the pendulum had moved away from behaviorism and back to studies of “inside-the-head” phenomena such as problemsolving and reading. As a result, cognitive psychologists of the period again considered issues such as letter recognition (Posner & Snyder, 1975) and lexical access (Neely, 1977).

It was during this period that linguists attempted to describe the reading process. Fries (1962), for example, discussed the importance of mapping spoken language onto print within reading. According to Fries, to be considered a fluent reader, a person has to do this language mapping rapidly and easily. Soon after, LaBerge and Samuels (1974) published their general

theory of automatic information processing in reading in which they explained why automaticity in word recognition was an important prerequisite to skilled reading comprehension. This insight was echoed and expanded in later work.

By this point, theoreticians began to wonder about how fluency skills develop. Stanovich (1990), for example, was critical of assumptions regarding cognitive resource limitations, and Logan's (1997) instance theory explained how a single exposure to a word could leave a sufficient memory trace to allow it to be recognized automatically in the future.

### Defining Automaticity and Fluency

There has been a high degree of overlap in the use of terms such as "automaticity" and "fluency." Most scholars treat automaticity as the more general term that embraces a wide variety of behaviors, ranging from motor skills such as driving and typing to cognitive skills such as reading. Some would prefer to reserve the term "fluency" for reading or other language phenomena. This distinction, however, is not universally recognized. For example, *The Literacy Dictionary* (Harris & Hodges, 1995) defines "fluency" as "freedom from word identification problems that might hinder comprehension . . ." whereas, in the same source, "automaticity" is defined as "fluent processing of information that requires little effort or attention." In other words, automaticity and fluency are often used synonymously.

Actually, the fundamental idea of automaticity requires much more than that information be processed with little effort or attention. This definition has the advantage of simplicity, but it suffers from the fact that it includes within its scope acts that result from innate forces. For example, many behaviors would fall within this definition of automaticity—such as the avoidance of a steep dropoff by newborn mountain goats or the eye blinking and avoidance behaviors exhibited by 3-week-old infants at the rapid approach of a looming object—even though these are not highly skilled expert behaviors. A proper definition of automaticity would rule out behaviors that can be carried out without much previous experience. Automaticity involves the processing of complex information that ordinarily requires long periods of training before the behavior can be executed with little effort or attention. This definition

would include various reading behaviors or processes because it is clear that it takes a considerable period of time and substantial practice before even the fastest learners can be considered to be fluent readers.

Furthermore, researchers have generated property lists that can be used to distinguish automatic from non-automatic processes. According to Logan (1997), "The general strategy was to find a list of properties that could be used to define and diagnose automaticity, so that processes, tasks, or performances that possessed those properties could be designated 'automatic,' and processes, tasks, and performances that did not possess them could be designated 'non-automatic'" (p. 124).

One such list described three general properties essential to automaticity (Posner & Snyder, 1975), indicating that the behavior be carried out without immediate intention, without conscious awareness, and without interfering with other process that are occurring at the same time. Shiffrin and Schneider (1977) augmented this list to include two additional properties. They claim that automatic processes are acquired gradually as the result of extended practice and that once activated these processes continue to completion because they are difficult to suppress. The importance of practice in the development of automaticity is also evident in Ackerman's (1987) description:

Automatic processes are characterized as fast, effortless (from a standpoint of allocation of cognitive resources), and unitized (or proceduralized) such that they may not be easily altered by a subject's conscious control, and they may allow for parallel operation with other information processing within and between tasks. . . . *These processes may be developed only through extensive practice under consistent conditions, which are typical of many skill acquisition situations* [p. 4, emphasis added].

Logan (1997) applies the automaticity construct to reading directly by highlighting the role of speed, effortlessness, autonomy (i.e., ability to be completed without intention or deliberation), and lack of consciousness or awareness, although he fails to emphasize the importance of practice or repetition within his description. However, Logan emphasizes one more essential dimension of automaticity in reading that makes his contribution essential to this discussion.



The property list approach defines automaticity in terms of a list of binary-opposite properties. . . . This view has suggested to some that automatic processes should share all of the properties associated with automaticity (i.e., they should be fast, effortless, autonomous, and unconsciousness) (Logan, 1997).

However, according to Logan, automaticity should be viewed as a continuum rather than a dichotomy. This distinction has important implications for reading.

To show the importance of thinking of fluency as a continuum, consider reading speed as one example. Reading speed at the early stages of instruction tends to be slow and even labored. However, if we examine a student after years of practice, we will typically find that a rapid rate of reading speed has been attained. Was the shift from slow to fast an abrupt one in which the reader was transformed from a nonfluent to a fluent reader, or was this a more gradual change? This question can be answered using data gathered as children practice reading over time. Such data reveal a gradual, continuous improvement in reading speed in which only the beginning and end points could be justifiably characterized as “slow” or “fast.” Reading speed, like other aspects of fluency or other automatic behaviors, shows gradual or incremental improvement through practice (Samuels, 1979).

### **Beyond Accuracy to Automaticity: Why Automatic Decoding Matters**

One of the key reasons for the abiding interest in the word recognition process is the consistent finding that development of efficient word recognition skills is associated with improved comprehension (Calfee & Piontkowski, 1981; Herman, 1985; Stanovich, 1985). To understand how efficient word recognition skills can influence other reading processes such as comprehension, word recognition must be fractionated into its component elements such as accuracy of word recognition and the automaticity of word recognition. In the early stage of reading instruction, the beginning reader may be accurate in word recognition but the process is likely to be slow and effortful. With increased practice and repeated exposure to the words in the texts that the student reads, word recognition continues to be accurate but there would be improvements evident in the speed and ease of word recognition as

well. Continued reading practice helps make the word recognition process increasingly automatic. In some situations, however, teachers may persist in trying to develop a high degree of word recognition accuracy without commensurate attention to other essential dimensions of fluency (i.e., speed, expression) or may accept recognition accuracy as a sufficient outcome of instruction without any emphasis on true fluency.

Although accuracy in word recognition is, indeed, an important reading milestone, accuracy is not enough to ensure fluency—and without fluency, comprehension might be impeded.

Why do problems with reading accuracy, speed, and expression interfere with comprehension? To answer this question, we need to examine the reading process in terms of two basic cognitive tasks. The reader must recognize the printed words (decoding) and construct meaning from the recognized words (comprehension). Both decoding and comprehension require cognitive resources. At any given moment, the amount of cognitive resources available for these two tasks is restricted by the limits of memory. If the word recognition task is difficult, all available cognitive resources may be consumed by the decoding task, leaving little or nothing for use in interpretation. Consequently, for the nonfluent reader, difficulty with word recognition slows down the process and takes up valuable resources that are necessary for comprehension. Reading becomes a slow, labor-intensive process that only fitfully results in understanding.

The reading task for the fluent reader is easier than the one facing the nonfluent reader. After considerable practice, the fluent reader has learned how to recognize the printed words with ease and speed, and few cognitive resources are consumed in the process. In essence, the reader has become automatic at the word recognition task. Because the cognitive demands for word recognition are so small while the word recognition process is occurring, there are sufficient cognitive resources available for grouping the words into syntactic units and for understanding or interpreting the text. The fluent reader is one who can perform multiple tasks—such as word recognition and comprehension—at the same time. The nonfluent reader, on the other hand, can perform only one task at a time. The “multitask functioning” of the fluent reader

is made possible by the reduced cognitive demands needed for word recognition and other reading processes, thus freeing cognitive resources for other functions, such as drawing inferences.

Being an “automatic” or “fluent” reader should not be thought of as a stage of development in which all words can be processed quickly and easily. Even highly skilled readers may encounter uncommon, low-frequency words such as *oenology*, *epistrophe*, *anfractuous*, *faience*, *casuistically*, and *contralesional*—words that they cannot recognize automatically but that require some reliance on decoding strategies. Skilled readers usually have several options available for word recognition. They can recognize words automatically or, in cases like these, they can use controlled effortful strategies to decode the word. Unskilled readers, on the other hand, are limited to controlled effortful word recognition.

Research on the eye in the past 2 decades has provided a perspective from which to observe the fluent reading process. These studies take a picture of how the eye moves and what it fixates on during reading. For the most part, readers—no matter how fluent—have to fixate on or look at each word in a text. However, more skilled readers come to fixate on function words (words such as *of*, *the*, *to*, etc.) less often than on content words. It is not so much that fluent readers skip function words as that their facility with such words allows them to see them adequately at the edge of their visual field—while fixating on other words—without having to stop to look at them specifically (Carpenter & Just, 1983; Rayner & Duffy, 1988; Radach & Kempe, 1993). Skilled readers also get better at seeing a word in a single fixation; therefore, they evidence fewer refixations on the same words and fewer short regressions in which they have to come back to look at a word again after they have read other words (Frazier & Rayner, 1982; Kennedy, 1983; Kennedy & Murray, 1987a, 1987b; Murray & Kennedy, 1988). Skilled readers learn to develop a broader perceptual span or word identification span during reading that allows them to take in more information about words in a single fixation (Ikeda & Saida, 1978; McConkie & Rayner, 1975; McConkie & Zola, 1987; Rayner, 1986; Underwood & McConkie, 1985). The placement and

overlap of these fixations improve in efficiency as well, allowing fluent readers to integrate the information from each fixation more effectively (McConkie & Zola, 1979; Rayner, McConkie, & Zola, 1980).

