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RELEVANCE OF ORAL LANGUAGE SKILLSThe Relevance of Oral Language Skills to Performance on State Literacy Testing

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The Relevance of Oral Language Skills to Performance on State Literacy Testing[1]

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Abstract

Purpose: Investigated correspondences between performance on an array of literacy and oral language abilities with the proficiency ratings on the reading portion of the New England Common Assessment Program (NECAP).

Method: Tested 106 fifth-grade students on measures of word-level reading and oral language (i.e., vocabulary, syntax, discourse) near the time when students completed the NECAP assessment. Analyses of performance were conducted with three NECAP outcome groups (Above Proficient, Proficient, Nonproficient (combination of Partially Proficient and Substantially Below groups).

Results: Large effect sizes were obtained for differences in oral language and word-level reading skills among the three groups. Decoding, syntax and discourse each accounted for significant variance in state reading scores and differentiated NECAP reading proficiency groupings. Notably, students at all levels varied in their patterns of skills. The majority of Nonproficient students had low scores on word-level reading skills; yet 100% had weaknesses in syntax and/or discourse. Similarly, many students ranked as Proficient had word-level deficits; even more had oral language weaknesses.

Conclusions: Treatment of students' reading weaknesses should be differentiated according to the specific needs of individual pupils. This practice should apply to all critical components of reading comprehension, including oral language skills in syntax and discourse.

Word count: 199 words

Introduction

Comprehension measures, the usual metric on state and federal exams of literacy achievement in the United States, are critical indices of reading competence. Currently, if children in the elementary grades fail to reach proficient levels (i.e., grade level) on state exams, they typically are placed in Response to Intervention (RTI) groups designed to target the foundational skills necessary for becoming a skilled reader. The rationale for this stems from the substantial body of research on reading development that has documented the importance of attaining phoneme awareness and decoding skills for subsequent reading comprehension, as well as the need to build word recognition and fluency (Ehri, 2005; Rayner, Foorman, Perfetti, Pesetsky, & Seidenberg, 2001). Complementing this line of evidence, studies of instructional methods underscore the value of systematic and explicit methods of phonics for fostering reading and spelling achievement, both for typically-developing readers and those with reading difficulties. (Brady, 2011; Ehri, Nunes, Stahl & Willows, 2001). Accordingly, the prevailing focus of intervention efforts on code-level reading skills has validity.

Yet, the assumption that poor reading comprehension stems from difficulties in word-level skills is likely in some cases not to be accurate (Cain & Oakhill, 2007) and, in many cases, to be only part of the problem (Leach, Scarborough & Rescorla, 2003). This has contributed to criticism that state and federal examinations designed to assess literacy learning do not sufficiently clarify the bases of students' reading problems (Duke, Pressley, & Hilden, 2004). In addition to word-level reading skills, oral language abilities in the areas of vocabulary knowledge, syntax skills, and discourse competence are critical for competence in reading comprehension (Gough & Tunmer, 1986; Hogan, Bridges, Justice, & Cain, 2011; van der Lely &

Marshall, 2010). Hence, both word reading and oral language skills may require evaluation to determine the remediation needs for individual students (Hogan et al., 2011; Lombardino, 2012). If a pupil's reading difficulties stem from oral language deficits, and not from code-related weaknesses, clearly the usual RTI program would not address the problems and allow that student to progress. Or, as appears to be frequent (Leach et al., 2003), if a student has challenges in both word level and oral language factors, treating the former would only be part of a solution (Bishop & Snowling, 2004).

In the present study, the goal with a sample of mid-elementary pupils was to investigate the correspondences between an array of literacy and oral language abilities and the proficiency ratings on the reading portion of the New England Common Assessment Program (NECAP) (i.e., the state-level exam used in Rhode Island, New Hampshire, Vermont and Maine to assess student achievement for many years). If both oral language and word-level reading abilities differ across proficiency levels on the reading portion of the NECAP exam, and if low-performing students do not have uniform profiles of deficits, the results would have practical implications for the identification and treatment of reading difficulties in the elementary grades.

Background

Before describing the study per se, evidence linking oral language abilities with reading performance will be briefly reviewed, followed by a section documenting variability in domains of difficulty for students with reading comprehension difficulties.

Oral Language Components of Reading Acquisition and Skilled Reading: Potential Factors in Reading Difficulties

Vocabulary Knowledge. Successful reading comprehension has been strongly linked with vocabulary knowledge (Beck, McKeown, & Kucan, 2008; McGregor, 2004). Reading

achievement corresponds with vocabulary levels, and adequate comprehension relies on understanding an estimated 90% of the words in a text (Nagy & Scott, 2000; Perfetti, 1985). Skilled readers know more about words' meanings, spellings, and pronunciations (Perfetti, 2007) and understand a greater number of words and word relationships (McGregor, 2004). In contrast, less-skilled readers and poor comprehenders often display weaknesses in vocabulary knowledge (Catts, Adlof, & Weismer, 2006; Soifer, 2005). For socio-economically disadvantaged students, pronounced deficits in vocabulary size and scope impede their word reading accuracy beginning in the mid-elementary grades, subsequently affecting overall reading achievement (Chall, Jacobs & Baldwin, 1990). Recent evidence provides insight regarding the basis of the initial word-reading difficulty for disadvantaged pupils. Studies have documented the role of vocabulary knowledge not only for comprehension, but also for decoding of words when they are first encountered in print: if the word is in the child's spoken lexicon, decoding is facilitated (Mitchell & Brady, 2013).

As a child's vocabulary increases, word meanings become more elaborated. Categories of words are refined within the context of superordinate and subordinate classes, facilitating the development of semantic networks (McGregor, 2004). Given meaningful context clues, these semantic networks aid word recognition ability (McGregor, 2004). As children progress through the grades, the words they learn are less common and more abstract, and they occur in more formal written contexts. By the fourth grade, written language becomes an important source of vocabulary growth (Anderson & Nagy, 1993; Cunningham & Stanovich, 2001).

