

Oral Reading Fluency as an Indicator of Reading Competence: A Theoretical, Empirical, and Historical Analysis

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The purpose of this article is to consider oral reading fluency as an indicator of overall reading competence. We begin by examining theoretical arguments for supposing that oral reading fluency may reflect overall reading competence. We then summarize several studies substantiating this phenomenon. Next, we provide an historical analysis of the extent to which oral reading fluency has been incorporated into measurement approaches during the past century. We conclude with recommendations about the assessment of oral reading fluency for research and practice.

Reading is a complex performance that requires simultaneous coordination across many tasks. To achieve simultaneous coordination across tasks, instantaneous execution of component skills is required. With instantaneous execution, reading fluency is achieved so that performance is speeded, seemingly effortless, autonomous, and achieved without much consciousness or awareness (Logan, 1997).

It is not surprising, therefore, that the most salient characteristic of skillful reading is the speed with which text is reproduced into spoken language (Adams, 1990). The characteristic to which Adams referred, which we term *oral reading fluency*, is the oral translation of text with speed and accuracy. In this article, we consider whether oral reading fluency may serve as an indicator of overall reading competence. Our proposition is that oral reading fluency represents a complicated, multifaceted performance that entails, for example, a reader's perceptual skill at

automatically translating letters into coherent sound representations, unitizing those sound components into recognizable wholes and automatically accessing lexical representations, processing meaningful connections within and between sentences, relating text meaning to prior information, and making inferences to supply missing information. That is, as an individual translates text into spoken language, he or she quickly coordinates these skills in an obligatory and seemingly effortless manner, and because oral reading fluency reflects this complex orchestration, it can be used in an elegant and reliable way to characterize reading expertise.

Several operational reasons explain how oral reading fluency may serve to represent this complicated process. Oral reading fluency develops gradually over the elementary school years (e.g., Biemiller, 1977–1978; L. S. Fuchs & Deno, 1991). To reflect incremental differences or change, oral reading fluency can be indexed (or counted) as words read correctly per minute so that scores reflect small, roughly equal interval units (L. S. Fuchs & Fuchs, 1999), which permits practitioners and researchers to use oral reading fluency in two ways. First, within a normative framework, performance levels can be compared between individuals. Second, gains or performance slopes can track the development of reading competence within an individual. These strategies for characterizing reading competence and improvement have been shown to be more sensitive to inter- and intraindividual differences than those offered by other well-accepted, more broadly conceptualized reading tasks (e.g., Marston, Fuchs, & Deno, 1985). For example, as Frederiksen (1981) demonstrated, the number of word reading errors in context does not as a rule distinguish groups of high- and low-ability readers as well as the chronometric aspect of processing, as reflected in oral reading rate, which consistently provides a basis for distinguishing levels of reading expertise.

We begin this article by examining theoretical arguments for supposing that oral reading fluency reflects overall reading competence. We then summarize several studies substantiating this claim. Next, we provide an historical analysis of the extent to which oral reading fluency has been incorporated into measurement approaches during the past century. We conclude with recommendations about the assessment of oral reading fluency for research and practice.

Before beginning this discussion, we offer one caveat. Research (e.g., L. S. Fuchs, Fuchs, Hamlett, Walz, & Germann, 1993) suggests that the typical developmental trajectory of oral reading fluency involves greatest growth in the primary grades, with a negatively accelerating curve through the intermediate grades and perhaps into junior high school. Consequently, after the intermediate grades or the junior high school years, the nature of reading development may change to reflect literary analysis of narratives and processing of expository text. This suggests that the relation between oral reading fluency and comprehension should be stronger in the elementary and junior high grades than in older individuals, a pattern borne out in the literature (e.g., Gray, 1925; Jenkins & Jewell, 1993; Sassenrath, 1972). It also suggests that oral reading fluency may serve as an indicator of basic reading

competence rather than an individual's capacity to analyze literature or to learn new information from complicated expository text. Future research should explore these issues.

