The Effects of Powerful Vocabulary for Reading Success on Students' Reading Vocabulary and Comprehension Achievement

Powerful Vocaculary for Reading Sucess is the FIRST vocabulary program to offer a systematic, teacher-directed approach to improving students' reading achievement in just fifteen minutes a day. It has long been established that vocabulary knowledge is critical to successful reading comprehension. Today, we have research-based data on how best to provide students with effective vocabulary instruction. First, students need to be taught specific word-learning strategies through teacher modeling and repeated practice. Second, they need to learn high-utility vocabulary words through engaging tasks, repetition, and multiple exposures. Finally, students need to be presented with a variety of multimodal vocabulary-building activities. **Powerful Vocabulary for Reading Success** provides students with all of these critical components.

This strategy-intensive program ensures that all students receive the instruction they need to not only learn words found in the program but also words they encounter in their reading of literature and in all content areas. It prepares students for high-stakes tests through the study of academic vocabulary that is highly correlated to state and national tests and through practice with test-like assessments. This powerful combination of strategy, targeted word-learning, and assessment practice provides students with the tools they need for improved reading achievement.

For teachers, **Powerful Vocabulary for Reading Success** offers research-based instructional resources that require minimal prep time. Teachers also benefit from the program's flexible instructional model, which allows them to customize instruction to fit their classroom schedules and meet individual student needs. With **Powerful Vocabulary for Reading Success**, teachers are finally able to implement proven strategies to promote vocabulary knowledge with ease. We hope you join us in our journey to improve student success.

Powerful Vocabulary
for Reading Success

The Effects of Powerful Vocabulary for Reading Success on Students' Reading Vocabulary and Comprehension Achievement

Research Report 2963-005 of the
Institute for Literacy Enhancement

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Theoretical Foundation

Vocabulary instruction is ill-defined within America's classrooms today. On one hand, few, if any, teachers or literacy professionals would argue about the important role that a strong reading vocabulary plays in a student's ability to derive meaning from text. Conversely, vocabulary instruction has not occupied a distinct role in many reading classrooms. Over the years, efforts to develop students' vocabulary have generally been ineffective and fraught with erroneous instructional practices and learning premises.

In the past two decades, numerous research investigations have shown the effects of vocabulary instruction on students' literacy growth. Those studies that describe instructional interventions and are pertinent to the hypothesis of this investigation are described below.

Beck, Perfetti, and McKeown (1982) demonstrated that fourth graders receiving vocabulary instruction performed better on semantic tasks than those who did not receive instruction. McKeown, Beck, Omanson, and Perfetti (1983) also found that vocabulary instruction had a strong relation to text comprehension for fourth-grade students. Stahl and Fairbanks (1986) conducted a meta-analysis of all vocabulary studies from 1924–1984 and concluded that vocabulary instruction was an important component for the development of comprehension. They found that best instructional techniques were (a) mixes of definitional and contextual programs; (b) the "key word method," which produced some significant gains in recall; and (c) repeated systematic exposures to words.

Stahl and Fairbanks . . . concluded that vocabulary instruction was an important component for the development of comprehension.

Other studies also found direct instruction in definitional and contextual strategies to be highly significant in increasing vocabulary learning (Tomeson & Aarnoutse, 1998; White, Graves, & Slater, 1990; Dole, Sloan, & Trathen, 1995; Rinaldi, Sells, & McLaughlin, 1997). The more concrete and personal connections that students can make to a specific word, the better it seems to be learned. For example, there is empirical evidence indicating that making connections with other reading material

or oral language in other contexts seems to have a significant effect in the development of a rich reading vocabulary.

It also seems clear from the National Reading Panel's (NICHD, 2001) data that having students encounter vocabulary words often, and in various ways, can have a significant effect on the development of increased reading vocabulary (NICHD, 2001; Senechal, 1997; Leung, 1992; Daniels, 1994; Dole, Sloan, & Trathen, 1995). Although not a surprising finding, it does have direct implications for instruction. Students should not only repeat vocabulary terms while learning them, but they should also learn words that frequently appear in many texts and contexts (to reinforce the retention of these words' meanings and expand the value of time spent in vocabulary instruction).

