

A Review of the National Reading Panel's Studies on Fluency: The Role of Text

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Abstract

In this review, texts used in the research on which the National Reading Panel based its conclusions in its 2000 report about the role of fluency in reading and its sensitivity to practice were grouped in 4 categories. Three of these text categories (pre-1990 basals, skill builders, and high-interest/low-vocabulary texts) used controlled vocabulary and accounted for approximately 75% of all texts used in the studies reviewed by the panel. When various features of these controlled vocabulary texts were compared with those in current, mainstream textbook programs, the primary difference was the treatment of rare words. Compared to controlled texts, current mainstream textbook programs have substantially more rare words, and approximately 70% of these words appear a single time.

By fourth grade, all but a small percentage of U.S. schoolchildren can recognize the words in a fourth-grade text with reasonable accuracy. However, approximately two-thirds of these students recognize words slowly enough to jeopardize their comprehension. Evidence for these statements comes from the largest study of students' oral reading fluency to date: the 1994 National Assessment of Educational Progress (NAEP). As part of this large study, Pinnell et al. (1995) found that students' oral reading rate of a text was correlated with comprehension on an earlier, silent reading of the same text. Students who read 130 words per minute or more attained the proficient level or higher on the NAEP comprehension scale. Few students in the two-thirds of the sample who failed to attain the proficient level on the comprehension scale read above 125 words per minute, and most read substantially slower.

The National Reading Panel (NRP, 2000)

concluded that fluency, defined in terms of speed, accuracy, and proper expression, is a critical part of proficient reading. Further, they identified repeated and guided oral reading as instructional practices that consistently and positively influence fluency, word recognition, and comprehension through at least grade 4 for typically developing readers and through high school for students with reading problems.

The congressional mandate to the NRP was to identify best instructional practices that had been validated by scientific research. Like the other domains of reading that the NRP studied, best practices in fluency were viewed through the lenses of instructional procedures and strategies. When a meta-analysis focuses on a single aspect of instruction—such as fluency outcomes as a function of instructional procedures—critical components that could influence outcomes, such as types of texts, can be ignored (Hiebert, 1987). The NRP did not focus on how text types contribute to or detract from the effectiveness of instructional procedures. Features of the text, however, can be expected to influence reading, including rate and accuracy. Even for most adults, fluency in reading an article from *Scientific American* and an article from an entertainment magazine would differ.

For school-aged children, especially beginning and struggling readers, the features of texts would seem to be a critical factor in fluency. The features of texts can change from one copyright to the next, as a function of the mandates of large-state textbook adoptions. For example, if many of the studies in the NRP meta-analyses were conducted prior to the shift to literature in large-scale textbook adoptions (Hoffman et al., 1994), the features of text may have been quite different than those that characterize literature-based reading textbooks. The current study was aimed at identifying the features of the texts that were used in the NRP database on fluency and exploring the effects of text features.

Before describing the procedures for,

and results of, this analysis of text types and their features in the NRP fluency database, we describe the theoretical and empirical background that led us to conduct this study. This review of theory and research also provides background for the features that were addressed in the analysis of the texts used in the NRP's database for their meta-analyses of fluency.

Theory and Research: Fluency and Texts

The Construct of Automaticity

Almost a century ago, Huey (1908/1968) described the phenomenon that would become known as automaticity. Based on his review of the findings of German experimentalists on word recognition and eye movements during reading, Huey concluded that "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).

It was not until, 60 years later, when paradigm shifts occurred in linguistics and psychology, that Huey's observations began to drive research on the reading process. In 1974, LaBerge and Samuels described the construct of fluency as a foundation of proficient, fluent reading. Automaticity, they suggested, was the point at which decoding processes do not require conscious attention. LaBerge and Samuels argued that when readers devote considerable attention to identifying words, their comprehension suffers. Once decoding becomes automatic, readers can devote their attention to comprehending text. True comprehension always requires attention.

At the earliest stages of reading, almost all words are unknown and, consequently, beginning readers concentrate on decoding words. At this point, the content of texts should be sufficiently familiar so that once a word is decoded, children know the word's meaning. Although becoming automatic is a consuming and substantial feat, a

significant group of children have developed automaticity with a core group of words by the middle of grade 1 (Lesgold, Resnick, & Hammond, 1985). For students who do not develop this automaticity by the end of grade 1, their speed of reading connected text will increase over the next several years (Good, Wallin, Simmons, Kame'enui, & Kaminski, 2002; Hasbrouck & Tindal, 1992). However, students who leave grade 1 reading slowly are likely not to be reading with sufficient speed at fourth grade to comprehend the texts that proficient, grade-level readers are expected to read (Juel, 1988). This group of students continues to read too slowly to give the kind of attention that comprehension requires.

Although LaBerge and Samuels (1974) did not attend to the features of text that support automaticity on the part of young readers, the prominent instructional texts at the time they described their construct were based on behaviorist principles. Whether the unit of repetition was the high-frequency word (e.g., *for*, *and*, *of*) or the phonetically regular word (e.g., *ran*, *Nan*), instructional texts for children during the first trimester of grade 1 controlled the number of unique words (Juel & Roper/Schneider, 1985). Moreover, the rates of introducing new words and of repeating words once introduced were also controlled. In the initial wave of fluency studies, these were the texts that were used (Dahl, 1979; Samuels, 1979).