THEORETICAL BASES FOR ORAL READING FLUENCY AS A MEASURE OF READING CAPACITY

On its face, from a behavioral perspective, oral reading fluency is a direct measure of phonological segmentation and recoding skill as well as rapid word recognition. What is the theoretical basis for presuming that this behavior, in which the individual quickly and accurately translates written language into its oral form, may also reflect the reader's ability to derive meaning from text? Theoretical frameworks for understanding the reading process do provide a basis for conceptualizing oral reading fluency in this way—as a performance indicator of overall reading competence, which includes comprehension. We briefly discuss two perspectives that offer such support.

LaBerge and Samuels' (1974) automaticity model of reading is probably most frequently invoked as a framework for conceptualizing oral reading fluency as an indicator of overall reading competence (see, e.g., Potter & Wamre, 1990). LaBerge and Samuels described how the execution of a complex skill necessitates the coordination of many component processes within a short time frame. If each component required attention, the performance of the complex skill would exceed attentional capacity and therefore be impossible. By contrast, if enough components are executed automatically, then attentional load would be within tolerable limits, permitting successful performance. In this way, automaticity became a key explanatory construct in reading. LaBerge and Samuels assumed, however, that comprehension processes demand attention and therefore are not strong candidates for the development of automaticity; they considered lexical processes, such as orthographic segmentation and phonological coding, to be better targets for automaticity. In essence, LaBerge and Samuels promoted the view that skilled reading involves the reallocation of attentional capacity from lower level word identification processing to resource-demanding comprehension functions.

Of course, LaBerge and Samuels' (1974) bottom-up serial-stage model of reading requires that higher level processes await the completion of lower ones. More recent conceptualizations of reading instead pose an interactive process, in which the initiation of a higher level process does not await the completion of all lower ones. In fact, studies (e.g., Leu, DeGross, & Simons, 1986; Stanovich & Stanovich, 1995; West, Stanovich, Feeman, & Cunningham, 1983) document that although good and poor readers both experience contextual facilitation, the effect is greater for poor readers. This phenomenon is hard to rectify against a bottom-up serial-stage model of reading. Fortunately, Posner and Snyder's (1975a, 1975b) the-

ory of expectancy provides a framework for posing alternative processes by which context facilitation accrues for good and poor readers and lends support to an interactive model of reading.

According to Posner and Snyder (1975a, 1975b), semantic context affects word recognition via two independently acting processes. With the automatic-activation process, stimulus information activates a memory location and spreads automatically to semantically related memory locations that are nearby in the network. This process is obligatory, is fast acting, and requires no attentional capacity. The second process, a conscious-attention mechanism, relies on context to formulate a prediction about the upcoming word and directs the limited capacity processor to the memory location of the expected stimulus. This slow-acting process is optional, it utilizes attentional capacity, and it inhibits the retrieval of information from unexpected locations. For good readers, rapid word recognition short-circuits the conscious-attention mechanism; the automatic spreading-activation component of contextual processing dominates. By contrast, for poor readers, contextual facilitation results from the combined effect of the conscious-attention and the automatic-activation mechanisms. Unfortunately, as poor readers rely on the conscious-attention mechanism, they expend their capacity in prediction processes to aid word recognition. Little is left over for integrative comprehension processes, which happens for readers with strong word recognition skills, whereby new knowledge is constructed or new material is integrated into existing knowledge structures.

Consequently, the model from LaBerge and Samuels (1974) and more recent, interactive models of reading (Stanovich, 2000) differ in terms of what type of processing occurs as individuals engage with text at the word recognition level and what occurs when word recognition is inefficient. With LaBerge and Samuels, word recognition does not rely on contextual facilitation; with an interactive model, prior contextual knowledge aids in word identification to compensate for poor word-level skill.

Both perspectives, nevertheless, do share the assumption that efficient low-level word recognition frees up capacity for higher level, integrative comprehension processing of text; this is the key point in framing a theoretical argument that fluent oral reading from text serves as a performance indicator of overall reading competence, which includes the reader's capacity, for example, to process meaningful connections within and between sentences, to infer the macrostructure of a passage, to relate text meaning by checking consistencies with prior information, and to make inferences to supply missing information. Within both theoretical perspectives, reading development presumes increasing word recognition speed, which is associated with enhanced capacity to allocate attention to integrative comprehension processing when engaging with text. In this way, the fluency with which an individual translates text into spoken words should function as an indicator not only of word recognition skill but also of an individual's comprehension of that text.