In much the same way that multiple exposures are important, the context in which a word is learned is critical (McKeown, Beck, Omanson, & Pople, 1985; Kameenui, Carnine, & Freschi, 1982; Dole, Sloan, & Trathen, 1995). Vocabulary words should be ones that the learner will find useful in many contexts. To that end, a large portion of vocabulary items should be derived from content-learning materials.

Ideal vocabulary instruction will also have effects that carry over and benefit students in the reading of materials that is new to them. Such instruction includes words that students encounter frequently in language usage. Biemiller (2003) stated that "children need this body of familiar words so that they can read new and even advanced text" (p. 331). In addition, Biemiller noted the importance of learning to apply morphological strategies to words, which has been shown to increase students' vocabulary abilities. These studies suggest that such strategies may apply to students' meaning-gaining abilities when reading novel texts. Because of these data, we incorporated a test of these strategies in novel text in our research investigations.

In summary, the National Reading Panel (NICHD, 2001) recommended that (a) vocabulary should be taught both directly and indirectly; (b) repetition and multiple exposures to vocabulary items are important; (c) learning in rich contexts is valuable for vocabulary learning; (d) how vocabulary is assessed and evaluated can have differential effects on instruction; and (e) dependence on a single vocabulary-learning strategy will not result in optimal learning.

This research investigation sought to answer five important questions:

1. What is the effect of specific vocabulary-instruction strategies on students' overall vocabulary and comprehension achievement?

2. Does increased vocabulary ability result in increased scores on standardized comprehension tests?

3. Were the effects of this type of vocabulary instruction different by grade levels?

4. Does entry level of attitude toward reading mediate achievement on the Stanford vocabulary posttest and vocabulary transfer test?

5. Can students apply the vocabulary strategies reported in this study to the learning of new vocabulary in (a) material that they have not previously read; (b) previously unread material at a higher grade level than the grade at which student is in; and (c) will learning how to determine the meaning of one classification of English words make it easier to deduce the meaning of words from other categories of English words?

Method

PARTICIPANTS

This study involved 644 elementary- and middle-school students who participated in a 22-week research study to assess the effects of four types of vocabulary building strategies in the Powerful Vocabulary for Reading Success (PVRS) program (Block & Mangieri, 2005) on students' reading abilities. This population came from Grades 3–6, and of the 644 students, 282 were in the experimental group and 362 were in the control group. Of these children, approximately 26% were above grade-level readers, approximately 38% were on grade-level readers, and the

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remaining 34% read below their grade-level placements, based on scores of state assessment tests for Texas, New Jersey, and Maryland. This population was socioeconomically and ethnically diverse, and represented the spectrum of students who attend schools in the U.S.

Students were enrolled in an urban, intercity school; a middle-class suburban school; or a rural, middle-class, county school. All schools were public institutions of education, had a total school population that was within 23 students of the national mean. Students came from Caucasian (42%), African-American (29%), and Hispanic (19%) origins.

PROCEDURE

The classrooms of the students in the three elementary schools and one middle school were randomly assigned to experimental and control groups by site coordinators prior to the study. These schools were located in Texas, New Jersey, and Maryland, and they represented the demographics of public institutes in the U.S. (as determined by 2000 Census data). Forty teachers were randomly assigned as experimental- or control-group teachers. They volunteered to participate and were paid for their involvement in this study. At each site, a program coordinator was also paid to direct the study's implementation.

In addition to their regular literacy block of instruction, experimental-group students received approximately 20–25 minutes of daily instruction using the Powerful Vocabulary for Reading Success program. As described in greater detail on the Scholastic Web site, *www.teacher.scholastic.com/products/powerfulvocabulary*, this program (a) teaches high-utility words; (b) provides students with a range of instructional experiences including reading, writing, speaking, and listening; (c) has a detailed teaching plan for each lesson that includes a Think Aloud activity, which explicitly models thinking about word meanings; (d) uses metacognitive strategies to aid students in the acquisition and retention of words; and (e) measures a student's mastery of a lesson's objective, which includes vocabulary word meanings, four vocabulary-building strategies, and word-learning principles, known as Vocabulary Building Clusters.