As Hoffman and others have shown (Hoffman et al., 1994; Hoffman, Sailors, & Patterson, 2002), the features of reading textbooks have changed since the 1970s when LaBerge and Samuels introduced automaticity and when Samuels (1979) proposed repeated reading as a technique for achieving this automaticity. We have been interested in the task that these new texts posed for beginning and struggling readers, leading to the development of a model of text features and their influence on word recognition in early reading. In the next section, we describe this model and a hypothesis of the manner in which particular features of text

could influence the development of fluency in reading text.

The Text Elements by Task (TEXT) Model

The Text Elements by Task (TEXT) model is aimed at the initial stages of independent reading and addresses how texts support or detract from automatic word recognition for beginning and struggling readers. The focus is on how particular features of the individual and collective body of words within a text or set of texts influence beginning and struggling readers' automatic word recognition and simultaneous recognition of a word's meaning. The first feature of words within a text is the number of unique words. For beginning and struggling readers, every unique word within a text can require attention. However, the number of different unique words and the number of repetitions for each of these unique words in a text are only one feature of the task that a text poses for beginning and struggling readers. The frequency with which words occur in English and the frequency with which graphophonic patterns occur, particularly those associated with vowels, are also critical. The first of these features—frequency of a word in written English—indicates the likelihood that a word is new or has appeared previously in texts for beginning and struggling readers. The more frequent the word, the more opportunities students have had to encounter the word and to figure it out. Further, encounters with words that have common and consistent graphophonic relationships aid readers in becoming automatic in their use of these relationships, the hallmark of proficient, beginning reading (Adams, 1990).

One purpose of this article is to consider the curriculum or the body of words with which readers must first be automatic in order to be fluent. From the perspective of the TEXT model, one aspect of defining fluent, automatic reading involves understanding the task posed by typical texts. Zeno, Ivins,

Millard, and Duvvuri's (1995) analysis of the number and frequency of words in a comprehensive sample of school texts from grades kindergarten through college demonstrated the breadth of the vocabulary task that confronts students. Although all of the texts that students read were not represented in the Zeno et al. (1995) sample, and all students will not read all of the texts in the sample, this survey did identify the words that dominate texts. The distribution of words in a million-word corpus as analyzed by Zeno et al. (1995) is summarized according to six word zones (Hiebert, 2005) in Table 1.

The differences in appearances of words in written English are substantial (see Table 1). If children read a million words over an elementary school career, the 930 most-frequent words can be expected to account for approximately 670,000 or 67% of the total words in their texts. It seems reasonable to hypothesize that successful school-aged readers are able to recognize at least the 930 most-frequent words automatically. By the same token, students who do not have fluency with these highly frequent words would seem ill-equipped to read texts with numerous rare words, such as those on specialized topics in content areas or literature. Researchers have yet to document whether the acquisition of these groups of words is an incremental process or whether, once fluency is gained with a core group of words, such as the 107 most-frequent words (i.e.,

zone-0 words), the corpus of automatically recognized words expands quickly.

The mechanisms involved in word recognition go much beyond the recognition of words as a result of their frequency in written English. Rapid recognition of words, even of the 107 most-frequent words, involves the use of common, consistent graphophonic patterns (Lesgold et al., 1985). However, especially with the large number of vowel patterns in written English, including the many variants of common patterns, some repetition of highly and moderately frequent words can be expected to be useful in developing automaticity. Although this feature of repetition has been ignored in current U.S. reading textbooks (Foorman, Francis, Davidson, Harm, & Griffin, 2004), researchers in adults' learning of English as a second language have identified the first 2,000 words as the initial curriculum for oral and written proficiency (Nation, 2001).

Word frequency does enter into the assessment of school-aged children's fluency. Evidence for the critical role of word frequency in assessing fluency comes from the design of one of the few norm-referenced assessments of fluency—the Gray Oral Reading Test (GORT) (Wiederholt & Bryant, 2001). The distribution of words in the word zones on the two passages for the first 10 levels on the GORT appears in Table 2.

Through levels that Wiederholt and Bryant (2001) defined as entry grades 5 and 6,

TABLE 1. Number of Unique and Root Words per Million-Word Corpus

No. of Appearances in 1 Million Words	No. of Unique Words (Cumulative) ^a	Proportion of Total Words: Million-Word Corpus (Cumulative)	Word Zones (Hiebert, 2005)	Label for Word Zone(s)
1,000 +	107	.48	0	Highly frequent
300	310	.57	1	
100	930	.67	2	
30	2,606	.74	3	Moderately frequent
10	5,586	.79	4	
3	11,240	.82	5	Infrequent
1	19,468	.87		
.99 and fewer	154,941	1.0	6	Rare

^a Based on Zeno et al. (1995).