EMPIRICAL EVIDENCE FOR ORAL READING FLUENCY AS AN INDICATOR OF READING COMPETENCE

Theoretical frameworks, therefore, provide a basis for hypothesizing that oral reading fluency may serve as an indicator of overall reading competence. It is interesting to note that a persuasive database empirically demonstrates how word recognition skill, in general, relates strongly to text comprehension (e.g., Gough, Hoover, & Peterson, 1996). Of course, word recognition skill may relate less well to text comprehension than do more “direct” measures of comprehension. Moreover, oral reading fluency can be assessed via isolated word lists or text. In addition, it may be tested under oral or silent reading conditions.

In this section, we address a set of questions that parallel these issues. First, we describe research examining how oral reading fluency compares to more direct measures of reading comprehension as an indicator of reading competence. Second, we report findings of a study exploring how text reading fluency compares to isolated word reading fluency. Third, we summarize a database comparing silent reading fluency and oral reading fluency as correlates of reading comprehension performance. It is important to note that in the studies we describe, criterion measurement of overall reading competence was operationalized as performance on traditional, commercial, widely used tests of reading comprehension. This operationalization reflects the widely held assumption that meaning construction is the goal of reading. It does not, however, address questions about whether traditional commercial achievement tests, designed for large-scale assessment, optimally reflect the capacity to construct meaning from text.

Oral Reading Fluency Versus Direct Measures of Reading Comprehension

To contrast the criterion validity of several reading measures, L. S. Fuchs, Fuchs, and Maxwell (1988) used the Reading Comprehension subtest of the Stanford Achievement Test (Gardner, Rudman, Karlsen, & Merwin, 1982) as the criterion measure, with which to correlate four alternative measures. Three of these alternative measures were deemed to be direct measures of reading comprehension; oral reading fluency was the fourth measure.

Question answering was one of the direct reading comprehension measures. Question answering is the most commonly employed reading comprehension assessment in classrooms, and it is incorporated frequently within commercial standardized tests. As operationalized by L. S. Fuchs et al. (1988), question answering required students to read two 400-word passages, each for 5 min. For each passage, students provided oral answers to 10 short-answer questions, which were posed orally. The questions required recall of information contained in idea units

of high thematic importance. A response was scored correct if it matched or paraphrased information in the idea unit. Number correct was averaged across the two passages.

Another direct reading comprehension measure was *passage recall*. Recall is a well-established method for assessing students' comprehension of text; it is employed frequently in reading comprehension research. L. S. Fuchs et al. (1988) used the same 400-word passages. Pupils read one passage for 5 min and had 10 min to retell the passage. If students completed the recall before the time limit, examiners delivered a maximum of four controlled prompts, with 30 sec of no response between prompts, before terminating the recall. Recalls were scored as total number of words retold, percentage of content words retold, and percentage of idea units retold.

Cloze was a third direct measure of reading comprehension. We created a cloze for each 400-word passage by deleting every 7th word from the passage and replacing each deleted word with a blank. Cloze is considered a measure of reading comprehension because correct replacements are generated by means of reasoning processes that constitute comprehension; these include accessing background information, understanding the pertinent textual information, relying on linguistic properties, and using reasoning skills. In this study, students wrote replacements to restore blanks for one passage; restorations were scored as exact matches, as synonymous matches, and as syntactic matches with deleted words.

In addition to measuring students on the criterion variable (i.e., the Reading Comprehension subtest of the Stanford Achievement Test) and these three direct reading comprehension measures, L. S. Fuchs et al. (1988) also assessed oral reading fluency. Students read two of the 400-word passages aloud, each for 5 min, while the examiner scored omissions, repetitions, substitutions, and mispronunciations as errors. Performance was reported as words read correctly per minute averaged across the two passages.

Seventy middle school and junior high school students participated; all had a reading disability. Stanfords were administered in small groups. Each pupil completed the four alternative measures (question answering, recall, cloze, oral reading fluency), with the order of administration and the passages assigned to each measure counterbalanced.

Results were as follows. Criterion validity coefficients (average correlations across the different scoring methods) for the question answering, the recall, and the cloze measures were .82, .70, and .72, respectively. The coefficient for oral reading fluency was .91. Tests for differences between these correlations demonstrated that the correlation for oral reading fluency was significantly higher than the correlation for each of the three direct measures of reading comprehension.