The four vocabulary-building clusters that were taught in this experimental study are described below:

1. Vocabulary Building Cluster 1 taught students how to think about the part of speech that a word serves in a sentence, and how to use context clues as strategies to learn the meaning of words that appear frequently in our language.

2. Vocabulary Building Cluster 2 taught students how to recognize when a word is affixed or has distinct, morphological units. For these words, students were taught to divide unknown words into prefixes, roots, and suffixes. Then students were taught to add the meanings of parts within this word together to derive its meaning.

3. Vocabulary Building Cluster 3 taught students how to identify the meaning of content-specific words. Students learned that many long, unfamiliar words that they have not seen frequently will most often have a meaning that is related to the particular content area and theme of the paragraph in which the unknown content-area word appears. Students are also taught how to connect the meanings of known content-area words to the possible specific object, event, phenomenon, etc. to which the unknown word must refer by relating all meanings from all other content-specific words to the unknown word. The unknown word will contain a meaning that describes a unique aspect of the theme not portrayed by the other content-specific words in that paragraph.

4. Vocabulary Building Cluster 4 taught students to use the unusual letter or sound combination of a word as a signal that the word's meaning has to be memorized, as it likely has an unusual word history or is derived from a foreign language. Students were taught to create their own personalized mnemonic device to learn this unusual word's meaning.

In addition to their regular literacy block of instruction, experimental–group students received approximately 20–25 minutes of daily instruction using the Powerful Vocabulary for Reading Success program.

Students in the control group did not receive instruction using the Powerful Vocabulary for Reading Success, but continued to receive their customary literacy instruction for an additional 20–25 minutes a day.

Thus, the total block of time devoted to reading instruction in control groups was the same as that which occurred in experimental groups.

To collect qualitative data, the researchers performed three actions. First, experimental-group teachers in the study were instructed to send questions, comments, or concerns regarding the study or the research materials directly to the researchers via email, as needed. Second, one of the researchers sent an email to every experimental-group teacher at three different times during the study. Each one asked three questions concerning the study. For example, in November we asked (a) if the students are having adequate time to complete their work in class; (b) how many days a week the lessons were used and why; and (c) if this program would be valid if used four days per week rather than five. While the specific answers to these questions were read and studied by the researchers, all comments were collapsed for a single qualitative data analysis. To determine fidelity to this program, we computed the total number of pages every student in every class completed (as a measure of quality of implementation). This page count variable was used in statistical analyses.

At two of the sites (New Jersey and Maryland), all experimental-group teachers were interviewed individually in one-to-one settings one month after the study ended. The purpose of these interviews was to receive feedback regarding their likes and dislikes of the study. All emails and interview data were collapsed into categories using the constant comparative method (Lincoln & Guba, 1985).

ASSESSMENT MEASURES

At the inception of this investigation, all subjects were assessed with the Stanford 9 Achievement Test Battery (Harcourt Brace Educational Measurement, 1996), specifically the Vocabulary and Comprehension Tests. This measure was selected because of its content validity and congruence with state competency-based literacy curricula, which were followed in these states and in the intervention materials. Following 22 weeks of instruction, the Stanford 9 Test Battery was re-administered to all subjects. The Vocabulary and Comprehension tests given at this time were one grade level higher in order to suit the new chronological ages of the subjects.

In addition, two metacognitive transfer vocabulary tests were given to all students in the investigation at pre- and posttest. The first transfer test contained passages from basal readers, not being used in the study's schools, but which had been written between 2001–2005. These passages were written at the grade-level placements of the students. The second transfer test was constructed in the same manner as the first one, but the passages were written at a grade level that was one grade level above students' grade placements.