Rayner (1998) has summed up the differences in eye movements between good and poor readers:

There are well-known individual differences in eye movement measures as a function of reading skill: Fast readers make shorter fixations, longer saccades [the jump of the eye from one fixation to another], and fewer regressions than slow readers (Everatt, Bradshaw, & Hibbard, 1998; Everatt & Underwood, 1994; Rayner, 1978b; Underwood, Hubbard, & Wilkinson, 1990) . . . . In characterizing the eye movement patterns of dyslexic readers, Olson, Kliegl, Davidson, & Foltz (1985) categorized such readers as *plodders* and *explorers*; plodders made relatively short forward saccades, and more regressions, whereas explorers showed more frequent word skipping, longer forward saccades, and more regressions (p. 392).

## Indicators of Fluent Reading

A number of informal procedures can be used in the classroom to assess fluency. Informal reading inventories (Johnson, Kress, & Pikulski, 1987), miscue analysis (Goodman & Burke, 1972), pausing indices (Pinnell et al., 1995), running records (Clay, 1972), and reading speed calculations (Hasboruck & Tindal, 1992). All these assessment procedures require oral reading of text, and all can be used to provide an adequate index of fluency.

For example, informal reading inventories (IRI) require students to read grade-level passages aloud and silently. The teacher determines a reading level by calculating the proportion of words read accurately in the passage. To ensure that students do not focus solely on fluency—at the expense of comprehension—the student is expected to summarize or answer questions about the text.



The Gray Oral Reading Test–3 (GORT–3) (Wiederholt & Bryant, 1992) is a standardized measure requiring oral reading and providing scoring for reading accuracy, rate, and passage comprehension. In addition, Wagner, Torgesen, and Rashotte (1999) have recently published a standardized measure of word reading efficiency that tests the speeded reading of single words.

The National Assessment of Educational Progress fluency study noted earlier (Pinnell et al., 1995) calculated speed and accuracy but performed most analyses on the basis of a four-point pausing scale. This scale provided a description of four levels of pausing efficiency with one point assigned to readings that were primarily word by word with no attention to the author’s meaning, to four points for readings that attended to comprehension and that paused only at the boundaries of meaningful phrases and clauses.

### Fluency and Practice

How does one become so fluent in reading that words are recognized accurately, quickly, and with ease and so that a text sounds like spoken language when read aloud? The conventional wisdom is that it is only through extended practice in which large quantities of material are read that the student develops fluency skills that go beyond accuracy of recognition to automaticity of recognition (Allington, 1977, 1984; Snow, Burns, & Griffin, 1998). But how accurate is conventional wisdom? One might assume that with all the research that has been done on factors that produce superior readers, that there would be solid experimental evidence showing a causal connection between input variables such as time spent reading or the amount read and reading outcomes such as fluency.

What is surprising is that most of the evidence linking up input variables such as amount read and output variables such as reading ability is correlational. For example, in a longitudinal study of 54 children, Juel (1988) estimated that 1st grade children with good word recognition skills were exposed to about twice as many words in basal text as children with poor word recognition skills. Biemiller (1977-1978) also reported similar differences in print exposure among readers with different levels of reading ability, and Taylor and her colleagues (Taylor et al., 1999) found that high-achieving primary classes allotted more time for independent reading.

There is ample evidence that one of the major differences between poor and good readers is the difference in the quantity of total time they spend reading. Allington (1977) in his article “If they don’t read much, how they ever gonna get good?” found that the students who needed the most practice in reading spent the least amount of time in actual reading. Biemiller (1977-1978) similarly reported substantial ability group differences related to how much reading was done, and Allington (1984) in a sample of first grade students found that as little as 16 words were read in a week by one child in a low-reading group compared to a high of 1,933 words for a child in a high-reading group. Nagy and Anderson (1984) claimed that good readers may read ten times as many words as the poor readers in a given school year. Stanovich (1986), in his article “Matthew effects in reading,” suggested that students who start out as poor readers often remain that way. In the Bible chapter on Matthew (Matthew, 25:29), there is the phrase “The rich get richer and the poor get poorer.” Stanovich applied this Biblical phrase as a metaphor to reading, claiming poor readers read less than good readers, and he speculated that because of this difference, year after year the gap between the two groups increases. More recent empirical evidence indicates that while poor readers remain poor readers, the gap between the two groups does not increase (Shaywitz et al., 1995).

Although correlational findings may be useful, they also can be deceptive because correlations tell nothing about the direction or sequence of a relationship. That good readers read more could be because reading practice contributes to reading attainment, but it could also be simply that better readers choose to read more because they are good at it. If this is true, then it is reading achievement that stimulates reading practice, not the reverse. Although there is an extensive amount of correlational data linking amount of reading and reading achievement (Cunningham & Stanovich, 1998; Krashen, 1993), such studies do not permit a clear delineation of what is antecedent and what is consequent.

What kinds of practice develop fluency? If fluency were just a word recognition phenomenon, then having students reviewing and rehearsing word lists might make sense. Although there is some benefit to isolated word recognition study of this type, the evidence is that such training is insufficient as it may fail to transfer

when the practiced words are presented in a meaningful context (Fleischer, Jenkins, & Pany, 1979). Competent reading requires skills that extend beyond the single-word level to contextual reading, and this skill can best be acquired by practicing reading in which the words are in a meaningful context.

In the sections below, the Panel examines the evidence supporting two major approaches to teaching fluency—first, repeated oral reading and then, silent reading practice.

## Repeated Reading and Guided Repeated Oral Reading

Although theories of fluency have emphasized the primacy of practice effects in reading development, most of the evidence has been correlational or ambiguous. Fortunately, several procedures for developing fluency directly through instructional practice have been proposed and evaluated during the past two decades. These procedures typically emphasize repeated reading or guided oral reading practice, including techniques such as repeated reading, neurological impress, radio reading, paired reading, and a variety of other similar procedures. The purpose of each of these procedures is to help students through oral reading practice and guidance to develop fluent reading habits that would allow them to read text more quickly, accurately, and with appropriate expression and understanding.

Historically, most of the instructional attention accorded to oral fluency was developed through round-robin reading, a still widely used approach in which teachers have students take turns reading parts of a text aloud (Opitz & Rasinski, 1998). These procedures have been criticized as boring, anxiety provoking, disruptive of fluency, and wasteful of instructional time, and their use has been found to have little or no relationship to gains in reading achievement (Stallings, 1980). It is evident that with round-robin procedures students receive little actual practice in reading because no child is allowed to read for very long. Such procedures do provide students with some guidance or feedback—although studies suggest that teachers vary greatly in their ability to provide this effectively (Pflaum & Pascarella, 1980). But even when this guidance is of high quality, students rarely have the opportunity to perfect their performance of a passage, as most texts tend to be read only once.

Newer guided repeated oral reading techniques share several key features. First, most of these procedures require students to read and reread a text over and over. This repeated reading usually is done some number of times or until a prespecified level of proficiency has been reached. Second, many of these procedures increase the amount of oral reading practice that is available through the use of one-to-one instruction, tutors, audiotapes, peer guidance, or other means. In round-robin reading, time was severely limited because the teacher was the only one allowed to provide expert guidance; that is not true of the newer procedures. Third, some of the procedures have carefully designed feedback routines for guiding the reader's performance.

The purpose of this section of the review is to provide a research synthesis of empirical studies that have tested the efficacy of repeated reading and other guided oral reading procedures. The Panel's purpose is to determine whether the use of such procedures improves student fluency and whether such improvements are evident in better reading comprehension, how appropriate such procedures would be for regular classroom application, and what additional research is needed.

## Repeated and Guided Repeated Oral Reading: Methodology

### Database

The Panel determined that the literature search for a research synthesis must be conducted in a systematic, replicable way and that these procedures be described thoroughly. This methodology will allow others to weigh the appropriateness of the procedures for answering the research questions and to check for bias and error.

### Consideration of Extant Literature Searches.

This search started with the location of two published literature reviews on the impact of repeated reading procedures (Strecker, Roser, & Martinez, 1998: *Toward understanding oral reading fluency*. Forty-seventh Yearbook of the National Reading Conference (pp. 295-310); Dowhower, 1994: *Repeated reading revisited: Research into practice*. Reading and Writing Quarterly, 10, 343-358). These literature searches were used in two ways. First, they were examined carefully to identify appropriate terminology that could be used to



conduct a thorough electronic search of the literature. Second, the reference lists included in these literature searches were examined for additional, potentially relevant studies on this topic.