Thus, the contributions of vocabulary knowledge to reading acquisition and reading performance are pervasive and reciprocally related to reading development. Increasing vocabulary size has been documented to be facilitated by instruction that promotes an

appreciation for word meanings, the development of word analysis skills, and the use of both context clues and morphological analysis to infer a word's meaning (Beck et al., 2008; Bowers & Kirby, 2010; Henry, 2010; Stahl & Nagy, 2006).

Syntax. Syntactic knowledge, encompassing both form (parts of speech) and function (the role word/words play in a sentence), is pivotal to both spoken comprehension and expression (Justice & Ezell, 2008). Correspondingly, understanding syntax is essential when reading, and formulating syntax is fundamental to the writing process (Moats, 2010).

During elementary school years and extending into adolescence, children demonstrate growth in the length and complexity of formulated sentences. As noted by Nippold (2007), this growth is reflected in the use of sentence combining skills to form complex and compound-complex sentences with conjunctions, noun and verb phrases, and dependent (subordinate) clauses. With the development of syntax, there is an increase in the number of subordinate clauses and propositions, a greater number of embedded clauses, and variations in the order of syntactic units (Scott, 2009).

Reading experience provides exposure to lengthier and more complex sentences than those encountered in conversational speech, no doubt enhancing syntax skill development (Nippold, 2007; Paul, 2007; Scott, 2009). Nonetheless, research findings also point to a relationship between syntax expertise at the outset of learning to read and later reading performance (Catts et al., 2006). Preschool and kindergarten assessments of oral language syntactic abilities have been found to be predictive of reading achievement in later grades (Catts et al., 2006; Cutting & Scarborough, 2006; Scarborough, 1990). During children's first two years of school, Muter, Hulme, Snowling, and Stevenson (2004) assessed students' grammatical awareness skills using a word-ordering task. Along with vocabulary knowledge, grammatical awareness was a

significant predictor of later reading comprehension ability. Recently, Mokhtari and Niederhausen (2013) reported that syntactic awareness uniquely predicted 33% of the variance in reading comprehension of passages after controlling for vocabulary knowledge (also see Nation & Snowling, 2000).

At this point, there is general agreement that children who struggle with syntax comprehension and production are at risk for reading comprehension problems, and in turn may require intervention for syntax difficulties (Bowyer-Crane, Snowling, Duff & Hulme, 2011; Scott, 2009; Snowling & Hulme, 2012). In studies targeting early intervention, noteworthy gains in expressive grammar have been achieved for four- and five-year-old children (Bowyer-Crane et al., 2008). Effective methods also have been used to build the syntax skills of older students (Paul, 2007).

Discourse. Above the level of the sentence, discourse is the form of language used in the classroom (Justice, 2010), existing in many forms in oral use and in text structures in reading comprehension and written expression tasks. Discourse skills fall along a continuum of formality from the less constrained style of conversation, to narrative discourse, to the formal, literate style of expository text (Westby, 2005).

Accordingly, text structure varies depending upon the type of text, and comprehension of different texts requires the use of different strategies. In narrative text, comprehension is facilitated by knowledge of a story's organization or story grammar (macrostructure) (Paul, 2007). Because of its predictable structure and frequently familiar themes, narrative text is thought to be easier to understand for children (Hogan et al., 2011). However, students with reading disabilities often know less about story grammar, formulate stories that are less well developed and organized, and comprehend and remember less of narrative text (Westby, 2005).

In short, children with reading comprehension difficulties are less likely to construct an accurate and complete situation model (Cain & Oakhill, 2007).

Expository or informational text can be more difficult to understand than narrative text because it often contains longer and more complex syntax patterns, content schemata that may be unknown to the reader, and text structures that vary (Hogan et al., 2011). Expository texts are organized in terms of text functions such as descriptions, procedures, comparisons/contrasts, problems/solutions, and argumentation (Westby, 2005). A skilled reader may better understand varying text structures, and thus be able to create organized representations. On the other hand, less-skilled comprehenders, who may have limited text structure awareness and reduced content knowledge, in addition may have difficulty making inferences, integrating background knowledge with the text, and monitoring their comprehension (Cain & Oakhill, 2007; Hogan et al., 2011; Ray & Meyer, 2011; Westby, 2005).

Research has confirmed a correspondence between oral discourse skills and reading comprehension, particularly as students get older (Catts et al., 2006; Harlaar et al., 2010; Verhoeven & Leeuwe, 2008). Fortunately, studies designed to foster oral discourse skills have documented improvements in text comprehension and expression pointing to the value of addressing deficits in oral discourse abilities. For example, a first grade classroom–based narrative intervention program improved the development of macrostructure and microstructure text features: following a six-week intervention, narratives produced by children in an experimental versus comparison class were significantly more complex with an associated large effect size (Gillam, Olszewski, Fargo, & Gillam, 2013). Although recommending further investigation, Peterson (2011), in a review of narrative-based language intervention studies for language impaired children, reported that a majority of effect sizes were moderate to large both

for macrostructure and microstructure gains. Likewise, Ray and Meyer (2011) point to the benefits of explicit instruction of expository text structure, especially for poorer readers. In sum, studies point to promising outcomes for discourse level interventions.

Variability of Reading Problems

With multiple factors contributing to reading comprehension, it is likely that students who are poor readers may have differing sources of difficulty. In line with the simple view of reading (Gough & Tunmer, 1986), poor reading may be the consequence of three different patterns of skills: decoding deficits with adequate language comprehension (i.e., for both reading and listening), language comprehension difficulties with adequate decoding, or the combination of both decoding and language comprehension problems.