TABLE 2. Percentages of Words in Word Frequency Zones: Gray Oral Reading Test Levels

GORT Level	GORT Entry Levels	Zone 0-2 (Highly Frequent)	Zones 3 and 4 (Moderately Frequent)	Zone 5 (Infrequent)	Zone 6 (Rare)
1	Grades 1 and 2	100			
2		94	98	100	
3	Grades 3 and 4	89	100		
4		90	98	100	
5	Grades 5 and 6	84	97	100	
6		85	98	100	
7	Grades 7 and 8	66	94	100	
8		66	94	100	
9	Grades 9-12	44	69	97	100
10		45	62	91	100

84% or more of the unique words are from zones 0 through 2 (i.e., the 930 most-frequent words in written English). Even through levels associated with grades 7 and 8, words are confined to zones 0-5. None of the words are so rare that they occur less than once per million-word corpus. According to the GORT, rare words do not appear in the measurement of fluency until the high school grades.

The distribution of words in written English and on a prominent norm-referenced fluency assessment lends support to the hypothesis that texts that facilitate fluency would emphasize high-frequency words. Further, such texts will have low percentages of total, unique words that are rare. This is not to say that students do not read texts with rare words but that, when reading for fluency development, rare words will account for a limited percentage of all of the unique words.

The graphophonetic features of words play a key role in word recognition and, ultimately, in reading fluency. Although *mat* is a rare word, it should be recognized automatically because of the number of members of the same word family that are among the 930 most-frequent words (i.e., *cat, hat, sat, that*). We now address evidence for the hypothesis that texts aiding in fluency development, especially for beginning and struggling readers, have high percentages of unique words from zones 0, 1, and 2 and low percentages of unique words in zones 5 and 6.

Empirical Evidence for the Effects of Text on Fluency

Studies of text features and their effects on readers' fluency as well as other aspects of reading development, such as vocabulary, have been few, especially in light of the considerable annual investment in reading textbooks (Education Market Research, 2003). The research literature contains only a small number of studies examining the effects of texts on reading fluency.

Among the 51 studies identified by the NRP subgroup on fluency, only two manipulated the forms of texts to consider their effects on fluency. In Rashotte and Torgesen's¹ (1985) study, the amount of shared vocabulary in the texts used for repeated reading was varied. Two sets of texts were used—one with low overlap of vocabulary across stories and a second with high overlap. It should be noted that, even in the low-overlap condition, the vocabulary was limited in scope because all texts needed to have a second-grade readability (Spache, 1981). This point is critical in light of the review of the frequency of vocabulary because few words on the Spache (1981) word list are infrequent or rare.

Even when limited to second-grade vocabulary, the condition with the highest percentage of shared words yielded the greatest gains in reading speed for struggling readers in the Rashotte and Torgesen (1985) study. When new stories shared many words with the original story, fluency gains

were observed with the new stories. However, shared vocabulary did not produce significant differences on accuracy or comprehension.

The second study in the NRP review in which text was manipulated was conducted by Faulkner and Levy (1994). They examined overlap of concepts as well as the vocabulary overlap that Rashotte and Torgesen (1985) had studied. Good and poor readers read pairs of texts in four conditions: (a) words and content identical (re-reading), (b) few shared words but same content (paraphrasing), (c) many shared words but different story content (word overlap), and (d) few shared words and different story content (unrelated stories). Faulkner and Levy (1994) reported that good and poor readers exhibited the most transfer when words and content were shared (i.e., rereading). Poor readers, unlike good readers, also improved on speed and accuracy when texts had high levels of word overlap. Word overlap was helpful to poor readers even when the shared words appeared in different stories.

Based on this finding, Faulkner and Levy (1994) argued that studies where repeated reading has been reported to affect reading rate, accuracy, comprehension, and prosody could be explained by the overlap between words in the practice and final texts. Faulkner and Levy gave as an illustration Dowhower's (1987) study where the overlap between words in the practice and final texts was 77%. Similarly, the findings of Samuels (1979) and Herman (1985) that poor readers read later texts faster on their first reading than earlier texts reflects opportunity to practice on a shared vocabulary.

The Rashotte and Torgesen (1985) and Faulkner and Levy (1994) studies had limited sessions and were conducted by members of the experimental team. Hiebert (2003, in press) has conducted two studies where instruction was led by classroom teachers and extended for a semester or longer. In both studies, two groups of class-

rooms read repeatedly. In one group of classrooms, however, repeated reading occurred with selections from the literature-based, basal reading program. In the other group, repeated reading occurred with short texts that had been written to emphasize high-frequency and phonetically regular words. The two sets of texts differed substantially in the number of multisyllabic, single-occurring words, with the literature texts having a rate that is typical of current second-grade basal anthologies (approximately 10%). The specially written texts had multisyllabic words, although at a substantially lower number and, when these words were not within the grade-level, high-frequency vocabulary, they were repeated.

One difference between the two studies was the length of the treatment (with study 2 twice the length of study 1). Weekly growth in words read correctly differed across the two studies. Students in study 1 showed almost twice the weekly growth of students in study 2. In the two studies, the weekly increases in fluency of those reading literature and those reading short, specially written texts exceeded typical growth according to fluency norms (Good et al., 2002; Hasbrouck & Tindal, 1992). The increases for students who read the short, specially written texts were consistently greater than those for students who read literature. In comparison to a control group, the differences were greater for students in the former group than for those in the latter group.