**Identification of Appropriate Terminology**

This search depended on electronic databases, and these require the use of appropriate search terms. In addition to these literature reviews, the NRP examined various published reference sources to help identify terms for use in the search. The Panel used The Literacy Dictionary (Harris & Hodges, 1995); Handbooks of Reading Research I and II (Barr, Kamil, Mosenthal, & Pearson, 1991; Pearson, Barr, Kamil, & Mosenthal, 1984); The Encyclopedia of English Studies and Language Arts (Purves, 1994); and the Handbook of Research on Teaching the English Language Arts (Flood, Jensen, Lapp, & Squire, 1991). These sources were examined for articles on fluency, oral reading, repeated reading, and other relevant topics identified during this analysis and from the previous literature searches.

These efforts led to the identification of terms that described particular instructional approaches, as well as those that focused on specific aspects of reading that supposedly are improved by the application of such procedures. Table 1 provides a list of the 22 search terms that were used in this synthesis.

**Table 1**

Terms used to search the electronic databases for studies that evaluated the effectiveness of repeated reading and other guided oral reading procedures.

chunking	parsing
echo reading	intonation
speech pitch	expression
punctuation	phrasing
reading rate	reading accuracy
repeated reading	neurological impress
reading fluency	assisted reading
paired reading	inflection
reading speed	verbal fluency
automaticity	instance theory
prosody	oral reading

**Electronic Search Strategies**

Because of the nature of the topic and the possibility that a single search could miss key information, the Panel elected to examine two separate databases: ERIC and PsycINFO. The Panel searched PsycINFO using the terminology listed in Table 1.

Each of these terms was linked by OR statements, meaning that if any article in that database focused on any of these topics, it would be included in our target pool. The target pool that was identified in this way included 18,763 articles. This number was reduced slightly by limiting the pool to include only English-language articles. Then a separate focus pool was constructed using the terms: reading, reading ability, reading achievement, reading comprehension, reading development, remedial reading, silent reading, reading education, reading materials, reading skills.

These reading topics were linked with each other by OR, again, with the idea of identifying all articles about any aspect of reading in the PsycINFO database. The focus pool included 16,422 English-language articles. This focus pool was then combined with the target pool using AND as the link. This means that the Panel was discarding anything in the target pool that was not clearly linked with reading or reading education. The resulting combination resulted in the identification of 1,260 potential articles.

This number was still deemed too large to search efficiently, so the Panel used number of years as a delimiter. That is, the Panel limited the search to articles in the PsycINFO database that had been published since 1990 (inclusive of 1990). This limit reduced the number of target articles to 346 and printed out abstracts for each of these papers.

Each abstract was read and coded as to whether it should be included in the search for articles. To be included, an article had to meet the following criteria:

1. The study had to examine the impact of repeated reading or some other form of guided oral reading instruction on reading achievement.
2. The study had to focus on reading in English, conducted with children (K-12).
3. The study had to have appeared in a refereed journal.

4. The study had to have been carried out with English-language reading.

If an article was clearly inappropriate in terms of these criteria, it was rejected without search. Rejected articles were designated as (1) nonrefereed, (2) nonresearch, (3) off topic/off sample, or (4) non-English language instruction. Although an abstract might indicate several violations, only one needed to be noted for an article to be rejected. A conservative application of these criteria was used to ensure the inclusion of any article that *might* be tangentially appropriate to our search goals because this would allow us to make sense of articles that could reveal important information about fluency learning. Because of this, analyses of the relationships among various fluency measures, studies of the correlation of fluency and comprehension, or literature searches on related topics were all retained in the pool at this stage. Such articles would not be used for the final analysis of whether guided repeated oral reading procedures are effective, but they were used to help identify relevant studies outside the boundaries of these search procedures. As a result of this screening, the Panel attempted to locate 81 articles for further consideration.

The same basic terminology and search procedures were used in the ERIC system. The search for target pool items was identical to that carried out in PsycINFO. Because ERIC uses a larger collection of reading-relevant terminology, the focus pool was expanded to ensure the widest possible inclusion of reading articles. The focus pool included basal reading, beginning reading, content area reading, critical reading, decoding, directed reading activity, early reading, independent reading, individualized reading, oral reading, reading, reading ability, reading achievement, reading aloud to others, reading comprehension, reading difficulties, reading failure, reading habits, reading improvement, reading instruction, reading material selection, reading materials, reading motivation, reading processes, reading programs, reading rate, reading research, reading skills, reading strategies, recreational reading, remedial reading, silent reading, speed reading, story reading, supplementary reading materials, OR sustained silent reading.

For this search, the target pool included 6,730 potential items. This was reduced to 2,053 items on combination with the focus pool of 39,694 items. This set was further reduced to 840 potential articles by omitting non-English language reports and nonjournal articles. For the sake of consistency, 1990 inclusive was again the cut-off year for the electronic search. This reduced the ERIC search to 410 potential items.

Of these 410 items, a review of the abstracts indicated that only 50 of these had potential value for our purposes. Many of these, however, had already been identified in the PsycINFO search and did not need to be double counted. Thus, the ERIC search resulted in the identification of only 18 additional potential studies or articles.

### **Location of Articles**

As a result of these two searches, the Panel set out to find 99 articles on guided repeated oral reading. Of these, the Panel was able to locate 76 articles, or 77% of the total. Of the articles that could not be located, only 11 met or appeared to meet all of the selection criteria; it was recognized that the other 12 papers did not actually meet the criteria although these papers had some apparent relevance to the topic. Of the 11 papers the abstracts of which suggest that they might have met the criteria, nine abstracts claimed positive and substantial improvements in reading due to the procedures used, one reported no significant difference, and one reported mixed results. It is possible that locating these missing studies could alter the findings of this report. Any alteration, however, would likely strengthen the support for guided oral reading procedures given that the vast majority of these appear to provide evidence on that side of the equation.

Each of the 77 articles that were located was reviewed to determine its relevance to the topic and its adherence to the various selection criteria. Any study that appeared to meet the criteria was then coded for possible use in the final analysis.

### **Further Identification of Articles**

The Panel's search procedures were biased against older studies of these instructional procedures. Only studies that had been published since 1990 were included in the selection procedures up to this point. To expand on that set of studies in an effective manner, the Panel analyzed the reference lists of all studies that



were located through the previously described procedures. Even studies that were determined to be in violation of the final selection criteria were analyzed in this way. The literature searches that the NRP used as the starting point for its electronic searches were also examined for relevant references that were not in its search set. This led to the consideration of 133 additional papers, and of these the Panel was able to find 109 or 81%. For the most part, these second-generation papers had been published before 1990. Of these 109 papers, only 21 were found to meet all of the selection criteria. These 21 studies were added to the 77 already identified, and these were designated for further examination and coding.

### Analysis

Each of these studies was read and summarized on a six-page coding sheet. Each study was summarized in terms of the following variables: reference, narrative summary, source of citation, states or countries represented in the sample, number of schools included, number of classrooms included, number of participants, number of participants in each group, student ages, student grade levels, reading levels of the participants, community (urban, suburban, rural), socioeconomic status, ethnicity, exceptionality, sample selection criteria, availability of additional reading instruction, amount of attrition per group, how attrition was addressed, study location (classroom, lab, clinic, pullout, other), assignment to groups (random, matching, etc.), sample equivalence, description of each treatment and control condition, nature and difficulty of texts used in treatments, duration of treatments in minutes of training, duration of treatment from beginning to end in days, checks on treatment fidelity, student/teacher ratios, trainer (classroom teacher, researcher, parent, peer, etc.), amount and type of training for trainers, special costs associated with treatment, and pretests and posttests means and standard deviations.

If information was omitted from the original study, it was omitted from the coding. The most serious omissions were evident in the older studies (pre-1994), and no effort was made to locate authors of the original studies to help fill in these gaps. After coding, these data were further summarized within a spreadsheet program (Microsoft Excel) to allow statistical analysis and comparison.

### Reliability

A 10% sample (10 articles) was randomly selected for independent re-analysis. The coefficients of agreement ranged from 0.88 to 1.00, with most variables receiving a 1.00. The lowest agreements were evident with student/teacher ratios, trainer identification, and numbers of subjects lost to attrition.

### Consistency With the Methodology of the National Reading Panel

The methods of the NRP were followed in the conduct of the literature searches and the examination and coding of the articles obtained. However, the wide variations in methodologies and implementations required the subcommittee to qualify its use of the NRP Criteria for Evaluating Single Studies, Multiple Studies, and Reviews of Existing Studies. These departures from the stated NRP criteria are described below.

Coding these variables made it clear that the studies that were being examined represented dramatically different conceptualizations of the problem. As a result, the NRP divided articles into four sets. One set of 14 articles, Immediate Effects Articles, examined the immediate impact of repeated reading and guided oral reading on a reading performance with no effort to measure transfer to other reading (see Appendix A). To be placed in this set, a study had to examine how reading performance changed with feedback or repetition but with no transfer measure to other passages. These studies are valuable because they examine changes to reading behavior that could contribute to a more general change in reading ability although they do not attempt to measure that change directly.

The second set of articles, Group Experiments, attempted to evaluate the impact of repeated reading and other guided oral reading procedures on the reading abilities of students in grades K to 12 (see Appendix B). To be included in this group, a study had to meet the following criteria:

1. Study had pretest and posttest measures of reading, separate from the material used for training.
2. Study had a treatment group that received some form of guided repeated oral reading training and a comparison group that did not receive such training.