Research findings confirm that poor readers do have varying profiles of strengths and weaknesses in word level and oral language skills. For example, Leach et al. (2003) reported that for students identified as having reading problems in the fourth and fifth grades, 35% had word-level problems, 32% had weak comprehension skills, and 32% were weak in both areas. Thus, given the co-occurrence of difficulties for the last group, 67% were documented to have weaknesses in word reading and 64% of the students were found to be struggling with comprehending what they were reading. In a longitudinal investigation assessing language and reading skills in students in kindergarten, second, fourth, and eighth grades, Catts et al. (2006) also reported differing patterns for students with reading difficulties. The poor decoders displayed poorer performance on phoneme awareness, decoding and word-reading measures from kindergarten to grade eight, whereas the students in the eighth grade with poor reading comprehension had demonstrated oral language comprehension problems across the grades.

In recent years, there has been growing attention to students who have normal word level reading skills but significant problems comprehending text, a pattern referred to as a specific reading comprehension deficit. Students with this profile, affecting successful reading comprehension in a subset of school children with reading difficulties (Rønberg & Peterson, 2015), demonstrate accurate and fluent word level reading, but show difficulty in understanding what has been read (Cain & Oakhill, 2007), especially in later grades (Catts & Kamhi, 2005).

The convergence of evidence of differing profiles for students with reading difficulties adds weight to the need for adequate assessment of students' reading and language performance.

Purpose of Study

As noted earlier, state assessments of student achievement in reading primarily target global measures of reading comprehension. In the northeast, the NECAP has been used to classify students at different numerical levels of reading proficiency: 1, 2, 3, 4. However, it has not pinpointed sources of difficulty that may be contributing to different levels of reading comprehension. Three domains of research point to the importance of looking more closely at students' sources of reading problems, as the preceding overview underscores. First, a number of diverse reading and oral language components contribute to reading comprehension ability. Second, research confirms variability in terms of which component(s) are sources of comprehension difficulties for individual students with reading deficits. Third, intervention studies indicate that weaknesses in word-level reading skills, in vocabulary knowledge, in syntax abilities, and in discourse performance each can be ameliorated, but with differing content of instruction.

Because state-testing practices do not identify sufficiently the elements of reading difficulties for individual pupils, and practitioners in the schools typically do not conduct follow-up

diagnostic work, the risk exists that students identified as struggling readers may not be receiving the kind(s) of intervention needed to help them improve. To ascertain the occurrence of this potential problem, the present study was designed to evaluate the correspondence of an array of oral language and word-level reading abilities with proficiency ratings on the reading portion of the NECAP. A total of 106 mid-elementary students were tested near the time of state literacy testing on standardized measures of word reading skills, vocabulary knowledge, sentence-level syntax abilities, and discourse performance. Later in the school year, the NECAP reading scores for these students were obtained and studied in relation to their performance on the word reading and oral language measures.

Our central hypotheses were: a) that both oral language and word level reading abilities would differ across proficiency levels on the state reading assessment; b) that each would account for significant variance in reading performance on the state test; c) that the level of NECAP reading proficiency (i.e., nonproficient (1& 2), proficient (3), proficient with distinction (4)) would be predicted by oral language and word level reading skills; and d) that those students who scored below the proficient level on the state reading exam would have varying profiles of reading and oral language deficits associated with poor reading comprehension.

Methods

Participants

The participants in this study were 106 fifth-grade pupils (47 girls and 59 boys) from six different schools in two New England suburban towns (see Table 1 for demographic characteristics). In the first district, students from five different schools took part; from the second district, students in the fifth grade from a single school were invited to participate. Based on data from the Rhode Island Department of Education (2012-2013a), the neighborhoods for the

six schools represent a range from less to more socioeconomically diverse, as reflected by the proportions of students eligible for subsidized lunch (i.e., 7% - 49%). The schools involved had predominately white populations: only one (School C) had a somewhat diverse population with white students accounting for 69% of the pupils, an additional group comprising 21% of the total (Hispanic students), and a small percentage of students consisting of other racial groups. Likewise, the rates for ESL or bilingual services were less than or equal to 1%, with the exception of School C (9%), corresponding with a general lack of racial diversity. In terms of special education services, the six schools had recorded rates of students receiving services that ranged from 10% to 19% of their total enrollments. A majority of the fifth-grade pupils in all six schools (i.e., 63% to 88%) achieved proficiency status on the state mandated NECAP reading assessment (see Table 1). In sum, the cohort of students in the study was largely a homogeneous, middle-class, white sample from suburban neighborhoods.

Insert Table 1

The students who took part were those for whom permission had been provided by parents or guardians. All students in the fifth grades were invited to participate (N = 442); 31% (n = 137) were granted permission to do so, allowing the researchers to evaluate their reading and language skills and to have access to their reading test results for that year on the state examination. One student's state testing results were not provided to the district; therefore that student was eliminated from the sample. Of the remaining 136 pupils, 106 were included in the study. Twenty-nine students did not take part in the study either because they were not available at the particular testing time (n = 27) or had known histories of sensory or neurological disorders

(n = 2). The data for one other student was excluded from the analyses for failure to meet a criterion for participation (i.e., all students had to receive a standard score on the Peabody Picture Vocabulary Test 4 that was no lower than one standard deviation below the mean to ensure that participants fell in a normal range of verbal cognition).

Measures

Reading Achievement

New England Common Assessment Program (NECAP). The NECAP scores on the reading achievement portion of this state-mandated assessment were used to provide student's data on achievement in language arts. These scores were based on uniform Grade Level Expectations (GLEs) (Rhode Island Department of Education, 2012-2013b). Testing had been conducted in the fall of the school year and was administered by school personnel. The NECAP test format has multiple-choice and constructed-response items. Results were made available in February of the same school year in the form of scaled scores for each participant. These scores were used to analyze the correspondences between the NECAP reading variables and the oral language and word level reading skills assessed for this study. Students also received over-all NECAP performance scores at one of four levels: Proficient with Distinction (4), Proficient (3), Partially Proficient (2), and Substantially Below Proficient (1). These served as the grouping dimension for comparing student profiles corresponding with different levels of achievement with one modification: students classified as either Partially Proficient (n = 18) or Substantially Below Proficient (n = 2) were placed in a single combined group termed Nonproficient.