Consequently, although each measure correlated respectably well with the criterion measure, it is notable that students' oral reading fluency was most strongly

associated with capacity to read passages and answer questions about those passages on a widely used, commercial achievement test of reading comprehension. In part, these findings reflect difficulties associated with the direct forms of reading comprehension assessment. Such difficulties include producing good sets of questions that cannot be answered from information contained in the set of questions, identifying tenable methods for scoring recalls, or the tendency for cloze measures to reflect textual redundancy. A correlation between oral reading fluency and performance on the Reading Comprehension subtest of the Stanford Achievement Tests of .91 is nonetheless impressive because oral reading fluency, on its face, does not require students to understand what they read. The high correlation for oral reading fluency, however, does corroborate theoretically driven hypotheses about the potential of oral reading fluency as an indicator of overall reading competence.

Of course, these results are based on a sample of students with reading disabilities, for whom individual differences in word reading processes are likely to have a stronger effect on comprehension outcomes than among more skilled readers. Nevertheless, high correlations have also been documented for nondisabled elementary school age children within a variety of studies that (a) incorporated different criterion measures of reading accomplishment, (b) examined within-grade as well as across-grade coefficients, and (c) used instructional level as well as a fixed level of text across students (for reviews, see Hosp & Fuchs, 2000; Marston, 1989). These findings are consistent with the idea that oral reading fluency appears to reflect individual differences in overall reading competence.

Reading Words in Context Versus Words in Isolation

Of course, demonstrating that oral reading fluency is a better proxy for traditional measures of reading comprehension than more direct measures of reading comprehension does not eliminate the possibility that reading isolated word lists may represent a similarly good—or better—indicator of reading competence. To examine this possibility, Jenkins, Fuchs, Espin, van den Broek, and Deno (2000) examined the criterion validity of fluency scores when students read words in isolation or in context.

Jenkins et al.'s (2000) sample comprised 113 fourth-grade students: 85 skilled readers (performing at or above the 50th percentile on the Reading Comprehension test of the Iowa Test of Basic Skills; Riverside, 1994), 21 students without disabilities who read below the 50th percentile, and 7 students with reading disabilities (randomly selected from a larger pool of students with reading disabilities). Jenkins et al. sampled in this way to approximate a normal distribution of fourth graders. Students read from two measures, each for 1 min. The first measure was an intact, 400-word folktale; the second was a word list comprising randomly

ordered words from the folktale. Performance for each measure was scored as words read correctly per minute. Also, in groups, students completed a criterion measure, the Reading Comprehension portion of the Iowa Test of Basic Skills, under standard conditions (i.e., with a time limit that permitted most students to complete the test without pressure).

The criterion validity coefficient (i.e., with reading comprehension) for text fluency was .83; for list fluency, it was .53. The difference between these correlations was statistically significant. Pairs of regressions were also computed, with the order of the predictors varied within pairs so that the unique contribution of each predictor could be estimated after controlling for the paired predictor. Text fluency and list fluency together accounted for 70% of the variance in the Iowa test scores. Text fluency uniquely explained 42% of the variance in the Iowa scores, whereas list fluency uniquely explained only 1%. When comparing text fluency to list fluency, text fluency accounted for substantial variance in reading comprehension, with little additional variance accounted for by list fluency.

Perhaps of even greater interest, Jenkins et al. (2000) also used text fluency as the criterion variable, entering the Iowa test and list fluency as the predictors to shed light on how comprehension and isolated word reading fluency contribute to text fluency performance. Of course, the observed behaviors in list fluency and text fluency are virtually identical; by contrast, the nature of reading text aloud fluently versus the behavior required for the Iowa test (reading text silently and then answering multiple-choice questions) is strikingly different. On this basis, one might hypothesize that list fluency would account for more (and perhaps almost all) of the unique variance in text fluency. Interestingly, however, comprehension and list fluency did make unique and substantive contributions to the prediction of text fluency. Even more surprising, after the Iowa test was entered into the regression, list fluency accounted for only 11% of the variance in text fluency; by contrast, after list fluency had been entered, the Iowa test still accounted for 28% of the variance in text fluency. So, the unique contribution of comprehension was more than twice that of list fluency, indicating that text fluency appears to have more in common with reading comprehension than with reading word lists fluently.