There were 16 articles in this set. These studies could be directly evaluated through meta-analysis to test the claim that guided repeated oral reading procedures improve reading ability.

The third set of articles, Single Subject Studies, used multiple baseline single-subject designs to examine the impact of repeated reading and other guided oral reading procedures on the reading abilities of students in grades K through 12 (see Appendix C). These studies had to have some measure of reading transfer. These studies could be used to directly evaluate the claim that guided oral reading procedures improve reading ability, but they were not used in the meta-analysis. Data from these studies were used to confirm or contradict the meta-analysis results.

The fourth set of studies, Methods Comparisons, compared different methods for doing repeated reading or guided repeated oral reading but did not have a true control group (see Appendix D). These studies were based on the assumption that guided repeated oral reading procedures improve reading ability, and they were usually attempting to discern which methods work best. The lack of control group meant that these studies could not be used to evaluate the claim of whether guided repeated oral reading improves reading ability, but these studies could help guide any further analysis or help determine the applicability of such methods to regular classrooms. There were eight of these studies.

## Repeated and Guided Repeated Oral Reading: Results and Discussion

### Immediate Effects Articles

There were 14 studies found that dealt with the immediate impact of different programs of repetition and feedback during oral reading on the reading performance of a specific passage or article. It is important to note that these studies did not fail to find transfer effects for these procedures, only that these studies did not attempt to measure such transfer. These studies typically measured some aspects of fluency or comprehension with a particular passage and then monitored changes in this performance from one reading to another. Not surprisingly, all 14 studies reported demonstrable improvements from a first passage reading to a final passage reading with whatever measures were used.

Nine of these studies considered the impact of repeated reading (Faulkner & Levy, 1999; Levy, Nicholls, & Kohen, 1993; Neill, 1979; O'Shea, Sindelar, & O'Shea, 1985; Rasinski, 1990; Sindlar, Monda, & O'Shea, 1990; Stoddard, Valcante, Sindlar, O'Shea, & Algozzine, 1993; Turpie & Parratore, 1995; VanWagenen, Williams, & McLaughlin, 1994), although in other studies, repeated reading was combined with other procedures such as a particular type of oral reading feedback (Reitsma, 1988) or phrasing support for the reader (Taylor, Wade & Yekovitch, 1985). Repeated reading studies either required a set number of repetitions (as few as one and as many as seven) or required students to practice repetition for some amount of time or until some fluency criteria were reached. Other studies had students practicing oral reading while listening to the text being read simultaneously (Bon, Bokseveld, Freide, & van den Hurk, 1991; Rasinski, 1990; Smith, 1979), previewing a text through listening (Reitsma, 1988; Rose & Beatty, 1986), or receiving particular types of feedback during oral reading (Anderson, Wilkinson, & Mason, 1991; Pany & McCoy, 1988).

All these interventions saw clear improvement, although some conditions were better than others. For example, repeated reading with phrasing support seemed to be no better than repeated reading alone in a study of 45 good- and poor-reading 5th graders (Taylor, Wade, & Yekovich, 1985), whereas repeated reading with feedback or guidance (Pany & McCoy, 1988) was superior to repeated reading alone with 3rd graders.

These studies in their totality examined the reading of 752 subjects ranging from 1st grade through college. Four of these studies used normal populations, two compared the performances of good and poor readers, and the rest dealt with students who were somewhat below grade level, substantially behind grade level, or designated as learning disabled. The studies found clear improvements across multiple readings regardless of students' reading levels or age levels although greater gains were sometimes attributed to poor readers. Given the lack of transfer measures in this study, the greater gains for low readers could be an artifact of the design because these readers' initial performances would be relatively more deficient and would therefore be most amenable to improvement.



What inferences can be made from this set of studies? It certainly cannot infer that repeated reading or other guided repeated oral reading procedures would be effective in raising reading achievement on the basis of these studies alone. However, the clear improvements in reading rate, accuracy, and comprehension found for a wide range of readers under a wide range of conditions suggest the possibility that such procedures could have transfer effects worth examining.

### **Group Experimental Studies: Meta-Analysis**

Sixteen studies met the criteria for inclusion in the meta-analysis; these studies met the NRP review methodology. Each of these studies had pre- and post-tests that allowed for an analysis of the improvement or lack of improvement in reading and treatment and control groups that would allow the changes in outcomes to be attributed to the instructional procedures of interest. Of the 16 studies, 2 did not provide sufficient information to allow inclusion in the meta-analysis (Labbo & Teale, 1990; Lorenz & Vockell, 1979) although the findings of these studies will be considered in this section and their data will be included in calculations wherever relevant and possible. The Lorenz and Vockell study found no differences because of the treatments; however, the Labbo and Teale study found clear improvement as a result of repeated reading.

Although these studies were meta-analyzed, this analysis does not go very far. That is, the NRP did not attempt to evaluate all possible comparisons. Such thorough analysis can be informative for future research, but given the national scope of this effort and the potential significance of these determinations, the NRP decided to consider only questions that could be answered with a high degree of certainty (i.e., those that could be answered using all or most of these data). The studies in this set were conducted from 1970 to 1996, and most were carried out in the 1990s.

### **Calculation of Effect Sizes**

Effect sizes were calculated for each relevant comparison. These effect sizes used either the *d index* (Cooper, 1998, p. 128) or the *d index* calculated from the F tests (Cooper, 1998, p. 129). When there were multiple experimental groups in a study, effect sizes

were calculated for each guided oral reading group compared with a control group, so if a study had two experimental groups and one control group, there would be two effect sizes for each measure for that study. However, if one of these experimental interventions was not a form of guided repeated oral reading, no effect size would be calculated for that comparison, and those subjects would be dropped from the analysis. Even with these omissions, because most studies included multiple outcomes, 99 effect sizes were calculated for direct comparisons of experimental and control group performance. When multiple-effect-size statistics were calculated for a single study, the mean of effect sizes for that study was calculated to determine a study effect size.

### **Were Effect Sizes Greater Than Zero?**

In all but two of the studies, comparisons resulted in significant differences for the guided repeated oral reading groups over the control groups. Lorenz and Vockell (1979) found no benefit of these procedures for LD students after 13 weeks of neurological impress training with either reading comprehension or vocabulary. The other study that did not result in a positive outcome (Mathes & Fuchs, 1993) compared peer-mediated repeated reading with both peer-mediated silent reading and a control group. There were no significant differences between these treatments with LD students in a special education setting. All other comparisons significantly favored the guided repeated oral reading groups.

Great variance was evident in these study effect sizes; they ranged from as low as 0.05 (almost no effect) to as high as 1.48 (a substantial effect). The average of these study effect sizes was 0.48. However, these studies reported data on as few as 12 subjects and as many as 78. This means that the small studies would have as large an impact on this average as the largest studies. A weighted average is probably more accurate in this case, and it results in a study effect size average of 0.41. The largest effect sizes were obtained with some of the smaller samples, but this is probably an effect of the treatment features of these studies rather than an artifact of sample size. The smaller studies were less likely to use peer tutors; that is the students in the small studies received guidance and feedback from adults (teachers or researchers) rather than from other

kids. These effect sizes, weighted or not, suggest that guided oral reading procedures have a moderate impact on the reading achievement of the types of students who participated in these studies.

## Characteristics of Students

These 16 studies included data from 752 elementary and secondary education students. The data were drawn from students from six U.S. states and two other countries. The students attended 47 different schools (one study did not report the number of schools so this is an underestimate) and 98 classrooms (again, an underestimate because five studies, including some with relatively large sample sizes, did not provide this information). Not all were included in the analyses, however. As has been noted, two studies provided clear experimental evidence concerning the efficacy of the procedures but failed to include sufficient information for effect size calculation. These studies reported data on 74 subjects, and they were not included in effect size calculations. Also, given that not all comparisons within each study were relevant to our research questions, the Panel dropped from its analysis the data from an additional 73 subjects. Thus, the meta-analysis is based on data from 605 students.

The students in these studies ranged from grade 2 through grade 9. The studies that focused on average reading level samples or normal classroom populations focused on students in grades 2 through 4, while studies of poor readers included students from grades 2 through 9, with most of these drawn from the upper elementary grades. These studies as a collection have not provided sufficient data to allow for a sound analysis of the relative impact of repeated reading procedures on students at different grade levels. It is evident from the studies included in this set that repeated reading procedures have a clear impact on the reading ability of nonimpaired readers at least through grade 4, as well as on students with various kinds of reading problems throughout high school. Future research needs to determine at what point such instruction is no longer beneficial to normal readers.

Eleven of these studies (including the two not used in the meta-analysis) focused on poor readers, whereas only five studied average classrooms. The sample sizes of these studies differed so much, however, that the disparity between numbers of average and poor readers

was not as great as this suggests. These 16 studies included 398 students who were selected as poor readers (although data on only 324 of them were used in the meta-analysis) and 281 good readers.