Word Level Skills

The Test of Word Reading Efficiency-Second Edition (TOWRE-2) (Torgesen, Wagner, & Rashotte, 2012) was administered to assess decoding and word identification skills. The

TOWRE-2 total word reading efficiency score is comprised of two subtests, the Phonemic Decoding Efficiency (PDE) portion in which nonwords are presented, and the Sight Word Efficiency (SWE) measure consisting of real words. Standard scores for each of the subtests and for the combination of the subtests were based on the number of items correctly read under timed conditions. These scores were used in analyses. The TOWRE-2 demonstrates a high degree of validity as a measure of word reading skills. Test-retest reliability coefficients for the subtests on alternate forms exceed .90 and for the same forms ≥ .90.

Receptive Vocabulary

Single word receptive vocabulary was assessed using the Peabody Picture Vocabulary Test 4 (PPVT-4), Form A (Dunn & Dunn, 2007). For each item on this test, the student is asked to select which picture from a set of four corresponds with a spoken word. Standard scores based on the number answered correctly were used in all analyses. Coefficient alpha reliability is high (.97 for Form A), as is test-retest reliability (.93). Because the study was focused, in part, on language abilities, participation was limited to students with verbal abilities in the normal range on this measure; a criterion was set that participants attain a score no lower than one standard deviation below the mean. As noted above, one student was excluded based on this criterion.

Syntax

A subtest (Oral Expression: Recreating Sentences (OralExp)) from the Test of Language Competence-Expanded Edition (Wiig & Secord, 1989) was used to evaluate students' abilities to formulate grammatically complete sentences. On each trial, three target words are to be incorporated in an orally formulated sentence representing a context presented in a picture. To obtain a single combined score for each response, sentences were scored in two ways: first, holistically with the sentences rated in terms of being logical, meaningful, complete, and

communicatively appropriate for the pictured context; second for the total number of target words correctly used in each sentence. Standard scores for the combined score were used in all analyses. The internal consistency alpha (composite) reliabilities range from .75 - .82 for Level 2 testing data.

Discourse

The Understanding Spoken Paragraphs subtest (USP) of The Clinical Evaluation of Language Fundamentals–Fourth Edition (Semel, Wiig, & Secord, 2003) was used as a measure of oral discourse comprehension. This subtest requires students to respond to questions about orally presented paragraphs. The questions target main idea, details, and sequence, as well as inferential and predictive information. A single raw score is based on the number of questions answered correctly for all of the paragraphs presented. Standard scores were used in all analyses. The reliability coefficient for the USP subtest is .73.

Procedure

Following the fall NECAP administration in the school districts, students' oral language and word level reading skills were assessed individually by the first author and by two other certified educators who were trained by the first author. Testing was completed between October and January, with the majority of participants (91%) assessed between October and December. Students were evaluated in one 35-minute session in a quiet location on school premises during school hours. All students readily gave their assent to participate following an explanation of the goals and procedures. Measurements were administered in the following order: receptive vocabulary (PPVT-4), oral comprehension of discourse level information (USP), expressive syntax (OralExp), and word level reading skills (TOWRE-2: SWE and PDE). The first author rechecked raw scores and completed final scoring for all of the administered tests.

Results

Descriptive Statistics

Descriptive statistics were computed for the oral language and word level reading measures. Table 2 displays the means and standard deviations obtained for each of the measures for students classified with respect to NECAP reading levels as Nonproficient (Levels 1 and 2), Proficient (Level 3), and Proficient with Distinction (Level 4). Data were confirmed to meet necessary statistical assumptions.

Insert Table 2

Relationships Between Oral Language, Word Level Reading, and NECAP Reading Performance

Pearson product-moment correlation coefficients (r) were used for correlational analyses and coefficients of determination (r^2) were employed to examine the strengths of relationships between variables. All correlations between measures of oral language, word level reading, and NECAP scaled scores were statistically significant. In relation to NECAP scaled scores for reading, medium to large correlations were found with vocabulary (r = .39); discourse (r = .38); syntax (r = .49); sight words (r = .49); decoding (r = .56); total word level skills (r = .56). Correspondingly, the coefficients of determination, demonstrating the strength of the relationships between the NECAP reading scaled scores and the oral language and word level variables, were strongest for syntax (r^2 = .24) and word level skills (r^2 = .24 for sight words; r^2 = .31 for decoding), indicating medium to large effect sizes. Results indicated that the strengths

of the relationship of the NECAP scaled scores to both discourse (r^2 =.14) and vocabulary (r^2 = .15) were more modest.

Comparisons Among the Reading Proficiency Groups

Next, data were analyzed to determine whether there were statistically significant mean differences among students achieving Nonproficient, Proficient, and Proficient with Distinction status on the NECAP reading assessment with respect to the oral language and word level reading variables. A multivariate analysis of variance (MANOVA) on the set of five oral language and word level reading measures yielded statistically significant group differences with a large effect size (Wilks' $\lambda = .61$, $F(2,103) = 5.50$, $p < .001$, $\eta^2 = .217$).

Follow-up analyses included six, one-way analyses of variance (ANOVAs) conducted for each of the oral language measures (i.e., vocabulary, syntax, discourse) and word level reading tests (i.e., sight word, decoding, total word) using the NECAP proficiency levels as the between-subjects variable. Statistically significant group differences were found for all six measures. Thus, performances of the subgroups differed significantly with medium to large effect sizes obtained for vocabulary, $F(2, 103) = 7.26$, $p = .001$, $\eta^2 = .12$; for syntax, $F(2,103) = 17.34$, $p < .001$, $\eta^2 = .25$; for discourse, $F(2,103) = 7.54$, p = .001, $\eta^2 = .13$; and for both sight words, $F(2, 103) = 14.40$, $p < .001$, $\eta^2 = .22$, and decoding , $F(2,103) = 19.15$, $p < .001$, $\eta^2 = .27$.