Although research on effects of text features on reading fluency is not extensive, studies that have examined the topic have been consistent in their findings. With highly manipulated texts where the criterion task is limited to the experimental vocabulary, students' fluency is influenced more by the degree to which texts share vocabulary than to the practice of repeated reading (Faulkner & Levy, 1994; Rashotte & Torgesen, 1985). In classroom settings where students read repeatedly from literature with a significant percentage of words that are infrequent and rare or from texts

that have few, if any, infrequent or rare words, students who read from the latter texts do better on a criterion task that is similar to the GORT. Although the group of studies is small, the consistency of the findings provided a foundation for the current study: an examination of the text types used in studies reviewed by the NRP subcommittee on fluency and an evaluation of the features of the most prominent text types in the database.

The Current Study

The present study had two goals. The first was to establish the types of texts used in studies reviewed by the NRP for their conclusions on fluency. The second goal was to determine the text features of the prominent types of texts that were included in the NRP analyses. Three features of the words in samples of equivalent length from the prominent text types were examined: the number of unique words, percentage of unique words from word zones representing selected frequencies in written English, and percentage of unique words from the most infrequent word zones that were also multisyllabic and appeared a single time.

Database

The text types and exemplar texts for each text type in the NRP database were established by a five-step process. First, we obtained copies of all studies that were analyzed by the NRP subgroup on fluency. Second, we identified the types of texts used in each study. Third, a prototype of each text type was selected. Fourth, decisions were made about text level and samples of each text type. Finally, we identified text features that could be used to distinguish different text types.

Gathering the NRP corpus of studies. The conclusions of the NRP's subgroup on fluency were based on examination of 51 studies. Sixteen of these studies were used in a meta-analysis, and the remaining 35 were used to test patterns identified in the meta-analysis. We obtained reports of all 51

studies. The 51 reports were condensed to 49 when it was established that one report (Eldredge, Reutzel, & Hollingsworth, 1996) was an expanded version of another report (Reutzel & Hollingsworth, 1993) and a second report (Winter, 1986) was a review of research. These two reports—Reutzel and Hollingsworth (1993) and Winter (1986)—were not included in the current analyses of text types, bringing the total of studies to 49 rather than the NRP's 51. The studies reviewed by the NRP and used in the present analysis are included in Appendix A.

Identifying texts used in the corpus of studies. We studied the method sections of the 49 available research reports to establish the types of texts used in repeated and guided reading interventions. In many reports, texts were described in general terms, such as "a third-grade basal reader" (Smith, 1979, p. 40). When nonspecific nominations of basal texts were made, we sorted them into categories for pre-1990 or post-1990 basal text programs. Prior to 1990, publishers used readability formulas in generating new texts or manipulating existing texts. By 1990, mandates in the two largest states with central textbook selection—California (California English/Language Arts Committee, 1987) and Texas (Texas Education Agency, 1990)—had led to textbooks with literature selections rather than texts conforming to readability formulas. Post-1990 basal anthologies, particularly at and beyond grade 2, are composed of children's literature. Consequently, basal texts after 1990 are described as literature.

In addition to basal readers, three types of text were used in the studies reviewed by the NRP. In one study (Blum et al., 1995), predictable texts were used. In these texts, sentences, phrases, and/or story episodes are repeated as in *This is the house that Jack built*. We classified these texts as post-1990 literature-based basal textbooks because predictable texts typify the text used in the first-grade components of these programs (Hoffman et al., 1994). The other two types of text were the skill builders originally published

in the 1960s (e.g., skill builders published by Reader's Digest) and high-interest/low-vocabulary (HI/LV) texts (e.g., HI/LV series published by Random House or Harper-Trophy). In sum, we identified four primary text types among the studies reviewed by the National Reading Panel's subgroup on fluency: (a) pre-1990 basal texts, (b) literature, (c) skill builders, and (d) HI/LV.

Identifying prototypes of text types. For all of the text types, we obtained examples of specific texts cited in the target studies whenever possible. From these specific citations, an exemplar—and in one case, two exemplars—were chosen. Exemplars were the most frequently used texts or programs within a text type.

The choice for the pre-1990 basal program was not straightforward because no program was cited more than once within the sample of studies. In a well-designed study of fluency (Shany & Biemiller, 1995), selections from a 1966 basal textbook program were used. Consequently, a 1966 copyright of a prominent basal reading program was used as an exemplar for the pre-1990 basal programs. Selection of a particular program was predicated on what is currently popular in the marketplace to permit comparison of text features between the pre-1990 basal and current programs. The most widely used program in current use is Houghton Mifflin (HM) (Education Market Research, 2003). Thus, we selected the 1966 copyright of that program for analysis (McKee, Harrison, McCowen, Lehr, & Durr, 1966).

Evaluating all pre-1990 basal programs on the basis of a 1966 copyright, however, is inappropriate because that copyright was the last published prior to Chall's (1967/1983) landmark critique of basal reading programs. Including a basal program from the period prior to 1990 but following Chall's critique seemed appropriate. Consequently, we also analyzed the text features of a copyright that was published midway between 1966 and 1990 (Durr, LePere, & Brown, 1981).

