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Specific Reading Comprehension Disability: Major Problem, Myth, or Misnomer?

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Abstract

The goal of the present study was to test three competing hypotheses about the nature of comprehension problems of students who are poor in reading comprehension. Participants in the study were first, second, and third graders, totaling 9 cohorts and over 425,000 participants in all. The pattern of results was consistent across all cohorts: Less than one percent of first- through third-grade students who scored as poor in reading comprehension were adequate in both decoding and vocabulary. Although poor reading comprehension certainly qualifies as a major problem rather than a myth, the term specific reading comprehension disability is a misnomer: Individuals with problems in reading comprehension that are not attributable to poor word recognition have comprehension problems that are general to language comprehension rather than specific to reading. Implications for assessment and intervention are discussed.

Keywords

reading comprehension; reading disability; specific language impairment

According to the most recently released results from the National Assessment of Educational Progress, poor reading comprehension is rampant in the United States. A basic level of proficiency is defined as having “partial mastery of prerequisite knowledge and skills that are fundamental for proficient work at each grade” (NAEP, 2011, p. 6.). In the US, nearly one in every three fourth-grade students and one in four eighth-grade students is below even this basic level. Only about one out of three students score at the proficient or advanced levels at either grade.

Reading comprehension, which has been defined as gaining an understanding of written text through a process of extracting and constructing meaning (RAND, 2002), is perhaps the one of the most essential academic skills (Nash & Snowling, 2006; National Institute of Child Health and Human Development, 2000). Although difficulty in decoding the words on a page is a frequent cause of reading comprehension problems, between 10 and 15% of children experience poor comprehension despite maintaining normal levels of reading accuracy and fluency (Stothard & Hulme, 1995; Yuill & Oakhill, 1991).

One explanation of poor reading comprehension despite normal levels of reading accuracy and fluency is provided by the simple view of reading (Gough & Tunmer, 1986; Hoover & Gough, 1990), which asserts that reading comprehension is the product of decoding and oral language comprehension skills. According to the simple view of reading, poor reading comprehension despite adequate decoding would be attributed to a problem with oral language.

Relations between decoding, oral language, and reading comprehension have been extensively studied, with decoding and oral language explaining unique variance in reading comprehension (e.g., Kendeou, van den Broek, White, & Lynch, 2009). For example, Kendeou, Bohn-Gettler, and van den Broek (2008) investigated relations among inference-generation, language skills, vocabulary, and comprehension skills across different media (i.e., television, audio, and written modalities) in a longitudinal study of two cohorts of children 4 to 6 years old and 6 to 8 years old. Their findings indicated that inference-making skills generalized across different media and were highly correlated with reading comprehension; however, children's inference-making skills were inconsistently related to vocabulary and not at all related to other language skills—including word identification. These findings are consistent with other investigations (Kendeou, Lynch, van den Broek, Espin, White, & Kremer, 2005) and suggest that although decoding and oral language skills are highly correlated with reading comprehension, their development is independent.

Reading comprehension disability, a term that has been used to describe readers who struggle with reading comprehension, has been operationally defined in at least four ways: (a) a discrepancy between reading comprehension and word-level decoding (Nation & Snowling, 1998; Oakhill, Yuill, & Parkin, 1986), (b) discrepancies between reading comprehension and both decoding and chronological age (Cain, 2003, 2006; Cain & Oakhill, 1999, 2000, 2006, 2011; Cain, Oakhill, & Lemmon, 2004; Cain, Oakhill, & Bryant, 2000; Cain, Oakhill, Barnes, & Bryant, 2001; Oakhill, Hartt, & Samols, 2005; Weekes, Hamilton, Oakhill, & Holliday, 2008; Yuill & Oakhill, 1988); (c) a discrepancy between reading comprehension and decoding and the requirement that decoding be in the normal range (Cataldo & Oakhill, 2000), or (d) just scoring below a given percentile on a measure of reading comprehension (Locascio, Mahone, Eason, & Cutting, 2010; Sesma, Mahone, Levin, Eason, & Cutting, 2009).