The average effect sizes for these two groups of studies (those examining low-level readers and those that considered average readers) were highly similar and close to the overall average (0.49 for the nine low-level reader studies and 0.47 for the five average-reader studies). When weighted by sample sizes, the average effect sizes diverged more but, surprisingly, the nonimpaired reader studies showed the superior outcomes (0.50 versus 0.33). This is probably attributable, at least in part, to the longer time evident in the nonimpaired reader studies (an average of 24 to 25 hours in nonimpaired reader studies but only about 18 to 19 hours in the poor-reader studies).

Although some of the studies speculated that poor students might benefit more from these procedures, fluency is developmental and students must continue to meet the challenge of increasingly more difficult text as they develop as readers. It is possible, as Faulkner and Levy (1999) have shown, that good and poor students benefit from different aspects of this treatment, with poor readers learning more about the words and good readers developing a stronger command of the prosody of the passages. All of these studies tried to assign students to materials considered to be of appropriate levels of difficulty for the particular students, and this masks or complicates the true meaning of the performance disparity for good and poor readers.

## Properties of Instructional Approach

Many different instructional procedures were examined in these studies, so many that it is impossible to determine the best of the few studies. No method was used so often that a reliable estimate of effect size would be possible. Also, variations across studies are subtle in terms of material selection and amount and type of repetition and feedback. Some treatments were delivered by teachers or researchers, some by parents, some by other students, and some by the students themselves with computers or tape recorders. The treatments went under names such as neurological impress, repeated reading, peer tutoring, shared reading, assisted reading, and oral recitation method. All were associated with positive effect sizes. Some might be



better, or better in particular circumstances, but the sample sizes associated with any of these associated treatments were too small to allow for a meaningful partialing of variance. Given what is known, all of these procedures seem to have a reasonably high likelihood of success.

## Outcome Measures

These studies used a range of outcome measures, including tests of word knowledge, comprehension, and fluency, as well as combinations of these as overall scores derived from standardized reading measures. Some studies had multiple comprehension or fluency measures as well. The Panel attempted to determine whether these guided procedures had a greater impact on some aspects of reading than on others. These studies made 99 different comparisons that were relevant to the analyses. Only one pooled effect size per study per category (word recognition, fluency, comprehension, total score) was drawn from each study, and each of these was weighted by the numbers of subjects whose data were represented in each.

Across these studies, considering all sample comparisons and all measures, there were 49 different comparisons that used some form of comprehension test as an outcome measure. They included standardized tests of reading comprehension in which students read passages and answered multiple choice questions, as well as informal measures such as questions and passages, retellings, and maze tests. The mean weight effect size for these 49 comparisons drawn from 12 separate studies was 0.35.

There were 35 comparisons that used some fluency measure as an outcome. They included standardized tests of reading rate and accuracy, as well as informal measures of these using instruments such as informal reading inventories. The mean weighted effect size for these 35 comparisons drawn from 10 different studies was 0.44.

There were 11 comparisons that used some measure of word recognition. They included standardized tests of word knowledge as well as informal measures that examined students' ability to read particular words or word lists. The mean effect size for these 11 comparisons drawn from eight different studies was 0.55.

Finally, four of the comparisons considered aggregate or full-scale reading scores (these tended to be combinations of the other measures noted above) and included both full-scale scores from standardized tests of reading and reading-level scores derived from informal reading inventories. The average effect size for these four aggregate comparisons from four different studies was 0.50.

## Implications for Reading Instruction

As expected, the biggest effect of these procedures was on word recognition and fluency measures, with the smallest effects evident in reading comprehension. It appears that oral reading practice and feedback or guidance is most likely to influence measures that assess word knowledge, reading speed, and oral accuracy. Nevertheless, the impact of these procedures on comprehension (and on total reading scores) is not inconsiderable, and in several comparisons it was actually quite high. These changes in comprehension might take place simultaneously, with the improvements in word recognition and fluency mediating the improvements in comprehension, or there could be a hierarchical order to this, as Faulkner and Levy (1999) have speculated, with the lowest level readers improving in word recognition and the highest ones in comprehension.

## Studies Using Single-Subject Designs

Twelve additional studies reported experiments that used single-subject designs. See Appendix C for a list of these studies. The single-subject studies, because of their designs, were not combined in the meta-analysis, although the data were examined to evaluate the conclusions drawn from the meta-analysis. These studies focused on the reading of small groups of students, as few as 2 and as many as 13 (an average of 4 to 5). All these studies addressed the learning needs of elementary grade students with learning problems (i.e., special education, learning disabilities, autism, disfluent readers, readers substantially below grade level). All these studies provided some kind of one-to-one tutoring to students (sometimes parent or peer tutoring) or repeated reading work with tape recorders, for varying lengths of time (as little as 4 weeks and as long as 1.5 years, with most treatments lasting fewer than 10 weeks).

With one exception (Law & Kratochwill, 1993), all these studies found clear and substantial improvements in reading accuracy, speed, or comprehension. The best of these studies calculated a clear reading performance baseline over several days. Then they intervened with repeated reading, oral reading feedback, or reading-while-listening treatments and monitored student growth with new materials during the treatment and with standardized tests at the conclusion. For example, Blum and colleagues (1995) found that the introduction of repeated reading with tape recorders led to marked improvements in student reading performance; that when the training ended, the students maintained their gains; but when the intervention ended, the accelerating improvement ceased. Another example of a well-designed, single-subject study was reported by Kamps and her colleagues (Kamps, Barbetta, Leonard, & Delquadri, 1994).

The one study that found no effects resulting from paired reading of students with parents also found no improvements in word accuracy or reading speed after 6 weeks of treatment. This study had an especially weak design (failed to calculate a stable baseline in student reading performance and did not check on fidelity of treatment). In any event, no gains were found in this study of 1st through 3rd grade students.

The pattern of findings for these studies is almost identical to what was reported in the meta-analysis. Most, but not all, of the studies reported clear improvements. The changes described here were a bit larger in magnitude, but all but one of these studies were conducted with a one-to-one teacher-student ratio and all were carried out with low-level—sometimes very low-level—readers, and either of these factors could magnify the effect. Again, the conclusion is that repeated reading and other related oral reading procedures have clear value for improving reading ability.

## Methods Comparisons

Nine additional experiments were located that dealt with repeated reading and other guided repeated oral reading procedures. None of these studies used a true control group, however, so it is not clear whether these gains were greater than expected in the amounts of

time studied. These studies provided comparisons of the efficacy of various oral reading procedures or were meant as feasibility studies to evaluate the classroom readiness of the procedures.

There were not enough comparisons of guided repeated oral reading procedures to allow for a systematic determination of best procedures. For the most part, the comparisons that were done resulted in no differences. In other words, each of the procedures examined did about as well as the others. Some of the comparisons that were made included repeated reading with and without feedback (Dowhower, 1987), guided repeated reading and assisted nonrepetitive reading (Homan, Lesius, & Hite, 1993), and various peer or parent tutoring procedures in which students read aloud together or read to their parents (Lindsay, Evans, & Jones, 1985; Winter, 1986, 1988). The lack of clear differences among procedures is consistent with the findings of the meta-analysis and again suggests the robustness of these procedures for stimulating reading improvement.

One exception to the no-differences finding, which should be noted, was reported by Rashotte and Torgeson (1985). They did not vary the procedures, but tried out passages that either shared or did not share lots of words with the outcome measures. They found clear gains after 3 weeks for the passages with shared words but not for those without. This suggests that, at least for very poor readers, the first thing that is probably learned from repeated reading is the words (Faulkner & Levy, 1999) and that this growth might be facilitated by using passages that share lots of vocabulary.

Only one study was found that directly evaluated the feasibility of these procedures for use in regular school settings, though several of the studies already noted have done just that. Dixon-Krauss (1995) conducted a feasibility study of partner reading with 24 1st and 2nd graders in regular classrooms. The program proved to be manageable for the regular classroom teachers, and the students were positive about the activity. What was so notable about this study was that it focused on the teacher's abilities to use these procedures on a targeted basis with struggling readers, rather than with whole classes. The findings from this study are consistent with the findings of the other studies that considered classroom effects, including Rasinski's (1990), which



had regular classroom teachers applying such procedures on a classwide basis for almost an entire school year. Several other studies showed that regular teachers, with little or no extra training, could successfully use these procedures (for instance, Conte & Humphrey, 1989; Labbo & Teale, 1990; Reutzel & Hollingsworth, 1993; and Shany & Biemiller, 1995). There were also several special education studies in which students provided peer tutoring to their classmates under the direction of their teachers (Mathes & Fuchs, 1993; Simmons et al., 1994; Simmons et al., 1995). Teachers, parents, or peer tutors at most were provided 1 to 4 hours of training, and usually the procedures did not require special materials (though some interventions used tape recorders or elaborate computerized tutoring).

### Implications for Reading Instruction

Increasingly, teacher educators and educational researchers and theorists have called for more attention to direct instruction in fluency. Various procedures have been proposed for teaching students to read quickly, accurately, and with proper expression, though it is evident that this remains a serious weakness among many schoolchildren.