Statistically significant post hoc comparisons confirmed that Nonproficient students' mean scores on all oral language and word level reading measures were lower than those attained by the two other groups with one exception. Although significant results were obtained when comparing Nonproficient to Proficient with Distinction pupils on the discourse measure, significant differences were not evident when comparing Nonproficient to Proficient students on this one test.

Areas of Difficulty for Students in the Three NECAP Proficiency Categories

Next, the occurrence and patterns of weakness were examined for each NECAP subgroup and for the sample of students as a whole. In accord with the Simple View of reading (Gough & Tunmer, 1980), the students were categorized in terms of whether they made errors on oral language measures, on word level measures, or on both. Using a fairly conservative criterion, scores that were at or less than one standard deviation below the mean (i.e., a standard score of 85 or lower) were classified as low performing. With this criterion, 67 (63%[1]) of the students in the sample of 106 students were found to have weaknesses on one or more of the measures in the test battery: 64 (60%) on one or both of the oral language measures, 32 (30%) on one or both of the word level measures, and 28 (26%) of the students performed poorly on both oral language and word reading skills.

Weaknesses were observed for students in each of the NECAP performance groups, with higher proportions of difficulties occurring for the lower NECAP rankings, as one would anticipate. For the 18 students with the NECAP classification of 4 (i.e., Proficient with Distinction level), three of the students (17%) were identified as having difficulties: two on the oral language measures and the third pupil on the SWE task. For the 68 students with a classification of 3 (i.e., Proficient level), 45 of the 68 students (66%) had one or more weaknesses: 24 (53%) with an oral language weakness only, 3 (7%) with a word level difficulty only, and 18 (40%) with deficits in both domains. For the students who attained NECAP levels of 1 or 2 (i.e., the Nonproficient group), all 20 students (100%) had low scores on one or both of the oral language measures; 11 of these pupils (55%) also had word level weaknesses. In sum, at all NECAP proficiency levels at least some students were found to have on-going difficulties and

[1] All percentage values are rounded to the nearest whole number.

the profiles of weakness varied. Further, at all levels, the incidence of difficulties was approximately twice as frequent in the area of oral language as for word level abilities (i.e., NECAP 4 group: 2 vs. 1 students; NECAP 3 group: 64% vs. 32%; Nonproficient group: 100% vs. 45%).

Finally, we examined the frequency of weaknesses for each of the two tasks within the oral language and word level categories. Within the oral language domain, 32 of the 106 students (30%) had low scores on the discourse measure, 53 (50%) had weak performance on the syntax task, and 18 (17%) of these students were low on both. For the two word-level tasks, 13 (16%) had low scores on the real word task (SWE), whereas 28 (26%) had poor performance on the decoding task (PDE), and 19 (18%) of the students performed at low levels on both. Thus, within the oral language area, syntax more frequently was a source of difficulty and for word-level reading, this was true for decoding versus sight word reading.

The Relative Contributions of Individual Measures to Reading Comprehension on the NECAP

To assess the extent to which oral language and word level reading abilities contribute to the prediction of performance on the state reading assessment, a series of hierarchical multiple regression analyses was conducted. Because there was a high correlation between the two TOWRE-2 measures of sight word reading and decoding (r = .80), only one of these measures was included in the regression analyses to avoid problems associated with multicollinearity of variables. The decoding results were selected because this subtest had a higher correlation with the NECAP scaled scores for reading (r = .56). The correlation between the two oral language measures was not high (r = .34), consequently both syntax scores and discourse scores were included in the analyses.

For the hierarchical regression analyses, the order of entry of the oral language and the other variables was systematically varied, first with pairs of comparisons and then with sets, in order to investigate shared and unique variance accounted for by the measures. In the first set of comparisons, the decoding and syntax variables were entered in two steps. When syntax was entered first in the analysis, it accounted for 24% of the variance in NECAP reading scaled scores ($R^2 = .24$; $p < .001$). After controlling for syntax, decoding explained 11% of additional significant variance ($\Delta R^2 = .11$; $p < .001$), yielding a full regression equation that explained 35% of the performance on the reading assessment. Reversing the order of entry, decoding accounted for 32% of the variance on the reading measure ($R^2 = .32$; $p < .001$) and syntax explained an additional 4% ($\Delta R^2 = .04$; $p = .01$), for a total of 35% of explained variance. The results indicate that both syntax and decoding skills contribute significantly to reading results, although to a large extent they share variance related to NECAP reading performance.

In the second set of regression analyses, the relative contribution of discourse to reading performance in comparison to decoding was examined. When discourse was entered first into the equation, it accounted for 14% of the variance in NECAP reading scaled scores ($R^2 = .14$; $p < .001$); decoding at the second step explained a significant amount (22%) of additional variance ($\Delta R^2 = .22$; $p < .001$) for a total of 36% in the full model. Reversing the order, after the 32% of the variance again accounted for by decoding, discourse contributed only 4% of additional variance ($\Delta R^2 = .04$; $p = .01$). The findings indicate shared variance between discourse and decoding, similar to the findings for syntax and decoding.

In the final hierarchical regression analyses, syntax and discourse were tested to determine if the contributions of these oral language measures increased prediction of reading comprehension beyond vocabulary. In the model entering discourse first followed by vocabulary, as before,

discourse accounted for 14% of the variance in reading comprehension, and vocabulary, at step two, yielded an additional 7% ($\Delta R^2 = .07$; $p < .01$) for a total of 22% in explained variance in the full model. When the order of entry was reversed, vocabulary accounted for 16% of the variance in reading on the NECAP ($R^2 = .16$; $p < .001$). Discourse added 6% at step two ($\Delta R^2 = .06$; $p < .01$). For evaluating the variance accounted for by syntax and vocabulary, when syntax was entered first it accounted for 24% of the variance ($R^2 = .24$; $p < .001$), and vocabulary did not explain a large amount of additional variance at step two ($\Delta R^2 = .04$; $p = .02$). When vocabulary was entered first, it again accounted for 16% of the explained variance in reading with syntax adding 12% at step two ($\Delta R^2 = .12$; $p < .001$) for a total of 28% in the full model. Finally, when using all three variables, entering vocabulary first followed by discourse and then syntax, vocabulary at step one of course accounted for 16% of the variance in reading, discourse at step two added an additional 6% of explanation ($\Delta R^2 = .06$; $p = .01$), and syntax in the final step contributed another 10% ($\Delta R^2 = .10$; $p < .001$) for a total of 32% in the full model.