Another way to characterize the landscape of reading problems is using a classification system for types of readers adapted from Catts, Adlof, and Weismer (2006). This classification system, which is presented in Table 1, represents an application of the simple view of reading to reading problems. Adequate readers are characterized by good decoding and comprehension. Poor readers, sometimes referred to as garden-variety poor readers in the research literature (Stanovich, 1988), are characterized by poor decoding and comprehension. Dyslexia or specific reading disability is characterized by poor decoding but with good comprehension. Specific comprehension disability is characterized by poor comprehension but with good decoding. Students who fall in the quadrant labeled specific comprehension disability were of primary interest in the present study.

Specifically, the goal of the present study was to test three competing hypotheses about the nature of the comprehension problem of students with poor reading comprehension.

Three Competing Hypotheses of Reading Comprehension Disability

Hypothesis 1

Students with poor reading comprehension not attributable to poor decoding have comprehension problems that are largely specific to reading. Support for this hypothesis comes from studies that reported minimal or no deficits in vocabulary for students with poor reading comprehension (Cain, 2006; Nation, Cocksey, Taylor, & Bishop, 2010). One challenge for this hypothesis is that it is difficult to identify a theory of reading that would explain comprehension deficits that are specific only to reading comprehension, as opposed to also affecting oral language comprehension. Although it is conceivable that highly skilled readers such as experienced editors or proof-readers might rely on expertise that has been acquired over the years and is relatively domain specific (Wagner & Stanovich, 1986), this would not seem to be the case for school-age readers. Another difficulty faced by this hypothesis is the substantial body of evidence that individuals who are poor in reading comprehension have various deficits in oral language. We consider this evidence in discussing the second hypothesis.

Hypothesis 2

Students with poor reading comprehension not attributable to poor decoding have comprehension problems that are general to oral language comprehension rather than specific to reading. Support for this hypothesis comes from the extensive literature that reports poor performance on a wide variety of measures of oral language for students who are poor at reading comprehension (Cain & Oakhill, 2006; Cain & Oakhill, 2011; Cain, Oakhill, & Lemmon, 2004; Catts, Adlof, & Weismer, 2006; Clark et al., 2010; Nation, Clarke, Marshall, & Durand, 2004; Nation & Norbury, 2005; Nation & Snowling, 1997, 1998, 2004; Nation, Snowling, & Clarke, 2007; Ricketts, Bishop, & Nation, 2008; Sesma et al., 2009; Snowling & Hulme, 2012; Stothard & Hulme, 1992, 1995). For example, Nation and Snowling (1997) reported that students with poor reading comprehension had difficulty answering questions about a passage regardless of whether there were asked to read the passage or the passage was read to them. The simple view of reading (Gough & Tunmer, 1986; Hoover & Gough, 1990) provides a theoretical rationale for this hypothesis. It states that individual differences in reading comprehension are determined by the interaction of individual differences in word recognition and oral language comprehension.

Hypothesis 3

Students with poor reading comprehension not attributable to poor decoding represent a mixture of students, many with comprehension problems that are general to oral language and reading but at least some with comprehension problems that are specific to reading. Support for the existence of students whose comprehension problems are general to oral language as well as reading comes from the literature just cited that describes poor performance on various oral language tasks for students with poor reading comprehension. Support for the possible existence of students whose comprehension problems are specific to

reading comes from a study of students who were poor at reading comprehension by Catts et al. (2006). The sample from this study was taken from a larger epidemiologic study of language impairments in children (Tomblin et al., 1997). This made it possible to determine what percentage of the students identified by Catts et al. for their poor reading comprehension met criteria for either specific language impairment (SLI) or nonspecific language impairment (NLI). Criteria for SLI required scoring more than 1.25 standard deviations below the mean on at least two of five language composite scores (vocabulary, grammar, narration, receptive language, expressive language); criteria for NLI added the requirement of a Performance IQ more than 1 standard deviation below the mean (Tomblin et al., 1997). The results were that only a third of the sample of children with poor reading comprehension met criteria for either SLI or NLI. Similar rates of language impairment for children who were poor at reading comprehension were reported by Nation et al., (2004).