This finding leads us to expand on our earlier discussion of the theoretical basis of oral reading fluency as a measure of reading competence. Whereas LaBerge and Samuels' (1974) automaticity theory and Stanovich's (1980) interactive-compensatory model described how development of individual differences in word recognition efficiency affects attentional resources, Perfetti (1995) proposed that other reading subcomponents (e.g., identifying anaphoric referents, integrating propositions within text and with background knowledge, inferencing) can also become automatized. Moreover, as these reading subcomponents become efficient, additional attentional resources (beyond those freed by word-level skills) are released for constructing a more in-depth text model. Jenkins et al.'s (2000) finding that oral reading fluency and comprehension share unique variance (after controlling

for list rate) suggests that oral reading fluency taps individual differences in verbal efficiency for reading subcomponents beyond those at the word level. As Thurlow and van den Broek (1997) illustrated, fluency may reflect readers' capacity to automatically formulate inferences while reading. In a similar way, Nathan and Stanovich (1991) proposed that reading fluency is intertwined critically with reading comprehension. These possibilities find support in Jenkins et al.'s result that, after the contribution of students' word recognition skill (as indexed by list reading fluency) has been removed, oral reading fluency from text serves to predict reading comprehension, and comprehension in turn serves to predict oral reading text fluency. Thus, measurement of oral reading fluency may serve as a strong indicator of overall reading competence because it captures individual differences in a number of reading subcomponents at lower and higher levels of processing.

Silent Reading Fluency Versus Oral Reading Fluency as Correlates of Reading Comprehension Performance

Of course, none of these studies speaks to the issue of whether text fluency should be assessed via oral or silent reading. To address this issue, L. S. Fuchs, Fuchs, Eaton, and Hamlett (2000) assessed the concurrent validity of fluency with reading comprehension, when text fluency was assessed via silent versus oral reading. We asked 365 fourth-grade students to read a passage for 2 min and then to answer eight questions assessing recall of literal (six questions) and inferential (two questions) content of the passage. Students read and answered questions for two passages. One was read orally, the other silently. The order of administration was counterbalanced. For oral reading, an examiner circled the last word read at 2 min; for silent reading, the student circled the last word read when time was called. Students also completed the Reading Comprehension portion of the Iowa Test of Basic Skills in large-group sessions.

We computed correlations for the total words read scores (for silent and oral reading) with two criterion measures: the number of questions answered correctly on the passages that had been read and the raw score on the Iowa test. For silent reading, the correlation with the questions answered on the passage was .38, and with the Iowa test, it was .47. For oral reading, the correlation with the passage questions was .84, and with the Iowa test, it was .80. So, correlations for the oral reading fluency score were substantially and statistically significantly higher than for the silent reading fluency scores.

Several reasons might explain this differential relation for silent and oral reading fluency, but the most obvious candidate is inaccurate student reports about the last word read during silent reading. Of course, this limitation applies to all assessments of silent reading fluency, which provide no objective opportunity for examiners to ascertain accurate estimates of how many words were read.

HISTORY OF ORAL READING FLUENCY IN THE MEASUREMENT OF READING COMPETENCE

These studies together provide converging evidence regarding oral reading fluency's potential as an indicator of reading competence. L. S. Fuchs et al. (1988) showed how oral reading fluency corresponds better with performance on commercial, standardized tests of reading comprehension than do more direct measures of reading comprehension. Jenkins et al. (2000) extended that finding to demonstrate how text fluency compares favorably to list fluency as an indicator of reading competence. L. S. Fuchs et al. (2000) demonstrated how oral reading fluency functions as a better correlate of reading comprehension than does silent reading fluency. These studies thereby corroborate theoretically driven hypotheses about the value of oral reading fluency in the measurement of overall reading competence.

How do theoretical conceptualizations along with empirical evidence on oral reading fluency correspond with actual practice in the measurement of students' reading competence? We attempted to answer this question by analyzing the reading measurement tools widely available to the public. Toward that end, we examined reading measures critiqued within the *Mental Measurements Yearbook (MMY)*, from the first published issue through the present. We tallied the number of reading tests reviewed for each decade, counting a test only once, during the decade when it first appeared in the *MMY* (occasionally again, if a substantive revision occurred). We kept track of tools that incorporated an assessment of fluency and those that specifically measured oral reading fluency. We report our findings in Table 1.