Predictors of NECAP Proficiency Group Membership

The results of oral language and word level reading tests also were examined to determine the skills that best differentiated group membership in the three reading proficiency levels. A discriminant function analysis was conducted using the oral language and word level reading variables to predict group membership in the NECAP reading categories of Nonproficient, Proficient, and Proficient with Distinction. An adjusted probability range for entry was used in this analysis (Tabachnik & Fidell, 2013), and the independent variables of vocabulary, discourse, syntax, and decoding were entered. To again avoid problems associated with multicollinearity of variables, sight word reading, highly correlated with decoding ($r = .80$), was not used in the analysis.

The outcome yielded two discriminant functions with the first discriminant function explaining 92% of the between groups variance and providing the best separation among the three reading-level groups (see Figure 1). The second function explained the remaining variance (8%). Wilks' Lambda values indicated that decoding, syntax, and discourse were significant variables for defining the two functions. The combination of discriminant functions 1 and 2 obtained significant results ($\chi^2 = 47.47$; $p < .001$), although after the first function was removed, the test of function 2 showed that $\chi^2 = 4.59$ was not statistically significant ($p = .101$). Thus, the second function did not significantly account for further explanation of the between-groups variability, and only the first discriminant function was needed to describe group differences.

Of the three measures qualifying as interpretable predictors of classification, (decoding, syntax, and discourse), decoding ($r = .84$) correlated most highly with the first discriminant function and explained the most variance in classification. Syntax ($r = .78$) also was important in explaining variance in classification, as was discourse ($r = .51$) to a somewhat lesser degree.

Insert Figure 1

Discussion

The purpose of this study was to investigate the contribution of oral language abilities (i.e., vocabulary, syntax and discourse), in addition to word-level skills, to performance by fifth-grade students on a reading comprehension instrument. The comprehension measure was the reading portion of the NECAP, the state exam administered in a majority of New England states.

The driving concern was to evaluate whether students who do not perform adequately on the NECAP require remediation in basic decoding skills, as is currently assumed, or whether a

variety of profiles of difficulties in oral language as well as in word-level skills would be found to occur. If so, the findings would indicate the need for a broader, differentiated approach to instruction and remediation.

For those students who did not meet the standard of reading at the proficient level or above on the NECAP (i.e., the Nonproficient group), 55% had noteworthy word-level weaknesses, as revealed by low scores on real word and pseudoword tasks that tap word recognition and decoding skills. However, 100% of these students demonstrated significant limitations on the syntax and/or discourse measures of their oral language abilities. Comparisons with students in the Proficient and Above Proficient groups confirmed that Nonproficient students' mean scores on all oral language and word level reading measures were lower, with robust effect sizes, than those attained by the Proficient and Proficient with Distinction groups of students, with the exception of the discourse measure. On the discourse measure, the Nonproficient students only differed significantly in comparison to the Above Proficient participants. In addition, analyses validated that syntax and oral discourse abilities, together with decoding skills, were important variables predicting NECAP reading results and differentiating group membership in the three reading proficiency levels.

Further, the difficulties experienced by the Nonproficient students also occurred for a sizeable portion of the students in the other two groups, particularly for the students who attained NECAP scores of 3 (i.e., Proficient). For those pupils, 42 of the 68 students (66%) had oral language scores at the level needing intervention, some of these students (i.e., 18) also had low scores in word-level skills, and three pupils had word-reading weaknesses without oral language difficulties. Even for the group of students who had been classified as Proficient with

Distinction, two of the eighteen pupils performed low on the oral language tasks and one had low scores on word level skills.

Whether the difficulties in oral language skills are indicative of specific language impairment, (SLI) and/or a specific reading comprehension deficit cannot be determined from the evidence collected. (Likewise, whether the word level problems signify dyslexia or not would require further study of the students' reading and language acumen.) What can be said is that the proportion of students with oral language difficulties was high, pointing to educational factors with or without concomitant disabilities.

The occurrence of weaknesses in skills contributing to reading achievement for students in all of the proficiency levels on the NECAP makes evident that schools should have procedures in place to ascertain the instructional needs of individual students both in terms of time allocated for remediation (i.e., based on severity of deficits) and in the content of that instruction (i.e., based on area(s) identified); simply having a one-size-fits-all remedial model is likely to leave critical deficiencies untreated (Bishop & Snowling, 2004). Further, the chances of students attaining success at reading comprehension or with written expression are hampered, perhaps permanently, by failing to address oral language deficits. Accordingly, we and others recommend that school personnel evaluate students' progress in each of the critical domains for literacy achievement and, correspondingly, provide appropriate differentiation of interventions (Connor, Alberto, Compton & O'Connor, 2014; Duke et al., 2004; Spear-Swerling, 2004).

In critiquing this study, one could raise the issue as to whether the syntax and discourse measures administered accurately reflect the demands of mid-elementary reading material. That is, were they at the appropriate difficulty level for the students and thus valid as indices of remedial need. The correspondence of the NECAP groups with the distributions resulting from