A very thorough search for studies that evaluated the efficacy of various guided repeated oral reading procedures was made. Those studies provide a persuasive case that repeated reading and other procedures that have students reading passages orally multiple times while receiving guidance or feedback from peers, parents, or teachers are effective in improving a variety of reading skills. It is also clear that these procedures are not particularly difficult to use; nor do they require lots of special equipment or materials, although it is uncertain how widely used they are at this time. These procedures help improve students' reading ability, at least through grade 5, and they help improve the reading of students with learning problems much later than this.

### Repeated and Guided Repeated Oral Reading: Directions for Further Research

There is a need for more research on these issues. Clearly there is a need for longitudinal research that examines the impact of these procedures on the reading development of normal readers at different points along the continuum. The methods used should be characterized not by labels such as repeated reading, but by treatment descriptions that are explicit with regard to how much rereading there is, the nature and timing of the feedback, and the level of difficulty of the materials. Some effort should be made to document the changes that take place in student reading and knowledge during the intervention rather than just at the end.

Longitudinal studies of the impact of these procedures on nonimpaired readers could clarify how long the benefits can be maintained. It would be especially useful if these were examined under various conditions in terms of passage difficulties and feedback procedures. However, given the clear and substantial improvements produced by a wide range of reading procedures, the Panel thinks it advisable that teachers include such activities in their regular instructional routines at least during the elementary grades, and certainly with struggling readers.

One word of caution can be drawn from a short-term study (Anderson, Wilkinson, & Mason, 1991) that found that too much attention to fluency issues within a reading lesson could detract from reading comprehension. It should be noted that in all of these studies, the fluency work was only part of the instruction that students received. In most cases, the fluency work was relatively brief (15 to 30 minutes per lesson), and students who received these lessons were still engaged in other reading activities including comprehension instruction. Guided repeated oral reading and repeated reading provide students with practice that substantially improves word recognition, fluency, and—to a lesser extent—reading comprehension. They appear to do so, however, in the context of an overall reading program, not as stand-alone interventions.

## Encouraging Students to Read More

The NRP focused on another widely recommended approach to developing fluent readers—encouraging children to read a lot. Despite all of the controversy about reading instruction, there has been widespread agreement about the value and efficacy of reading practice in developing better readers. The importance of reading as an avenue to improved reading has been stressed by theorists, researchers, and practitioners alike, no matter what their perspectives. There are few ideas more widely accepted than that reading is learned through reading.

And why not? The theories of practice that have already been discussed do not differentiate much between different forms of practice, and so it is unclear why lots of reading would not contribute to improvement. It is possible that oral reading and silent reading operate differently in this regard, but theories of learning to read really do not make much of an issue of this distinction, and theories of practice generally do not stress such differences either. There seems little reason to reject the idea that lots of silent reading would provide students with valuable practice that would enhance fluency and, ultimately, comprehension. Nevertheless, the correlational evidence is overwhelming. There are literally hundreds of studies that find that the best readers read the most and that poor readers read the least; they include the National Assessment for Educational Progress, which has found such relationships with both elementary- and secondary-age students (Donahue et al., 1999). It appears—from the correlations—that the more that you read, the better your vocabulary, your knowledge of the world, your ability to read, and so on.

As a result of such widespread agreement and such clear evidence, books and journals for teachers emphasize ways that teachers can encourage voluntary reading. Several procedures for stimulating students to read more (SSR, DEAR, Million Minutes, etc.) are in the reading education literature and are used with great

frequency in the schools. Corporate incentive plans have been widely used to reward students for more reading (e.g., Pizza Hut’s Book It), and various programs and materials are available commercially (e.g., Accelerated Reader) that have the purpose of stimulating greater amounts of reading.

There could be a problem with this widespread belief, however. These data are correlational and correlations do not imply causation. That is, it could be that if you read more, you will become a better reader; but it also seems possible that better readers simply choose to read more. So which is it? Well, it is impossible to know from correlational studies alone. For this reason, the NRP chose to examine what effect encouraging students to read would have on student reading achievement. Even if more reading is beneficial, it is possible that programs designed to stimulate greater amounts of reading would fail to have this effect.

The Panel’s purpose here is to provide a research synthesis of empirical studies that have tested the efficacy of encouraging reading in terms of its impact on improving reading achievement. The Panel hopes to determine whether teachers are able to successfully encourage students to read more in ways that would actually improve fluency and overall reading ability. For the most part, these studies emphasize silent reading procedures, that is, students reading individually on their own with little or no specific feedback. Although the immediate impact of encouraging students to read would be expected first to increase the amount of reading engaged in, then to improve fluency in the ways discussed earlier, and finally to improve comprehension, that is not how these studies have been conducted. Studies of encouraging students to read rarely measure the actual increase in amount of reading due to the encouragement procedures, and they measure only the ultimate outcome (i.e., improvement in reading comprehension) rather than the intermediary enhancement to fluency that would be expected from the increased practice.



## Encouraging Students to Read More: Methodology

### Database

As with the search on repeated reading and guided oral reading, it is important to proceed in a systematic, replicable way and to describe these procedures thoroughly so that others can examine this work critically.

### Consideration of Extant Literature Searches

This search started with the location of a published literature review on the impact of reading [Cunningham & Stanovich (1998). What reading does for the mind. *American Educator*, 22(1-2), 8-15.] This paper was examined carefully to identify appropriate terminology that could be used to conduct a thorough electronic search of the literature, and the reference list from that study was examined for additional, potentially relevant studies on this topic.

### Identification of Appropriate Terminology

This search used electronic databases, which require appropriate search terms. In addition to conducting this literature review, the Panel examined various published reference sources to help identify terms for use in the search. The Panel used *The Literacy Dictionary* (Harris & Hodges, 1995); *Handbooks of Reading Research I and II* (Barr, Kamil, Mosenthal, et al., 1991; Pearson, Barr, Kamil, et al., 1984); *The Encyclopedia of English Studies and Language Arts* (Purves, 1994); and the *Handbook of Research on Teaching the English Language Arts* (Flood, Jensen, Lapp, et al., 1991). The sources were examined for articles on uninterrupted sustained silent reading, reading preferences and interests, Matthew effects, voluntary reading, and other relevant topics identified during this analysis and from the literature search.

These efforts led to the identification of terms generally related to the concept of increased reading as well as to specific instructional approaches used for that purpose. Table 2 provides a listing of the 30 search terms and names that were used in this synthesis.

**Table 2**

Terms used to search the electronic databases for studies that encouraged student reading.

free reading	recreational reading
voluntary reading	independent reading
SSR	sustained silent reading
USSR	uninterrupted sustained
SQUIRT	silent reading
DEAR	super quiet reading time
reading volume	Matthew effects
summer reading	volume of reading
reading amount	reading time
book flood	amount of reading
community literacy	leisure reading
Accelerated Reader	self selection
leisure time	choice behavior
Magazine Recognition Test	Author Recognition Test
Input hypothesis	free voluntary reading
	Stephen Krashen

### Electronic Search Strategies

Because of the nature of the topic and the possibility that a single search could miss key information, the Panel examined two separate databases: ERIC and PsycINFO. The Panel searched PsycINFO using the terminology listed in Table 2. Each of these terms was linked by OR statements, meaning that if any article in that database focused on any of these topics it would be included in our target pool. The target pool that the Panel identified in this way included 18,990 articles. Then a separate focus pool was constructed using the terms: reading, reading ability, reading achievement, reading comprehension, reading development, reading disabilities, reading education, reading materials, reading, reading measures, reading readiness, reading skills, reading speed, remedial reading, and silent reading. These reading topics were linked with each other by OR, again with the idea of identifying all articles about any aspect of reading in the PsycINFO database. The focus pool included 34,448 articles. This focus pool was then combined with the target pool using AND as the link. This means that the Panel was discarding anything in the target pool that was not clearly linked with reading or reading education. The resulting combination resulted in the identification of 1,021 potential articles; once non-English language

articles were deleted, 909 articles remained. Because this was judged to be too many to search for, the Panel limited the search to 1991 (inclusive) and identified 478 potential articles in the intersection of the target and focus pools for those years.

Next the Panel completed a similar search of the ERIC system. The Panel used all the terms listed in Table 2 to develop a target pool. This resulted in the identification of 5,645 possible articles published since 1984. The Panel then developed a focus pool using the terms: basal reading, beginning reading, content area reading, corrective reading, critical reading, decoding, directed reading activity, early reading, functional reading, independent reading, individualized reading, informal reading inventories, reading, reading ability, reading achievement, reading assignments, reading attitudes, reading comprehension, reading difficulties, reading failure, reading habits, reading improvement, reading instruction, reading interests, reading material selection, reading materials, reading motivation, reading processes, reading programs, reading rate, reading research, reading skills, reading strategies, recreational reading, remedial reading, silent reading, story reading, supplementary reading materials, OR sustained silent reading. There were 38,799 potential articles in the focus pool that included 1984. These were then crossed with the target pool, and this led to the identification of 1,669 potential articles, which were then limited to journal articles written in the English language (655 articles), with 325 of these published since 1991.