A pattern emerged whereby a stronger focus on fluency was evident in the earlier part of the century. From before 1929 through the 1960s, approximately 20% of the reviewed tests assessed fluency in some format, about 10% via oral reading. Beginning in the 1970s, however, the percentage of tests that focused on fluency in some format dropped to 6% from 11% per decade; for oral reading fluency, specifically, the corresponding percentages fell to 0% from 5%. We cannot provide a definitive reason for this pattern. One possible explanation is that the emphasis in the 1970s on language experience and whole language approaches to reading instruction gradually began to take hold; this movement oriented measurement toward the assessment of comprehension and oral miscues.

In any case, across decades, 59 of 372 (16%) commercially available tests assessed fluency; 28, or 8%, measured oral reading fluency. This latter percentage seems low. Of course, commercial tests are developed with an eye toward minimal costs and maximal feasibility; group administration and multiple-choice response formats, therefore, are strong priorities.

What of classroom-based tests, where practitioners might focus more strongly on individual assessment and diagnosis? According to Nathan and Stanovich (1991), although obtaining a clear picture of a child's decoding ability

TABLE 1
Reading Tests Reviewed in Buros *Mental Measurements Yearbooks* by Decade

Decade	<i>n</i> ^a	Oral					
		Fluency		Yes		No <i>n</i>	DK <i>n</i>
		<i>n</i>	%	<i>n</i>	%		
Before 1929	28	6	21	2	7	2	2
1930–1939	57	13	23	6	10	5	2
1940–1949	31	6	19	3	10	0	3
1950–1959	46	8	17	4	9	0	4
1960–1969	53	13	25	7	13	3	3
1970–1979	80	5	6	3	4	1	1
1980–1989	61	7	11	3	5	1	3
1990–1999	16	1	6	0	0	1	0
Across	372	59	16	28	8	13	18

Note. DK = Don't know because insufficient information was provided in Buros to make this discrimination.

^aNumber of reading tests reviewed in *Mental Measurements Yearbooks* for the first time during that decade.

requires a combined focus on speed and accuracy, teachers are traditionally concerned only with word recognition accuracy. This impression is corroborated by descriptions of informal reading inventories, which typically direct teachers to place students in instructional-level text according to accuracy, rather than fluency, criteria (e.g., Woods & Moe, 1985). Moreover, as described by Rasinski (1989) and Zutell and Rasinski (1991), analyses of reading textbooks for teachers reveal little in-depth focus on fluency. In fact, Dowhower (1991) reported that only 3 of 13 textbooks addressed fluency at all, and in those texts, fluency was mentioned only briefly.

In a similar way, oral reading fluency has not traditionally been a strong focus for assessing the effects of treatments in the reading research literature. For example, in recent years, researchers have made strides in developing and testing treatments to improve outcomes for young children at risk for reading failure (Berninger et al., in press; Blachman, Tangel, Ball, Black, & McGraw, 1999; Foorman, Francis, Fletcher, Schatschneider, & Mehta, 1998; D. Fuchs et al., in press; Mathes, Howard, Allen, & Fuchs, 1998; Torgesen, Wagner, & Rashotte, 1997; Torgesen et al., 1999; Vadasy, Jenkins, & Pool, in press; Wise & Olson, 1995). However, this literature has focused largely on the development of isolated word reading accuracy rather than text fluency; the expectation that improved decontextualized decoding skill automatically will translate into improved performance on text has not always materialized. Several studies have reported strong growth in decontextualized word reading but found smaller or nonsignificant ef-

fects on text (Fleisher, Jenkins, & Pany, 1979; Foorman et al., 1998; Mathes et al., 1998; Torgesen, in press; Vadasy et al., in press). In a related way, remedial instruction sometimes affects reading accuracy and fluency differently. Describing his remedial work with 8- to 11-year-old children with reading disabilities, Torgesen (in press) wrote, "The relative changes in fluency of both nonword and real word reading is about half of what has been observed for improvements in accuracy." The point here is that an explicit focus on the measurement of oral reading fluency, as an outcome of reading intervention, seems necessary both in research and practice.