the Discriminant Function Analysis (based on the scores for syntax and discourse, in combination with the decoding scores (see Figure 1)), suggests a reasonable range of difficulty. Further, the demands of the tests were considered carefully when they were selected for the study. The choice of the syntax assessment was guided by recommendations by Scott and Stokes (1995) that for children learning a literate language style, it is important to use a measure that stresses "a variety of syntactic forms and operations" (p.314). The syntax instrument for the study met this requirement and, because it evaluated expressive skills, eliminated the challenging processing and memory demands reported for a number of syntax tests (Scott, 2009; Scott & Stokes, 1995). In terms of the discourse measure, this task required students to respond to questions about orally presented paragraphs with questions targeting main idea, details, sequence, and both inferential and predictive information. One potential limitation is that the narrative paragraphs presented were approximately six sentences in length. It may be that a test that stresses processing of lengthier information, and that includes processing of both expository and narrative information, would be more comparable to the listening demands of a fifth-grade classroom. Yet, doing so would be likely to make the task even more difficult. In short, the discourse and syntax measures appear to have been sufficient for the purposes of the study to assess the importance of these skills for comprehension of text. In future research, increasing the processing demands of the discourse task and using an instrument that also utilizes expository text could be informative, as would evaluating the contributions of oral language skills to writing performance. Further modifications might include the use of an expressive vocabulary assessment, rather than one that evaluates receptive vocabulary knowledge, and the elimination of the requirement that vocabulary knowledge of participants must be in the normal range (with a standard score of 85 or above) as an indicator of normal cognitive functioning. However, because only one student was

eliminated as a result of this exclusionary criterion, this procedure had a minimal impact on the present results.

Whatever instruments are utilized, a further matter pertains to what cut-off criteria should be adopted to identify students in need of further support. In this study, we required performance at or below the 16th percentile (i.e., one SD below the mean) to identify students with weaknesses on the administered tasks in order to avoid overestimating the occurrence of difficulties. However, from a practical point of view, additional students are likely to be at risk of literacy problems who did not qualify for the designated cut score. Torgesen et al., (2012) propose that a score on the TOWRE-2 falling below the 25% (i.e., a standard score of 90), "warrants special interventions to improve word level skills" (p. 39) because of an elevated risk for reading problems when sight word and decoding skills fall below that level. We concur that a wider net would be preferable for addressing potential student weaknesses in requisite skills.

Another important question pertains to the generalizability of the results to other state tests, including The Partnership for Assessment of Readiness for College and Careers (PARCC, 2010) exam that this year is being launched as the new state assessment in ten states and in the District of Columbia, including one of the states that had used the NECAP (i.e., Rhode Island). The creators describe this test as being aligned with higher standards stemming from the Common Core State Standards (2010). They further state that the assessments will "better measure students' critical thinking and problem solving skills and their *ability to communicate clearly*" (italics added) (http://www.parcconline.org/sites/parcc/files/PARCCFAQ_9-18-2013.pdf). More rigorous standards are likely to entail higher comprehension demands, and the ability to communicate clearly will tap a broad array of literacy and language skills, including those targeted in this study. Accordingly, we are inclined to believe that the number of students under

performing on the PARCC may be higher than on the NECAP, if the goals are realized, and that the role of oral language factors are likely to contribute significantly to performance on this measure as well. Hence, we project that whenever comprehension and written expression are assessed in ways that are less dependent on decoding (Cutting & Scarborough, 2006; Keenan, Betjemann & Olson, 2009) that syntax, discourse and vocabulary skills, in addition to word-level reading abilities, will be relevant.

The impact of syntax and discourse skills, as well as vocabulary knowledge, on literacy achievement may be particularly problematic in schools serving children from disadvantaged backgrounds. The present study was conducted in two suburban districts in which a limited number of children were eligible for subsidized lunch, and in which the ESL/bilingual rate fell below state averages in all but one of the six participating schools. Because research has shown that children from disadvantaged backgrounds may struggle with oral language development (Guilano, 2006; Hart & Risley, 2003), it would be informative to conduct a comparable study in an urban district in which a high percentage of students are eligible for subsidized lunch and in which ESL/bilingual and special education services fall above state averages. We hypothesize that in such a district, a higher proportion of students may struggle with word level reading and oral language skills than in the sample for this study, pointing even more frequently to the need to remediate all the areas of weakness for individual students.

In light of the implications of this study, a critical issue that arises is how the necessary instruction can be provided by teachers, reading specialists, special educators and speech language pathologists (SLPs) in the requisite content areas (Wallach & Ehren, 2004). Because deficiencies in knowledge regarding the structure of language and the English writing system repeatedly have been documented for educators (Moats, 1995), these will have to be corrected.

Further, genuine expertise, rather that superficial exposure, will be needed in order to be effective (Piasta, Connor, Fishman, & Morrison, 2009). Thus, it will be important for teachers and specialists involved to meet sufficient professional standards (i.e., International Dyslexia Association Teacher Knowledge Standards, 2010) in each of the areas identified as relevant.

Presently, SLPs are better prepared and more knowledgeable about language constructs, and sometimes about orthographic patterns, than other specialists in schools. Likewise, they are knowledgeable about individualizing programming for students. Given these areas of expertise, SLPs could play an important role in providing the necessary professional development and could assist in the implementation of assessment, prevention, and interventions programs in language and literacy (American Speech-Language-Hearing Association, 2001).

Educators can be assured that teaching oral language skills can be exciting, empowering for students, and discovery-based. Experts in vocabulary instruction (Beck et al., 2008) advocate methods to build vocabulary knowledge in ways that provide in-depth understanding of words that have wide use in literate language. For syntax and discourse skills, both Project Read (Greene & Enfield, 2000) and Language! (Greene, 2009) are examples of programs that provide effective and engaging instruction. A final suggestion, given the widespread incidence of low performance on the syntax and discourse instruments in the present study, is that rather than endeavoring to ameliorate weaknesses once identified, including syntax and discourse content in the regular curriculum would be prudent (Bishop & Snowling, 2004).

In closing, the findings of the present study were straightforward, yet important: variations in profiles for students in the Nonproficient group were obtained and all of the low-performing students demonstrated weaknesses in oral language. Further, the incidence of difficulties was even more widespread than anticipated, occurring for students who had been ranked on the state

reading exam as Proficient or Above Proficient. These results are in line with research establishing the relevance of nonphonological language weaknesses for language and literacy comprehension problems (Catts, 2011; Snowling, 2011). Although decoding difficulties were prevalent, and accounted for a large portion of the variance on a state exam measure of reading comprehension, more extensive language weaknesses were evident as well. These findings are not to be taken as diminishing the importance of foundational code concepts for reading development and reading success: the evidence for the importance of word-level reading skills for reading achievement is unequivocal. However, the results underscore the relevance of oral language abilities for reading performance and have strong implications for school assessment and intervention practices, both for accurate identification of student weaknesses and for appropriate differentiation of instruction.