The 2001 copyright of the same basal textbook publisher (HM), *Invitations to Literacy* (Cooper et al., 2001), was chosen for the post-1990 basal category. We deemed a basal program a suitable choice for literature, rather than choosing individual trade books, for several reasons. First, basal programs constitute the materials that are readily available in most U.S. classrooms (Baumann, Hoffman, Duffy-Hester, & Ro, 2000). Second, the anthologies of post-1990 basal reading programs consist of literature. Using selections from this post-1990 basal program provided texts that are comparable to those used in Eldredge's research (Eldredge, 1990; Eldredge et al., 1996), a line of work that was represented in the NRP's meta-analysis. Searches on a library database and bookstore inventory indicated that all 10 texts in the third-grade anthology of the 2001 *Invitations to Literacy* program (Cooper et al., 2001) were available as separate trade books.

We chose the SRA Skill Builders (Bonning, 1963/1997) to exemplify the skill-oriented text programs. This program was originally published in 1963 as the Barnell Loft Skill Builders and complied with views of vocabulary control prominent at that time. The program has been reissued in the past decade, but its characteristics remain the same.

Finally, the original HI/LV program, *I Can Read* books that HarperTrophy Publishers initiated with Minarik's (1957) *Little Bear*, was cited in two of the four studies with HI/LV books. We chose 10 texts from the *I Can Read* series from the lists provided by Fountas and Pinnell (1996, 1999, 2001). The 10 selected texts had been assigned guided reading levels L through N, levels that correspond with third grade, according to Fountas and Pinnell. The titles of the 10 texts from the *I Can Read* series that were included in the current analysis are listed in Appendix B.

Identifying text level and text samples. We selected third grade as the focus grade level because of its use in public policy on

reading (U.S. Congress, 2001) and the stability of reading status after this grade (Chall, Jacobs, & Baldwin, 1990). To avoid possible anomalies associated with individual texts, we used instructional units as the unit of analysis. Following the convention established by Chall (1967/1983), an instructional unit was taken to be 10 texts. The program with the shortest texts, the SRA Skill Builders (Boning, 1963/1997), determined the size of the word samples. The third-grade SRA texts had a mean length of 230 words. To ensure comparability, 230-word samples were taken from 10 consecutive texts in the three remaining exemplars. Although individual texts in the three exemplars were considerably longer than 230 words, this sample size is about the upper limit of text length for a daily session on fluency in third grade. We chose an instructional unit of 10 consecutive texts from the middle of the third-grade component of the four program exemplars.

Establishing features of text samples. Each 2,300-word sample of a text type was analyzed with the Text Elements by Task (TExT) software (Hiebert & Martin, 2002). The TExT software can be programmed to provide information on text features. We examined three features in this analysis. The first was the number of unique or different words. A unique or different word is tabulated once for an entire sample of 2,300 words. Even if a word such as *the* occurred 180 times in a 2,300-word sample, it was counted as one unique word.

Second, the word zones of unique words were established. We described the word zones derived from the database of Zeno et al. (1995) previously in this article (see Table 1). We used this scheme of word zones to establish four groups of words: (a) highly frequent words: the 930 words in zones 0 to 2 with frequencies of 100 or more per million-word corpus), (b) moderately frequent words: the 4,656 words in zones 3 and 4 that have frequencies of 10 to 99 per million-word corpus, (c) infrequent words: the 13,882 words that occur 1 to 9 times per mil-

lion-word corpus, (d) rare words: the approximately 135,473 words in zone 6 that occur fewer than once per million-word corpus.

The TExT software was used to establish a third feature of infrequent and rare words: the percentage of unique words that were multisyllabic and occurred a single time in a text sample. For beginning and struggling readers, words that are multisyllabic have been found to be more difficult to read and to subsequently remember than monosyllabic words (Juel & Roper/Schneider, 1985). Further, struggling readers have difficulty becoming automatic in recognizing a word and remembering its meaning after a single encounter (Scott, 2005).

Results

Text types. Table 3 presents a classification of studies included in the NRP review into the four text types. A fifth category—unspecified—contained two studies where the type of text was not described. Pre-1990 basal texts were used in 47% of the studies, whereas skill builder texts, HI/LV texts, and post-1990 basal texts (children's literature) accounted for 18%, 8%, and 22%, respectively. Texts were unspecified in 4% of the sample.

In the meta-analysis, pre-1990 basal texts were used in 60% of the studies, skill builder texts in 0%, HI/LV texts in 13%, and post-1990 basal/literature in 26%. When texts with controlled vocabulary were clustered (i.e., pre-1990 basal, skill builder, and HI/LV texts), they accounted for 74% of the studies overall and 73% of the studies used in the meta-analysis.