Teachers and researchers, for the most part, have ignored not only theoretical and empirical accounts of the importance of fluency as an indicator of reading competence but also recent calls for a stronger focus on the assessment of oral reading fluency. For example, the Committee for Appropriate Literacy Evaluation of the American Reading Council recommended portfolios that regularly record students' oral reading fluency (Stayter & Allington, 1991), the Center for Learning and Literacy at the University of Nevada in Reno underscored the importance of reading rate in the measurement of reading ability (Bear, 1991), and the National Assessment of Educational Progress used oral reading fluency as a major strategy for indexing reading competence among fourth-grade children in this country (Pinnell et al., 1995).

RECOMMENDATIONS FOR RESEARCH AND PRACTICE

Research provides empirical corroboration for theory-based hypotheses that oral reading fluency may function as an overall indicator of reading expertise and development. Meanwhile, current research and practice have not incorporated measurement of oral reading fluency for understanding the reading process and reading development, for evaluating the effects of treatments, for placing students within instructional materials, for distinguishing between levels of reading development so that children may be identified for special attention, or for indexing students' acquisition of reading competence over time. We therefore conclude this article with a set of recommendations for teachers and researchers to include measures of oral reading fluency and for researchers to extend the knowledge base on reading fluency as an indicator of reading competence.

Incorporating Oral Reading Fluency Within Reading Assessment

Textbooks on reading assessment and pre- and in-service teacher preparation programs should provide teachers with information about how to incorporate reading

fluency into classroom-based assessment so that this datum is taken into account in formulating educational decisions. These decisions include placing students in instructional text, monitoring students' responsiveness to reading instruction, and identifying children for special intervention. At the same time, researchers need to consider incorporating reading fluency measures in an effort to understand better reading development and the effects of reading treatments.

Of course, oral reading fluency can be assessed in a variety of ways. Some methods, which emphasize prosody, require examiners to describe the pitch, stress, and duration with which children express text. Although reading with expression is a well-acknowledged aspect of reading fluency, these rhythmic and tonal features of speech can be difficult to index in reliable and efficient ways (Dowhower, 1991).

Other approaches are simpler. For example, one long-standing research program conducted by Deno and colleagues (see Deno, 1985; L. S. Fuchs & Fuchs, 1998; Shinn, 1989) has examined the psychometric and edumetric features of counting the number of correct words while a student reads aloud from text for 1 min; this method is known as curriculum-based measurement (CBM). Decades of research show how this simple method for collecting oral reading fluency data produces a broad dispersion of scores across individuals of the same age, with rank orderings that correspond well to important external criteria, and that represent an individual's global level of reading competence (see Fuchs, 1995, for a summary). Teachers can use these scores to identify discrepancies in performance levels between an individual and the individual's peer group to help inform decisions about the need for special services or the point at which decertification and reintegration of students might occur.

At the same time, CBM provides many alternate test forms, which permit repeated performance sampling over time. Time-series data are displayed graphically. This allows slope estimates to be derived for different periods and creates the necessary database for testing the effects of contrasting treatments for a given student (or across many students). Research indicates that these time-series displays result in better instruction and learning: With CBM-graphed displays, teachers raise goals more often and develop higher expectations (e.g., L. S. Fuchs, Fuchs, & Hamlett, 1989a), introduce more adaptations to their instructional programs (e.g., L. S. Fuchs, Fuchs, & Hamlett, 1989b), and effect better student learning (e.g., L. S. Fuchs, Deno, & Mirkin, 1984; L. S. Fuchs, Fuchs, Hamlett, & Ferguson, 1992).

In addition to generating quantitative scores, CBM can be used to gather qualitative, diagnostically useful descriptions of performance. As teachers count the number of words read correctly in 1 min, they can note the types of decoding errors students make; the kinds of decoding strategies students use to decipher unknown words; how miscues reflect students' reliance on graphic, semantic, or syntactic language features; and how self-corrections, pacing, and scanning reveal strategic

reading processes, along with the prosodic features of the performance. These on-line data can supplement the overall indicator of competence in ways that can further strengthen instructional planning.