## Analysis

The NRP combined the two searches to eliminate duplication and found 603 unique articles on these topics as a result of the two searches. Each abstract was read and coded to determine whether to include it in this analysis. The criteria for inclusion were that:

1. The study had to be a research study that appeared to consider the effect of encouraging students to read more on reading achievement.
2. The study had to focus on English reading education, conducted with children (K-12).
3. The study itself had to have appeared in a refereed journal.
4. The study had to have been carried out with English language reading.

If an article was clearly inappropriate in terms of these criteria, it was rejected without search. Rejected articles were designated as (1) nonrefereed, (2) nonresearch, (3) off topic/off sample, or (4) non-English language instruction. Although an abstract might have had several violations, only one needed to be noted for an article to be rejected. As a result of this screening, the Panel attempted to locate 92 articles for further consideration.

### Location of Articles

Of the 92 articles on encouraging students to read more, the Panel was able to locate 82, or 89% of the total. Each of the 79 articles that was located was reviewed to determine its relevance to the topic and its adherence to the various selection criteria. Any study that appeared to meet the criteria was then coded for possible use in the final analysis. Only nine papers survived this review because most of these turned out to be correlational studies that just attempted to test whether better readers read more, something that the Panel accepts as already proven.

### Additional Identification of Articles

The Panel's search procedures neglected older studies of these instructional procedures. Only studies published since 1991 had been included in the selection procedures up to this point. To expand on this set of studies in an effective and efficient manner, the Panel analyzed the reference lists of all studies that were located through the previously described procedures. Even studies that were determined to be in violation of the final selection criteria were analyzed in this way. This led to the consideration of 46 additional papers, and of these, the Panel was able to locate 42 or 91%. For the most part, these second-generation papers had been published before 1990. Of the 42 papers, 10 appeared to meet all of the selection criteria. These 10 studies were added to the 9 previously identified, and these were designated for further examination and coding.



On closer examination, the Panel discovered that five of these studies were actually correlational studies and not experimental studies. This left only 14 studies with potential for answering this question.

### Consistency With NRP Methods

The methods of the NRP were followed in the conduct of the literature searches and the examination of the articles obtained. However, in the case of these 14 studies, the Panel quickly realized that there were very few papers. Furthermore, the Panel evaluated a variety of procedures and found that many of the papers suffered from especially weak research design. Several of these 14 studies, although they met the selection criteria, could not be analyzed because of serious methodological or reporting flaws that undermined their results. Because of these concerns, the Panel did not think it appropriate to carry out a meta-analysis of the data. The Panel's concern was that the meta-analysis would be potentially misleading given the very limited data set that would be used for the analysis. Thus, this set of studies prohibited the of the NRP criteria for multiple studies.

## Encouraging Students to Read More: Results and Discussion

### Description of the Studies

Given that only 14 studies fit the selection criteria, it seems reasonable to summarize each one. The studies are listed in Appendix E. Most of the 14 studies examined the impact of sustained silent reading (SSR), but some other approaches were also studied. SSR goes under a variety of labels including USSR (uninterrupted sustained silent reading), DEAR (drop everything and read), and SQUIRT (super quiet reading time). In most cases, these procedures require the provision of approximately 20 minutes per day in which students are allowed to read material silently on their own with no monitoring. In most cases, the students select their own material, and there is no discussion or written assignment tied to this reading. Teachers and other adults in the school setting are to read during this time as well. Such programs are described in nearly all teacher preparation textbooks and have become widely popular in American classrooms in both elementary and secondary schools.

### Sustained Silent Reading (SSR)

One study of SSR (Evans & Towner, 1975) compared the effect of SSR on reading achievement with that of having students complete various reading skills exercises with commercial materials (i.e., worksheets). Reading gains were identical for both groups of 2nd graders at the end of 10 weeks.

In a similar, though larger study, Reutzel and Hollingsworth (1991) compared skills practice and SSR with 61 4th graders and 53 6th graders. These procedures were used for 1 month, and there were, again, no reading differences for the two approaches. As with the previous study, the skills work was assembled by the researchers specifically to serve as a control activity, and was not part of the regular instructional program that these students received from their teachers.

Collins (1980) conducted an analysis of the impact of SSR on the reading achievement of 220 students from ten classrooms in grades 2 through 6. Students were randomly assigned to the experimental and control groups. This daily program was evaluated after 15 weeks (different grade levels allotted different amounts of time to SSR—2nd graders had 10 to 30 minutes per day; 3rd graders received 15 minutes daily; 4th graders, 30 minutes; and 5th and 6th graders, 15 to 25 minutes each day). The control group worked on spelling during these time periods. The SSR procedures led to no significant differences in vocabulary or comprehension as measured by various standardized tests, although the SSR groups appeared to move slightly faster through their basal readers during this period.

Langford and Allen (1983) examined the impact of SSR on the reading attitudes and achievement of 11 5th and 6th grade classes. These classes were randomly assigned to SSR or control conditions, resulting in 131 students in the SSR group (60 5th graders and 71 6th graders) and 119 students in the control group. Students in the control group learned about health and grooming while the SSR activities took place with the experimental subjects. The study failed to report the length of the instructional period or the duration of the intervention. Although there was significantly better improvement in word reading for the SSR group, these differences appear to be small in terms of educational

importance. In any event, it is difficult to evaluate the value of these gains without more information about the length of the program. There were no differences in reading attitude that resulted from the intervention.

In still another evaluation of SSR, this one conducted in a junior high school, Cline and Kretke (1980) examined the effectiveness of the procedure over a 3-year period. This study compared the reading achievement of 111 students who had been enrolled for 3 years at a junior high school that was using SSR with that of control group students drawn from two other schools that did not have this program. This study found no differences between the two groups. However, it was poorly designed, and it would be impossible to be certain whether there were gains. The study apparently compared gains between different achievement tests used at different grade levels (something that is not statistically sound), and it failed to provide any information about the length of the SSR time or how this time was used at the control school.

Davis (1988) considered the effect of SSR on reading comprehension with 8th graders. Fifty-six students were randomly assigned to one of two English classes. These classes met daily for 50 minutes. Approximately half the time was devoted to either SSR or, alternatively, to directed reading activities with the teacher. This effort continued for an entire school year. Although the researcher intended to analyze these data for high-, medium-, and low-ability students separately, attrition in the low-ability groups rendered this impossible. Two comparisons were made for the high- and medium-ability groups, and it was found that the medium-ability students made much greater gains with SSR than with directed reading ( $n = 19$ ), but there were no significant differences among the two high-ability groups (15 students in these two groups). The gains attributed to SSR for the medium-ability group were substantial and educationally meaningful (about 1 year of difference on a standardized test). Unfortunately, the study is somewhat sketchy in terms of the statistical analysis: it provided no means or standard deviations and told little about the analysis of covariance that was used (i.e., How big were the initial differences across the groups? Was heterogeneity tested?).

In one of the best-designed studies on SSR, Holt and O'Tuel (1989) randomly assigned teachers and 211 7th and 8th grade students to an SSR condition and a regular reading instruction condition. Students in the SSR condition read self-selected materials for 20 minutes per day for 3 days each week, and they carried out sustained silent writing for two additional 20-minute periods each week. During the time these activities were carried out, the control group subjects worked on their regular reading instruction. At the end of 10 weeks, the students in the SSR groups had evidenced greater growth in vocabulary knowledge than was true for the control subjects. Reading comprehension did not improve for either group, however.

Burley (1980) randomly assigned 85 high school students enrolled in an Upward Bound summer program at a local college to one of four groups: SSR, programmed textbooks, programmed cassette tapes, and programmed skill development kits. The students in all groups received 75 minutes of reading instruction per day for 30 days, but part of this time was devoted to the SSR or other practice activities. In all, students practiced reading for about 14 hours in addition to the summer reading instruction during this 6-week period. This study found a small, positive, statistically significant difference favoring SSR over the other procedures on reading comprehension but no differences on a vocabulary measure.

Summers and McClelland (1982) examined the effect of a 5-month program of SSR with 65 intact treatment and control classes from nine elementary schools. They found no significant differences in covariance-adjusted mean scores from standardized and informal reading achievement and attitude measures and no significant interaction effects for reading achievement, attitude, grade level, and sex. This study included approximately 1,400 children. This study was unique not only in terms of its extensive sample, but also in that it carefully monitored the delivery of the treatments.

In yet another study of SSR (Manning & Manning, 1984), three variations of SSR were tested with 4th graders. These variations were compared across an entire school year with a poorly described control group. Students ( $n = 415$ ) from 24 classrooms were assigned to the four groups (intact classes were randomly assigned). The treatment lasted for an entire school year. This study found that two of the SSR



variations led to higher reading achievement and that one did not. The pure SSR variation (i.e., the one that matched the recommended procedures), in which students read for an extra 35 minutes per day, led to no greater reading growth than was evident for the control group. However, when SSR was coupled with teacher conferences or peer discussion, then slight improvement in reading was evident for the SSR groups. This suggests that reading alone might provide no clear benefit but that additional reading in combination with other activities could be effective.