We are not aware of any previous study that is capable of distinguishing these three hypotheses about the nature of the comprehension problem of students with poor reading comprehension. It is true that the overwhelming evidence of problems in oral language in children with poor reading comprehension pretty much rules out hypothesis one (i.e., their comprehension problems are specific to reading comprehension). But these studies, which either showed mean differences in oral language skills for students who were good or poor at reading comprehension, or correlations between oral language skills and reading comprehension, cannot distinguish hypotheses two (i.e., comprehension problems are general) and three (i.e., a mixture of general and reading-specific comprehension problems exists). A significant mean difference can be achieved either by a difference that occurs for all members of a sample, or by a difference that occurs for many but not all members of the sample. A significant correlation indicates a group relation between two variables, but does not rule out the existence of a sub-group for whom the overall correlation does not hold.

Being able to distinguish between these three hypotheses has practical implications. For example, if students with poor reading comprehension tend to have comprehension problems that are specific to reading (Hypothesis 1), classroom instruction and/or intervention for these students should focus more on remediating text-based reading skills (e.g., decoding) whereas if students with poor reading comprehension tend to have comprehension problems that are not specific to reading but general to oral language (Hypothesis 2), instruction and intervention would be better suited to target language skills (e.g., oral vocabulary) as opposed to skills that are more specific to text comprehension. In essence, distinguishing the core features of reading comprehension disability would provide teachers with a means of identifying which skills instruction and/or intervention practices should focus on to result in greater gains in student achievement. For students whose comprehension problems are general to reading and oral language, remediation should address language problems that are at a comparably general level. If there are students whose comprehension problems are specific to reading comprehension, a different approach to remediation would be required.

The present study used a large-scale database to address the question of the nature of the comprehension problem of students with poor reading comprehension in first, second, and third grades. We approached the data with several specific questions in mind: (1) What is

the proportion of students who have poor comprehension in first, second, and third grades? (2) What is the proportion of students who have poor comprehension yet maintain adequate levels of decoding? and (3) What is the proportion of students who have poor comprehension and adequate levels of decoding and who also have adequate vocabulary knowledge?

We first identified students who were poor at reading comprehension. Then we determined how many students who were poor at reading comprehension were at least adequate in decoding. Finally, we determined how many students with poor reading comprehension and at least adequate decoding were also at least adequate in the oral language skill of vocabulary. We did this at three grades because of the likelihood that the task of reading comprehension changes over the first few grades of formal schooling.

Method

Participants

Participants represented a cross-sectional study consisting of three cohorts (2003-04, 2004-05, 2005-06 school years) of first (N = 143,672), second (N = 135,943), and third grade students (N = 144,815) attending Reading First schools in Florida. There were slightly more males (52 percent) than females (48 percent). The sample was diverse, with 41 percent white, 32 percent black, 21 percent Hispanic, 4 percent mixed, and 1 percent Hispanic. Approximately 75 percent of participants received free or reduced lunch, and 17 percent were identified as having limited English proficiency. The participants' data were obtained from the state of Florida's Progress Monitoring and Reporting Network (PMRN), which was created to monitor the performance of students in the state's Reading First schools. Reading First was a large, federally funded initiative designed to improve the reading performance of students in high-poverty kindergarten, second-, and third-grade classrooms who were at risk for reading problems. On average, Reading First schools also tended to have lower student achievement. Although the PMRN primarily consists of students from Reading First schools, a small number of non-Reading First schools that voluntarily reported their data were also included in the database.

Measures

The Stanford Achievement Test served as a general measure of comprehension and was administered to all participants across the three grades. Vocabulary knowledge was assessed for first and second graders using the Peabody Picture Vocabulary Task; decoding was assessed using the Dynamic Indicators of Basic Early Literacy Skills. For third graders, the Gates-MacGinitie Reading Test measured vocabulary and decoding skills.

Stanford Achievement Test – Reading Comprehension—The Stanford Achievement Test, Tenth Edition (SAT-10; Harcourt Educational Measurement, 2003) is a group-administered multiple-choice standardized assessment that measures critical reading components including reading comprehension. Reading comprehension was assessed by having students read passages and then answer multiple-choice questions about the passages. Passage questions emphasize a variety of skills, including initial understanding

(i.e., explicit comprehension), interpretation (i.e., implicit comprehension), and critical analysis (i.e., a synthesis and evaluation of explicit and implicit information) (Florida Department of Education, 2006). The SAT-10 has well-established psychometric properties (Harcourt & Brace, 2004).