Based on their meta-analysis, the NRP subgroup on fluency reported an effect size of .48 across the measures of fluency, word recognition/accuracy, vocabulary, and comprehension. Of the studies in the meta-analysis, four used the literature texts of post-1990 basal reading programs for fluency practice. We reexamined these four studies to establish their contribution to the meta-analysis. Table 4 summarizes the ef-

TABLE 3. Types of Text Used in Fluency Studies Reviewed by the National Reading Panel

Text Type	Study ^a
Pre-1990 basal text	Carver and Hoffman (1981) Dowhower (1987) Faulkner and Levy (1999) Gilbert et al. (1996) Hollingsworth (1970) ^b Homan et al. (1993) Kamps et al. (1994) Law and Kratochwill (1993) Levy et al. (1993) Lorenz and Vockrell (1979) ^b Mathes and Fuchs (1993) ^b Neill (1979) Rasinski (1990) Rasinski et al. (1994) ^b Reitsma (1988) Shany and Biemiller (1995) ^b Simmons et al. (1994) ^b Simmons et al. (1995) ^b Smith (1979) Thomas and Clapp (1989) ^b Tingstrom et al. (1995) Weinstein and Cooke (1992) Young et al. (1996) ^b
Skill-builder text (e.g., Barnell Loft Multiple or Specific Skill Series and Reader's Digest Skill Builders)	Herman (1985) Langford et al. (1974) O'Shea et al. (1985) Pany and McCoy (1988) Rashotte and Torgesen (1985) Rose and Beattie (1986) Sindelar et al. (1990) Stoddard et al. (1993) Taylor et al. (1985)
High-interest/low-vocabulary stories (e.g., <i>I Can Read</i> series)	Conte and Humphreys (1989) ^b Hollingsworth (1978) ^b Mefferd & Pettegrew (1997) Rose (1984)
Post-1990 basal text/literature (including predictable and little books)	Blum et al. (1995) Dixon-Krauss (1995) Eldredge (1990) ^b Eldredge et al. (1996) ^b Labbo and Teale (1990) ^b Lindsay et al. (1985) Miller et al. (1986) ^b Morgan (1976) Morgan and Lyon (1979) Turpie and Paratore (1995) Winter (1988)
Unspecified	Van Bon et al. (1991) Van Wagenen et al. (1994)

^aSee Appendix A for full references.

^bUsed in meta-analysis.

fects for the four studies in which literature was used for fluency development.

The summary in Table 4 indicates that a fluency outcome was reported for only one

of the four studies in which literature was used for repeated reading. In this single study, no significant difference was found on the fluency outcome between the treat-

TABLE 4. Effects for Critical Variables: Studies in NRP Meta-Analysis Using Literature

Study	Fluency	Accuracy	Comprehension	Vocabulary
Eldredge (1990)	NR	NR	+	+
Eldredge et al. (1996)	—	+	+	+
Labbo and Teale (1990)	NR	NR	+	NR
Miller et al. (1986)	NR	+	—	NR

NOTE.—NR = not reported; plus sign indicates that significant, positive difference was found; minus sign indicates that no significant difference was found.

ment and comparison groups. On all other measures that were gathered—other than the comprehension outcome in the Miller, Robson, and Bushell (1986) study—significant differences were found that favored the group reading literature repeatedly. Table 4 suggests that the NRP's conclusions regarding positive effects on fluency for repeated and guided reading activities were not derived from the four studies that used literature or post-1990 literature-based reading textbooks. The effect sizes for gains in fluency that the NRP reported came from the other 11 studies. In all of these studies, the three text types that had some control of vocabulary were used for fluency practice—pre-1990 basal textbooks, skill builders, or HI/LV.

Word features of prototypical text types. We compared the exemplars of the four text types (with one represented by two exemplars) on three dimensions: (a) number of unique words, (b) percentages of unique words in particular word zones, and (c) percentages of multisyllabic, single-appearing features of rare words. These data appear in Table 5.

On all three dimensions, the indices for the samples of three text types—the two pre-1990 basals, the skill builder, and the HI/LV—were within similar ranges. The fourth text type (literature) differed on all three dimensions. On the dimension of number of unique words, the average number of unique words for the four exemplars of controlled text was 618 compared with 803 for literature (i.e., on average, there were almost 200 more unique words in the

literature sample compared with the samples of the other three text types).

On the dimension of word frequency, an average of 92% of the unique words in the three controlled text types was among the moderate to highly frequent words compared with 83% for the literature text type (i.e., the three controlled text types had approximately 10% fewer words that were infrequent or rare than the literature text type). As the data in Table 5 show, the higher percentage of infrequent and rare words in the literature meant the presence of more multisyllabic, single-appearing words. Although 3.75% of the words in the samples of the controlled text types consisted of multisyllabic, single-appearing words, 10% of the unique words in the literature were of this type.

To understand what the differences in the dimensions summarized in Table 5 mean for fluency practice, consider the presence of multisyllabic single-appearing infrequent/rare words in a sample of a 100-word text from either literature or one of the three types of controlled text. In a literature text, 3.5 words would be infrequent/rare, multisyllabic, and single-appearing words. In similar samples of the other three text types, one word would be infrequent/rare, multisyllabic, and single appearing.