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Table 1. Demographic Characteristics and Achievement Proficiency Ratings for the Schools in the Two Participating Districts

	District 1	District 2				
School	A	B	C	D	E	F
Number Participants	13	23	20	28	8	14
% FAR[a]	24%	15%	49%	7%	13%	23%
% ESL[b]	<1%	<1%	9%	<1%	1%	1%
% Special Education	14%	10%	18%	11%	16%	15%
% White	91%	86%	69%	93%	84%	86%
% Hispanic	3%	5%	21%	2%	8%	9%
% African American	1%	2%	5%	1%	2%	2%
% Other[c]	5%	7%	5%	4%	5%	3%
NECAP rating[d]	86%	85%	63%	87%	80%	88%

[a]Percentage of students qualifying for free and reduced lunch.

[b]Percentage of students receiving English as a Second Language or bilingual services.

[c]Asian, Native American, Multiracial

[d]Average proficiency level on the NECAP reading assessment for the school's population.

Table 2. Descriptive Data for Groups of Students at Three Levels of NECAP Reading Proficiency

	Oral Language Measures						**TOWRE 2**			
	Vocabulary		**Discourse**		**Syntax**		**Sight Words**		**Decoding**		**Total Word**	
NECAP <u>Proficiency Level</u>	***M***	**(*SD*)**	***M***	**(SD)**	***M***	**(SD)**	***M***	**(*SD*)**	***M***	**(*SD*)**	***M***	**(*SD*)**
Nonproficient (*n* = 20)	99.35	(11.44)	86.25	(17.31)	78.00	(5.93)	90.30	(10.69)	85.85	(9.11)	87.55	(8.93)
Proficient (*n* = 68)	106.54	(11.25)	91.63	(13.78)	88.97	(10.59)	99.88	(12.08)	95.83	(12.63)	97.76	(12.22)
Profic/Distinction (*n* = 18)	112.88	(9.21)	104.16	(15.26)	95.83	(8.44)	111.05	(12.48)	109.33	(10.43)	110.77	(11.63)
Total Sample *(N* = 106)	106.26	(11.61)	92.74	(15.63)	88.06	(10.94)	99.97	(13.34)	96.24	(13.58)	98.04	(13.44

[a]Measures: Vocab. = PPVT 4; Discourse = USP; Syntax = Oral Exp; Sight Word = TOWRE-2 SWE; Decod. = TOWRE-2 PDE; Total Word = TOWRE-2 Total Word Efficiency (Form A)

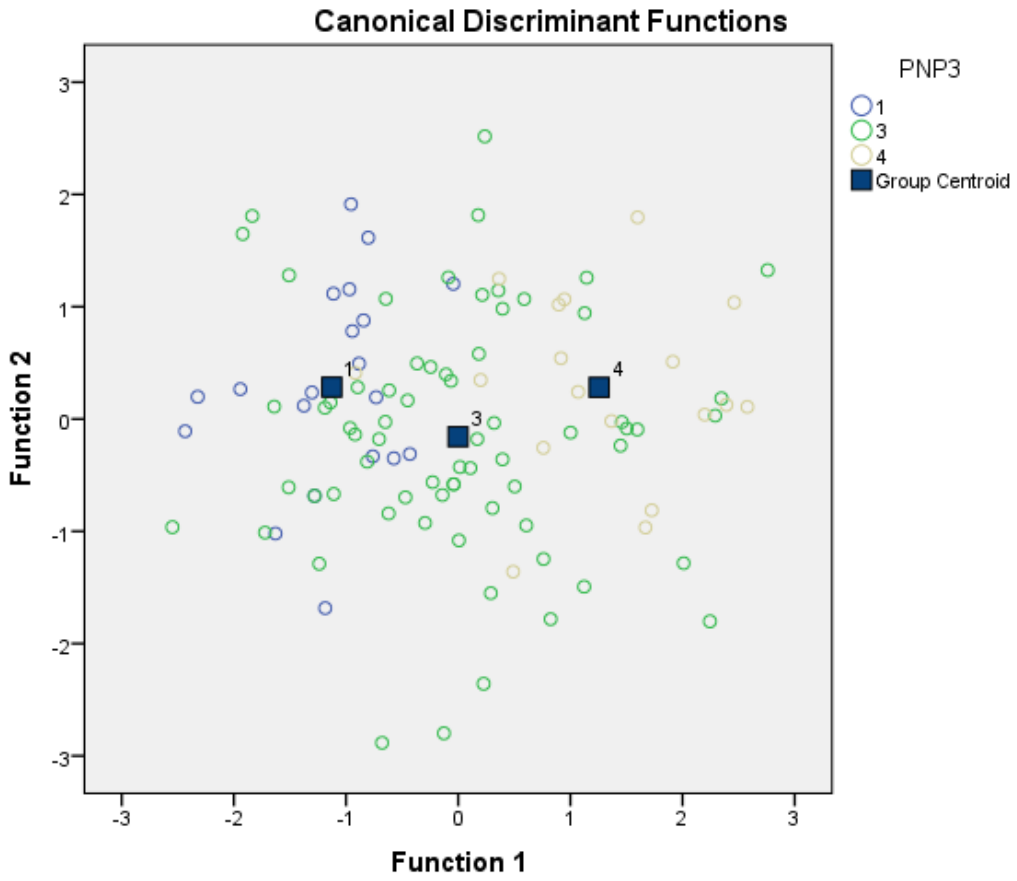

Figure 1. The Functions at Group Centroids: 1 for Nonproficient (Substantially Below Proficient and Partially Proficient), 3 for Proficient, and 4 for Proficient with Distinction