Peabody Picture Vocabulary Test – Receptive Vocabulary—The Peabody Picture Vocabulary Test, Third Edition (PPVT-III; Dunn & Dunn, 1997) is an individually-administered test of receptive vocabulary. Participants were instructed to match a spoken word with one of four presented pictures. Alternate-form reliability exceeds .88 and criterion-related validity coefficients with reading range from .69 to .91 (Williams & Wang, 1997).

Dynamic Indicators of Basic Early Literacy Skills –Nonsense Word Fluency—The Nonword Fluency (NWF) subtest of the Dynamic Indicators of Basic Early Literacy Skills – Sixth Edition (DIBELS; Good & Kaminsky, 2002) is a set of 60 single-syllable pseudo-words (e.g., jav) with short vowel sounds. Examinees are asked to read them aloud, and their score was the number of correct pronunciations in a one-minute time interval. Alternate-form reliability exceeds .8 and criterion-related validity coefficients with reading range from .4 to .9 (Speece et al., 2003; Good et al., 2004).

Gates-MacGinitie Reading Test – Reading Vocabulary—The Gates-MacGinitie Reading Test – Fourth Edition (GMRT-4; MacGinitie, MacGinitie, Maria, & Dreyer, 2000) is a group-administered standardized assessment that was used to measure reading vocabulary in the third grade sample. Participants were provided with a word embedded in text that was minimally suggestive as to not reveal meaning and were required to select the word or sentence that means the same as the test word. Kuder-Richardson reliability values are high for both forms of the assessment (K-R 20 = .91 – .96; MacGinitie, MacGinitie, Maria, & Dreyer, 2008).

Procedure

Trained school- and district-level assessment teams administered all measures, and no classroom teachers were involved in the assessment process. The assessments were administered during April and May, near the end of the school year.

Results and Discussion

A three-step procedure was used to analyze each cohort and grade. The first step was to identify students who were poor at reading comprehension according to the operational definition of scoring at or below the 5th percentile on SAT-10 Reading Comprehension. The 5th percentile was chosen to identify students with relatively severe problems in reading comprehension. The second step was to identify students who were poor at reading comprehension but adequate in decoding. The procedure we used for the second step was different for the third-grade cohorts compared to both the first- and second-grade cohorts. For first and second grade, identified students who were flagged in step one because of poor reading comprehension who also scored at or above the 25th percentile on DIBELS NWF met the criterion for being poor at reading comprehension yet adequate at decoding. The

third and final step was to identify the students who were flagged in step 2 as poor at reading comprehension although adequate in decoding who also were adequate in vocabulary, as determined by scoring at or above the 25th percentile on the PPVT. At third grade, Gates-MacGinitie Reading Vocabulary served the dual role of a measure of vocabulary and of decoding. Consequently, the second and third steps used for first and second grade were replaced by a single step in third grade of identifying students who were poor at reading comprehension yet who scored at or above the 25th percentile on Reading Vocabulary.

We recognize that our choice of the 5th and 25th percentiles is somewhat arbitrary. We chose a lenient criterion (i.e., 25th percentile) of adequate decoding and vocabulary to maximize our sensitivity to detect students who were poor at reading comprehension yet adequate at decoding and vocabulary. To determine the extent to which the pattern of results was sensitive to the specific percentiles used, we carried out analyses using other percentile ranks (e.g., poor reading comprehension defined by scoring at or below the 10th percentile, and adequate decoding and vocabulary defined by scoring at or above the 40th percentile). We found that the overall pattern of results was remarkably similar.

Results are presented in Table 2. Across the three first-grade cohorts, roughly 3 to 5 percent of students met the criterion for having poor reading comprehension. This makes sense given that our criterion was scoring at or below the 5th percentile. Less than 1 percent of first-grade students scored both below the 5th percentile in reading comprehension and above the 25th percentile in decoding. This indicates that decoding is an important limiting factor on reading comprehension in first grade. Finally, only approximately 0.1 percent of the sample was poor at reading comprehension yet adequate in both decoding and vocabulary, a result that replicated across the three cohorts.