Discussion

This reanalysis of the studies on which the NRP based conclusions about effective fluency instruction shows that the texts in these studies had high percentages of highly and moderately frequent words and

TABLE 5. Features of Text Types

Text Type	Unique Words (No.)	Percentage of Unique Words: Word Zones				Percentage of Unique Words in Zones 5 and 6	
		Zones 0-2 (Highly Frequent)	Zones 3 and 4 (Moderately Frequent)	Zone 5 (Infrequent)	Zone 6 (Rare)	Multisyllabic	Multisyllabic, Singletons
Pre-1990 basal:							
1966	617	76	94	98	100	4	2
1981	676	68	89	98	100	8	6
Skill builder	567	73	93	98	100	4	3
HI/LV	613	65	89	98	100	7	4
Post-1990:							
Basal/literature (2001)	803	60	83	95	100	13	10

low percentages of infrequent and rare words. This pattern is the opposite of that in the literature that now comprises the anthologies of basal reading programs. The relatively high ratio of rare words in children's literature that Hayes, Wolfer, and Wolfe (1996) reported was confirmed in the current analysis. In the literature texts in the third-grade anthology of the nation's most widely used textbook (Education Market Research, 2003), 17% of the unique words are infrequent or rare words relative to 8% for controlled text types. The ratios of highly and moderately frequent to infrequent and rare words were 83:17 for the literature texts and 92:8 (on average) for the other three text types. This difference would seem to lead to different reading tasks in terms of traditional benchmarks for instructional and frustration levels in reading (Betts, 1946). Although 92:8 approaches the traditional frustration level of 90%, students who are fluent with highly and moderately frequent words should be able to use context clues to identify the infrequent and rare words in the texts. However, texts with a ratio of 83:17 are well beyond the frustration level and demand considerably higher skills to be read proficiently. The proficiency that such texts require is associated with grade 9 or higher on the GORT (Wiederholt & Bryant, 2001), one of the few norm-referenced measures of fluency.

A high percentage of infrequent and rare

words in school texts is an obstacle for fluency development. It is an even larger obstacle if the infrequent and rare words are not repeated within and across texts. When words such as *collards* or *princessa* appear a single time in a text, struggling readers may be able to pronounce the word after several rereadings of a text. However, without these rereadings, it is unlikely that even attention to these words by the teacher will result in ease of pronunciation or comprehension. The situation is exacerbated when these words do not appear again in the textbook program or cannot be expected to appear in any other texts that students are reading.

This analysis suggests that texts in the studies within the NRP's database that showed significant results for fluency outcomes had a higher percentage of the 5,500 most-frequent words and a lower percentage of rare words than literature texts.

Although children's literature was not prominent in the studies that showed an effect for fluency, there may still be ways in which children's literature can support fluency.

First, different kinds of text may be effective with students of different proficiency levels. The samples in many of the NRP studies were limited to struggling readers. The NRP generalized their conclusion regarding the benefits of fluency training to students of all ability levels through

fourth grade. Because there was little differentiation in the kinds of texts used, we did not include the ability distributions within studies in this reanalysis. A few findings in the research literature suggest that the relation between ability and kind of text merits further examination. Hiebert (in press) found that students in the second quartile performed better when repeatedly reading literature than when repeatedly reading texts with a modicum of control. The other three quartile groups, including those in the first quartile (top), did better with texts that had a modicum of control. It may well be that, for those students who could use an extra push to attain the critical fluency levels associated with proficient and advanced comprehension, literature may work well. They already have a grasp of the highly frequent words. Applying context and word-recognition strategies to unknown words—when the high-frequency words are recognized automatically—may be enhanced with literature.

Second, if given sufficient time, students may become fluent with a piece of literature. Barr (1974–75) reported that highly effective teachers compensated for text difficulty by spending more time on difficult texts. When this occurred, students achieved similar levels as students who read easier texts for shorter reading periods. However, when teachers were not as effective and did not make these accommodations, students' reading achievement suffered. If even higher gains in fluency can be attained in shorter periods with accessible texts than with literature (Hiebert, in press), it would seem appropriate to consider what best practice means for fluency. As reading periods grow longer in response to state and federal mandates, there may seem to be an unlimited amount of time for repeated reading of the literature-based reading selections. However, this reallocation of time is usually at the expense of other academic content areas, such as science and social studies. If reading periods are to be used effectively as a context for

students' acquisition of a broad repertoire of reading strategies, best practices need to be applied. Spending long periods of time rereading literature selections and sacrificing other content may not be the best method for achieving fluency or, for that matter, other aspects of literacy, such as vocabulary and comprehension strategies.

Relatively large percentages of rare words in texts used for reading instruction can be expected to present serious challenges for the fluency development of English language learners and for students whose academic literacy is limited to the school environment. This situation is important to consider because some groups of linguistically and culturally diverse students perform poorly on the NAEP (Donahue, Finnegan, Lutkus, Allen, & Campbell, 2001) and because the percentage of English language learners has increased over the past decade (U.S. Census, 2001). Further, the presence of infrequent and rare words in literature selections begins in first-grade texts. In analyzing texts that were approved for use in Texas (Texas Education Agency, 1997), Foorman et al. (2004) reported that as many as 40% of the unique words in first-grade texts occurred a single time. Many of these are the multisyllabic words that have been shown to be difficult for first graders to read (Juel & Roper/Schneider, 1985).