Extending the Research Base on Oral Reading Fluency as an Indicator of Reading Competence

A wealth of research supports the value of oral reading fluency as an indicator of overall reading competence and its utility for helping teachers plan better instruction and effect superior student outcomes. Nevertheless, many questions remain unanswered about CBM specifically and oral reading fluency more generally. These questions provide fertile territory for productive study. In our closing section, we illustrate this potential by identifying a handful of research issues.

In terms of a normative framework, additional work is required to identify acceptable reading rates by grade or developmental level. Such a database could be expanded to determine incremental increases that correspond to qualitative shifts in reading expertise. For example, research could identify the number of words students must increase before independent listeners would deem performance to have qualitatively improved, or studies might be designed to specify reading rates that correspond to productive teaching strategies or to alternative ways by which students process text. In addition, information about performance levels, by grade, that predict success on graduation tests would serve an important practical function for determining which students require special intervention.

On another level, research is needed to examine how the nature of text affects oral reading fluency and its utility as an indicator of overall reading competence. Three issues seem important here. The first concerns the level of text difficulty at which measurement should occur: instructional, independent, or frustration level. Although some work (e.g., Hosp & Fuchs, 2000; Mirkin & Deno, 1979) has addressed this issue, additional research is warranted. Second and relatedly, when monitoring student growth across years, the use of a fixed level of difficulty across the elementary grades (e.g., third-grade passages for all students regardless of their instructional level) is desirable to maintain the constancy of the measurement across time. Some research (e.g., Deno, Fuchs, & Marston, 1995) suggests the potential for a fixed level of difficulty, but additional work is needed. A third issue concerning the nature of text involves text type: Studies are required to examine how narrative as opposed to expository material affects oral reading fluency's capacity to serve as an indicator of overall reading competence.

With respect to edumetric questions, research is needed to determine what kinds of qualitative information can be derived during oral reading fluency assessment to help teachers generate diagnostically useful performance profiles. For example, how might the collection and production of diagnostic profiles be systematized to ensure

reliable data and sound decisions? How might different kinds of diagnostic information be linked to useful instructional recommendations? Which types of diagnostic information effect which types of reading outcomes?

In a related way, work needs to be conducted on issues surrounding the assessment of prosodic features of fluency. Reading with expression, although a well-acknowledged dimension of oral reading fluency, can be difficult to index in reliable and efficient ways (Dowhower, 1991). Reliability problems may explain low correlations between prosody and criterion measures of reading competence (e.g., .02 for stress, .13 for pause, and .17 for pitch, as reported by Rice, 1981). Moreover, some evidence suggests that oral reading fluency, without consideration of prosody, may explain the relevant variance in reading comprehension. For example, in reanalyzing Marston and Tindal's (1996) database of 100 students without disabilities at each grade (e.g., Grades 1 through 8), Marston (personal communication, November 10, 2000) found that the number of words read correctly in 1 min accounted for 65% to 85% of the variance on a maze comprehension task (correlations ranged between .80 and .92). Only at fourth grade did prosody explain a significant, but small, amount (i.e., less than 1%) of the variance in comprehension beyond that accounted for by oral reading fluency. Research examining the relation of prosodic features with criterion reading measures as well as with more actuarial accounts of fluency should be extended. Such extensions, which might incorporate technological advances for quantifying prosodic features of oral expression, would help practitioners and researchers alike determine whether the logistical challenges inherent in prosody measurement are needed to complement rates of words read correctly. In addition, studies should explore the extent to which prosody gains robustly reflect increases in overall reading competence or correspond to increases in competence on a more specific set of reading skills.

SUMMARY

A decade ago, Adams (1990) reminded the field that oral reading fluency is the most salient characteristic of skillful reading. Theoretical perspectives on the development of reading capacity and empirical databases support Adams' claim. Yet, its use by teachers and researchers appears limited. Future research may extend the field's knowledge about the assessment of oral reading fluency in ways that make its measurement more compelling and useful for teachers and researchers. Nevertheless, reliable, valid, efficient methods for assessing oral reading fluency already exist, and the field should systematically incorporate its assessment in its quest to understand reading development, to formulate sound instructional decisions, and to assess the potential value of reading treatments.

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