For the three second-grade cohorts, there was one immediate difference in the results for second grade compared to first grade. Whereas nearly all first-grade students who were poor in reading comprehension were also poor in decoding, approximately half of the second-grade students who were poor at reading comprehension were adequate in decoding. However, when the additional criterion of being adequate in vocabulary was applied, the results were identical. Less than one percent of the sample was poor in reading comprehension yet adequate in both decoding and vocabulary, and this result was replicated across the three cohorts.

Turning to third grade, because of the combined second and third steps required by the use of Reading Vocabulary as a measure of both vocabulary and decoding, we cannot separate students who are adequate in decoding from those who were adequate in both decoding and vocabulary. Again, the results were remarkably similar. Less than one percent of the sample was poor in reading comprehension yet adequate in both decoding and vocabulary, and this result was replicated across the three cohorts.

We converted our percentages to proportions to calculate standard errors and then converted back to percentages. The purpose for doing so was to provide standard errors (i.e., estimates of how much variability would be expected over repeated random sampling from the same population) for our estimates of the percentage of readers who are poor at reading

comprehension yet adequate in both decoding and vocabulary. Combining the three first-grade cohorts, only 0.12 percent of the sample was poor at reading comprehension yet adequate in both decoding and vocabulary. The standard error was 0.01 percent, yielding a confidence interval from 0.11 to 0.13 percent. Comparable values for second and third grade were 0.17 (0.16-0.18) and 0.21 (0.20-0.22) percent respectively. Combining all grades and cohorts yielded an overall percentage of 0.17 (0.16-0.18).

General Discussion

The pattern of results was clear across nine cohorts and three grades, totaling more than 425,000 students in all. Well under one percent of first- through third-grade students were poor at reading comprehension yet adequate at both decoding and vocabulary.

Returning to our three hypotheses about the nature of the comprehension problem of students with poor reading comprehension, the results provide support for the hypothesis that the comprehension problem of early elementary students who are poor at reading comprehension tend to have deficits in oral language (i.e., vocabulary knowledge). The hypothesis that students with poor reading comprehension are a mix of individuals, some of whom have comprehension problems that result from limited oral language skills and others of whom have comprehension problems that are specific to reading, was not supported based on the fact that well below one percent of students who were poor at reading comprehension turned out to be adequate at both decoding and vocabulary.

Beginning in second grade, there is evidence of a mixture of different types of students with poor reading comprehension, but the mixture does not concern whether comprehension problems extend to both oral language and reading. Rather, the mixture is of students who are poor at reading comprehension and poor at decoding or poor at reading comprehension despite being adequate at decoding. This result is consistent with evidence from other studies that the transition from first to second grade is marked by a greater influence of oral language skills on reading comprehension (Kim, Wagner, & Lopez, 2012).

Our results suggest that students with poor reading comprehension who are adequate decoders really have language comprehension problems in the form of poor vocabulary knowledge. We did not have other measures of oral language so we cannot determine whether the oral language problems of the students in our sample extended beyond vocabulary knowledge. However, evidence from other studies suggests that this might be the case. Catts et al. (2006) reported that one third of their students who were poor at reading comprehension yet adequate at decoding met eligibility criteria for language impairment. In addition, they indicated that students who did not meet eligibility for language impairment still had sub-clinical levels of poor language skills. In fact, their poor reading comprehension group scored at the 20th percentile on vocabulary and at the 30th percentile in grammatical understanding on average. Similar results were reported by Nation et al. (2004). Both Catts et al. and Nation et al. speculated that sub-clinical levels of language impairment, which they referred to as hidden language impairments because they do not meet typical eligibility criteria, could by themselves, or in combination with other processing deficits, play an important role in reading comprehension difficulties.

Cain and Oakhill (2009) reviewed the literature for three kinds of studies with causal implications about the origin of reading comprehension problems: comprehension-age matched comparison studies, training studies, and longitudinal correlational studies. They concluded that there is evidence for causal influences on reading comprehension for inference making, comprehension monitoring, and understanding story structures. It is unlikely that limitations in inference making, comprehension monitoring, or understanding story structure are specific to reading. Hulme and Snowling (2011) commented, “In our view, many of these other putative causes may reduce to basic limitations in oral language comprehension, which are the direct cause of these children’s reading comprehension difficulties” (p. 141).