Not all the studies in this category focused on SSR, however. Morrow and Weinstein (1986), for instance, worked with six 2nd-grade reading classes to determine the efficacy of being involved in either a home- or school-based voluntary reading program in terms of amount of reading and reading achievement. This program, which provided students with enriched library materials and extended reading time, lasted for 9 weeks. Students did more school reading as a result of being in this program, and they continued to do so when the program ended, but achievement levels in reading were unrelated to program participation, and the program did not alter reading attitudes or the amount of home reading.

### **Accelerated Reader (AR)**

AR is a commercial program designed to increase the amount of reading that students do with appropriate materials. Peak and Dewalt (1994) compared reading gains for two schools, one that used this program and one that did not. To make this comparison, they randomly selected 50 9th graders from each school. To be selected, a student had to have attended these schools since grade 3. Because standardized reading test scores (California Achievement Test) were available for each school at 3rd, 6th, and 8th grades, comparisons were made between these two groups at each point. They found a slight reading advantage in 3rd grade scores for the school that did not use AR and a slight advantage for the AR group at the end of the year. Students in the AR group had taken part in 5 to 6 hours per week of in-class reading during the 5 years of this study, but there is no information on what the other students were doing during this time. More problematic is the calculation of gain scores across forms of a standardized test. The scores of each of these normative grade level tests are independent scales, and it is not

valid to subtract these test scores from each other. Given this serious problem and the limited data reporting that was evident, it is unclear whether any real difference in achievement can be attributed to this program on the basis of this study.

In another study of the Accelerated Reader (Vollands, Topping, & Evans, 1999), two small experiments were carried out. In one experiment, there was a small advantage due to participation in the program; in the other, there was not. Neither study had well-matched samples of students, and in the study that demonstrated an advantage, students also used a form of assisted reading similar to those examined earlier in this paper.

Carver and Liebert (1995) provided one of the clearest tests of the effect of reading by studying students during the summer. This study did not have a control group but simply examined the reading scores at the beginning of the program and 6 weeks later after the students had completed approximately 60 hours of self-selected reading. These students, in 3rd through 5th grades, made no gains in reading achievement at all, even though the books were at an appropriate level.

### **Encouraging Students to Read More: Implications for Reading Instruction**

None of these studies attempted to measure the effect of increased reading on fluency. Instead, most of these studies considered the impact of encouraging more reading on overall reading achievement as measured by standardized and informal tests. It would be difficult to interpret this collection of studies as representing clear evidence that encouraging students to read more actually improves reading achievement. Only three studies (Burley, 1980; Davis, 1988; Langford & Allen, 1983) reported any clear reading gains from encouraging students to read, and in the third of these studies the gains were so small as to be of questionable educational value. Most of the studies, including the best designed and largest ones (Collins, 1980; Holt & O'Tuel, 1989; Summers & McClelland, 1982), reported no appreciable benefit to reading from such procedures (Holt & O'Tuel found improvement in vocabulary scores, but these did not translate into better reading comprehension). The most direct test of the effect of reading on learning was provided by Carver and Liebert

(1995), and they found no clear benefit resulting from 60 hours of additional reading. Perhaps 60 hours of reading is insufficient for improving achievement in a measurable way.

Only two of the studies compared SSR with nonreading instruction (Collins, 1980; Langford & Allen, 1983). One of these found no benefit, and the other found a very small benefit from SSR. More of the studies compared additional reading time with reading instruction itself. Often these studies interpreted the lack of difference between SSR and the control condition as meaning that SSR was as good as some, usually unspecified, form of reading instruction. Comparing SSR with instructional routines that have no evidence of success—or whose success has been found to be unrelated to achievement gains (Leinhardt, Zigmond, & Cooley, 1981)—is meaningless. Although several reviews of the literature have concluded that procedures like SSR work simply because reading achievement does not decline once they are instituted, that is not a sound basis on which to recommend such procedures as effective. SSR may or may not work, but it is unreasonable to conclude that it does on the basis of such flawed reasoning. For the most part, these studies found no gains in reading due to encouraging students to read more. It is unclear whether this was the result of deficiencies in the instructional procedures themselves or to the weaknesses and limitations evident in the study designs.

It is impossible to sustain a negative conclusion with research. That is, the NRP cannot ultimately prove that a procedure or approach does not work under any conditions. No matter how many studies show a lack of effect due to an instructional routine, it is always possible that under some yet-unstudied condition the procedure could be made to work. Given the paucity of studies on increasing the amount of student reading—and the uneven quality of much of this work—there is a need to be especially cautious. Few of the studies reviewed here provided much monitoring of the amount of reading that students actually did in the programs, and only one kept track of the control student reading; therefore, in most cases, it is unclear whether the interventions actually led to more reading or just displaced other reading that students might have done otherwise. Nevertheless, given the evidence that exists, the Panel cannot conclude that schools should adopt

programs to encourage more reading if the intended goal is to improve reading achievement. It is not that studies have proven that this cannot work, only that it is yet unproven.

There are few beliefs more widely held than that teachers should encourage students to engage in voluntary reading and that if they did this successfully, better reading achievement would result. Unfortunately, research has not clearly demonstrated this relationship. In fact, the handful of experimental studies in which this idea has been tried raise serious questions about the efficacy of some of these procedures.

## Encouraging Students to Read More: Directions for Further Research

There is a need for rigorous evaluations of the effectiveness of encouraging wide reading on reading achievement, particularly with popular programs such as SSR, DEAR, and AR. These studies need to monitor the amounts of reading—in and out of school—by both the experimental and control group students. To really understand the implications of such reading, it is important to compare these routines against procedures in which students actually read less. Without such information, one might only be comparing the effects of different forms of reading practice rather than comparing differences in amount of reading practice. Finally, none of these studies could even demonstrate that they clearly increased the amount of student reading because none of them measured an adequate baseline of current or previous reading engagement. That, too, should be addressed in future studies.

That encouraging more reading does as well as certain instructional activities in stimulating learning does not speak well of those instructional activities. Voluntary reading within the school day should be compared against nonreading activities or activities in which the amount of reading can be closely measured. (In fact, the field should consider adopting a new research convention for methodological studies with students in the 2nd grade or higher. The amount of gain attributable to reading alone should be the baseline comparison against which the efficacy of instructional procedures is tested. If an instructional method does better than reading alone, it would be safe to conclude that method works.) Studies should consider the effect of increasing



student reading on both fluency and overall reading achievement. However, until such evidence is forthcoming, the National Reading Panel cannot indicate that research has proven that such procedures actually work.

## Overall Conclusions

Fluency is an essential part of reading, and the NRP has reviewed its theoretical and practical implications for reading development. In addition, the Panel has conducted two research syntheses, one on guided oral reading procedures such as repeated reading and the other on the effect of procedures that encourage students to read more. These two procedures have been widely recommended as appropriate and valuable avenues for increasing fluency and overall reading achievement.

The NRP found a better, and more extensive, body of research on guided oral reading procedures. Generally, the Panel found that these procedures tended to improve word recognition, fluency (speed and accuracy of oral reading), and comprehension with most groups. Although there has been some speculation that fluency development is complete for most students by grade 3 or 4, the Panel's analysis found that these procedures continue to be useful far beyond that—at least for some readers. Repeated reading and other guided oral reading procedures have clearly been shown to improve fluency and overall reading achievement.

There is clear and substantial research evidence that shows that such procedures work under a wide variety of conditions and with minimal special training or materials. Even with this evidence, there is a need for more research on this topic, including longitudinal studies that examine the impact of these procedures on different levels of students over longer periods. It would also be worthwhile to determine the amount of such instruction that would be needed with most students and the types of materials that lead to the biggest gains when these procedures are used.

The results of the analysis of programs that encourage students to read more were much less encouraging. Despite widespread acceptance of the idea that schools can successfully encourage students to read more and that these increases in reading practice will be translated into better fluency and higher reading achievement, there is not adequate evidence to sustain this claim. Few studies have attempted to increase the amount of student reading. Those that have investigated such issues have tended to find no gains in reading as a result of the programs. This does not mean that procedures that encourage students to read more could not be made to work—future studies should explore this possibility—but at this time, it would be unreasonable to conclude that research shows that encouraging reading has a beneficial effect on reading achievement.

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# FLUENCY

## Appendices

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### Appendix A

#### Studies of Repeated Reading and Guided Oral Reading That Tested Immediate Impact of the Procedures on Reading Performance (no transfer)

Faulkner, H. J., & Levy, B. A. (1999). Fluent and nonfluent forms of transfer in reading: Words and their message. Psychonomic Bulletin and Review, *6*, 111-116.

Levy, B. A., Nicholls, A., & Kohen, D. (1993). Repeated readings: Process benefits for good and poor readers. Journal of Experimental Child Psychology, *56*, 303-327.

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## Appendix B

### Articles Included in Meta-Analysis on Guided Oral Reading Procedures

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## Appendix C

### Studies of Guided Oral Reading That Used Single Subject Designs

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## Appendix D

### Studies That Compared Methods of Guided Oral Reading

Carver, R. P., & Hoffman, J. V. (1981). The effect of practice through repeated reading on gain in reading ability using a computer-based instructional system. Reading Research Quarterly, *3*, 374-390.

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## Appendix E

### Studies of the Effects of Encouraging Students to Read

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