The presence of a sizable percentage of rare words in texts that require extensive explanation and assistance in pronunciation is unlikely to facilitate English language learners' fluency with highly and moderately frequent words. For example, when single-appearing words from zone 6, such as *Baptists*, *embankment*, *principessa*, *coonskin*, and *collards*, account for a substantial portion of the unique words in a text, teachers are unlikely to spend as much instructional time on zone 3 and 4 words, such as *performed*, *operated*, *disturb*, and *admitted*. The latter words are part of semantic families with multiple members (e.g., *admit*, *admittance*). Many also have multiple meanings and are relevant to several school subjects.

Reading researchers have had little to say about the need for repetition of vocabulary in the instruction of English language learners. This situation is unlike that of research on adults' acquisition of English as a second language. In that domain, research has established which English words need to be taught and applied repeatedly for individuals to become proficient speakers and readers of English. Nation (2001) has identified the 2,000 most frequent words as the focus of instruction for learners of English as a second language. According to Nation's analyses, these 2,000 words account for 90% of words in conversations, 87% of words in fiction, 80% of words in newspapers, and 78% of words in academic texts. If a focused curriculum in learning English is necessary for adults, such a curriculum would appear essential for English language learners who are developing initial vocabularies in English at the same time they are being asked to become fluent readers of English. Because studies on this topic are almost nonexistent, the NRP (2000) did not comment on the fluency development of English language learners. This topic should be a high priority in future research in early reading.

We began this article with the hypothesis that the words with which students must first become fluent are those that account for large percentages of written English. For students who are not already automatic with highly and moderately frequent words, texts with high percentages of single-appearing rare words are likely to be too challenging. When rare words occur a single time in texts, students have limited opportunities to apply word-identification strategies to these rare words. Students may require multiple opportunities to figure out infrequent and rare words in various contexts. However, without fluency with words from zones 0 through 4, it is unlikely that these strategies will be effective.

Many questions have not been answered in the research on fluency. The amount of time with accessible texts that

readers require to attain benchmark levels is one of these questions. This question of time applies both to the proportion of reading periods that should be devoted to fluency issues and accessible texts as well as the grade levels when such emphases are most appropriate. However, the present analysis indicates that texts used in the archival research to produce fluency effects had particular features and that these features are different from the features of children's literature that now dominates mainstream basal reading programs.

Based on the NRP's findings, Reading First legislation has mandated that fluency be assessed and, where below performance standards, improved. At the same time, Reading First policies have emphasized the full implementation of basal reading programs. At present, the primary components of basal reading programs have texts where rare words account for a significant portion of the unique words. Analysis of the texts used in the studies that showed the significant effect for fluency in the NRP meta-analysis showed that these texts had a lower rate of rare words and a higher percentage of highly and moderately frequent words. Professional development for teachers on the instructional strategies of guided and repeated oral reading is likely insufficient for substantial changes in U.S. students' fluency levels. Attention also needs to be paid to the types of texts used for fluency training and, depending on the features of these texts, the time that is allocated for fluency practice.

Appendix A

References for Fluency Findings from the National Reading Panel

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* Studies used in meta-analysis.

Appendix B

Trade Books and Textbooks Used in Analysis

High Interest/Low Vocabulary

- Coerr, E. (1988). *Chang's paper pony*. New York: HarperTrophy.
- Coerr, E. (1986). *The Josefina story quilt*. New York: HarperTrophy.
- Himmelman, J. (1998). *The animal rescue clue*. New York: HarperTrophy.
- Lewis, T. P. (1971). *Hill of fire*. New York: HarperTrophy.
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- Low, A. (1978). *The witch who was afraid of witches*. New York: HarperTrophy.
- Monjo, F. N. (1993). *The drinking gourd*. New York: HarperTrophy.
- Parrish, P. (1966). *Amelia Bedelia and the surprise shower*. New York: HarperTrophy.
- Sandin, J. (1989). *The long way westward*. New York: HarperTrophy.
- Turner, A. (1995). *Dust for dinner*. New York: HarperTrophy.

Pre-1990 Basal Programs

- Durr, W. K., LePere, J. M., & Brown, R. H. (1979). *Passports* (Vol. 3.2 of Houghton Mifflin Reading Series). Boston: Houghton Mifflin.
- McKee, P., Harrison, M. L., McCowen, A., Lehr, E., & Durr, W. K. (1966). *Climbing higher* (Vol. 3.2 of *Reading for meaning*) (4th ed.). Boston: Houghton Mifflin.

Post-1990 Basal/Literature

- Cooper, J. D., Pikulski, J. J., Au, K. H., Calderon, M., Comas, J. C., Lipson, M. Y., Mims, J. S., Page, S. E., Valencia, S. W., & Vogt, M. E. (2001). *Invitations to literacy*. Boston: Houghton Mifflin.
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Skill Builders

- Boning, R. A. (1997). *Getting the facts* (Book C of *Specific Skills Series*, 5th ed.). Columbus: SRA-McGraw-Hill. (Original work published 1963)

Note

1. Some references cited in text are listed in the appendixes and not in the Reference section.

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