Our results are consistent with the simple view of reading (Gough & Tunmer, 1986; Hoover & Gough, 1990) in that nearly all cases of poor reading comprehension were associated with inadequate decoding, oral language (i.e., vocabulary), or both. Our results also support Catt’s et al.’s (2006) recommendation to use a framework based on the simple view (see Table 1) when assessing and intervening with poor readers. When assessing poor readers, it is important to target oral language and decoding in addition to reading connected text for meaning because students’ poor reading comprehension scores alone are not sufficiently informative for the purposes of remediation. It would be important to identify how much of the poor reading comprehension is attributable to poor decoding and to poor oral language skills such as limited vocabulary knowledge.

It is also important to consider developmental differences. Because of the nature of early reading and early reading comprehension assessments, it is likely that students in first grade who are poor in reading comprehension will also be poor in word recognition. It also is the case that difficulty decoding the words on the page is a profound limitation on reading comprehension. However, it is important to assess oral language as well as decoding because although poor decoding may be a limiting factor on reading comprehension, unaddressed deficits in oral language skills for students who have them will limit their reading comprehension even if their decoding skills improve upon intervention. Given this, students with reading comprehension disability would benefit from interventions that incorporate components of reading fluency (i.e., activities requiring simultaneous decoding and text comprehension) (NICHD, 2000) in addition to components of oral language like vocabulary, semantics, and syntactic understanding (i.e., grammar) (Snow, Burns, & Griffith, 1998).

It is important to acknowledge several limitations of our study. The population from which our sample was drawn was from Reading First schools. These schools served a larger percentage of low SES students than typical public schools in the US. It is important to replicate this study with samples drawn from non-Reading First schools. Second, our measures were relatively brief and our measure of oral language comprehension was limited to receptive vocabulary. Third, comprehension abilities in the early grades (e.g., first grade) are often assessed using an oral-format as opposed to a written format as used in the present study (i.e., SAT-10) because with a text-based measure, it is difficult to determine whether students are doing poorly because they do not comprehend the passage or because they are unable to read the question. Further, it is important to replicate this study using a broader

array or oral language skills to better determine the extensiveness of the oral language comprehension problems of students who are poor in reading comprehension yet adequate in decoding.

In conclusion, although poor reading comprehension certainly qualifies as a major problem rather than a myth, the term specific reading comprehension disability is a misnomer: Individuals with problems in reading comprehension that are not attributable to poor word recognition have comprehension problems that are general to language comprehension rather than specific to reading.

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Table 1

Classification of Types of Good and Poor Readers

	Good Decoding	Poor Decoding
Good Comprehension	Adequate Reader	Dyslexia (i.e., Specific Reading Disability)
Poor Comprehension	Specific Comprehension Disability	Poor Reader

Table 2

Frequencies and Percentages of Types of Poor Readers for Three Grades

First-Grade Students (<i>N</i> = 143,671)			
Cohort	2003-04	2004-05	2005-06
Total	35,314	43,712	64,645
Poor Reading Comprehension	1,669 (4.73%)	1,721 (3.94%)	1,896 (2.93%)
Yet Adequate Decoding	85 (0.24%)	197 (0.45%)	266 (0.41%)
Yet Adequate Decoding and Vocabulary	23 (0.07%)	69 (0.16%)	81 (0.13%)
Second-Grade Students (<i>N</i> = 135,943)			
Cohort	2003-04	2004-05	2005-06
Total	32,820	41,052	62,071
Poor Reading Comprehension	1,403 (4.27%)	1,428 (3.48%)	1,885 (3.04%)
Yet Adequate Decoding	735 (2.25%)	834 (2.03%)	1,162 (1.87%)
Yet Adequate Decoding and Vocabulary	72 (0.22%)	70 (0.17%)	93 (0.15%)
Third-Grade Students (<i>N</i> = 144,815)			
Cohort	2003-04	2004-05	2005-06
Total	36,925	42,546	65,344
Poor Reading Comprehension	568 (1.54%)	1,216 (2.86%)	2,046 (3.13%)
Yet Adequate Decoding and Vocabulary	34 (0.09%)	137 (0.32%)	138 (0.21%)