When creating these metacognitive transfer vocabulary tests, researchers completed the following procedures. First, they selected a one-page, single-typed opening page from a basal reader that had been published since 2001. For example, several of the stories were selected from Macmillan and Scott Foresman publications. To be chosen, the stories had to not only appear in the grade level for which they were to be used, but they had to contain a readability of that grade level as measured by the Fry Readability Graph (1977). Next, every passage was read and four words from each category of English vocabulary terms were encircled in a box. In the first category of English words (Type I) are the basic words of the English language that occur frequently in all types of publications. Type II words are affixed words. Type III words are content-specific words, terms that relate to specific subject areas. Type IV words are foreign derivatives or words with unusual letter or sound patterns. Each word was identified as to whether it was a Type I, II, III, or IV word. Each test contained four Type I, II, III, and IV words for a total of 16 test words. Tests were constructed so that students would define each of the words that appeared in a box. None of the words had been explicitly taught to students during the study.

This test had directions printed on the top of the page. It was a multiple-choice test, with four possible answers for each item. Correct answers were randomly assigned to be choice "a," "b," "c," or "d," through the selection procedure of randomly assigning numbers. Answer foils were constructed following these guidelines. Every item had one foil, which was the definition of a different word that occurred in the same sentence in which the vocabulary word appeared. A second incorrect answer choice was the definition of a word that looked similar to the word that was in the box. For example, with the word *roll-top* one of the answer choices was "a type of skate or shoe." Therefore, students would have to

know the difference between *roller* and *roll-top*. A third incorrect answer choice was a definition of a word that had a meaning similar to that of the word in the box, but this meaning would clearly be an incorrect answer.

In constructing the test, only one vocabulary word appeared in a sentence, therefore students could use the entire context of that sentence (and those that preceded and followed it) to determine the meaning of each word. All experimental- and control-group subjects received a metacognitive vocabulary transfer test that had a readability level which was at their grade level placement and one that was at a readability level which was one grade level above their grade placement.

In addition, researchers independently analyzed each item on the Stanford Achievement Vocabulary and Comprehension Tests to identify the specific type of vocabulary word or comprehension process being assessed by each item. Similar to the categorization used with the Metacognitive Transfer Vocabulary Test, the vocabulary words on the Stanford Test were also identified as Type I, II, III, or IV words. Items on the Comprehension Test were categorized according to the type of comprehension skill targeted: Main Idea, Remembering Details, Interference, Sequence, Draw Conclusions, or Metacognition. Researchers' inter-rater reliabilities ranged from 97 percent to 85 percent on these test measures. All disagreements on single items were resolved through a reanalysis and discussion.

In addition, a split-half test of reliability was computed for the informal metacognitive transfer vocabulary tests. The split-half Pearson correlation coefficient was .93 and .94, respectively, indicating that the test measured vocabulary reliably. Content validity was established (a) by patterning test items after standardized vocabulary tests; (b) through inter-rater reliability percentages; and (c) by asking judgments from forty masters-level reading specialists as to what domain the test was designed to measure. One hundred percent of these experts judged the test to be a valid assessment of students' reading vocabulary.

The attitude assessment used as a pre- and posttest in this study was An Inventory of Reading Attitude, shown in Appendix A (page 19). This instrument was developed in 1982 by the Department of Education and validated as reliable in the National Assessment of Title 1 Programs.

Results

In order to examine the effectiveness of the Powerful Vocabulary for Reading Success program, analyses of covariance (ANCOVAs) were conducted to compare experimental- and control-group students' performance in vocabulary, transfer of vocabulary-building strategies to material that they had not previously read, and attitude toward reading. Additionally, performance on a measure of reading comprehension was also examined. Finally, data obtained from post-study interviews with experimental-group students and teachers was analyzed.

FULL SAMPLE ANALYSES

Analyses of student performance on the Comprehension and Vocabulary Tests of the Stanford 9 were first conducted using the full sample. ANCOVAs were adjusted for pretest levels of pre-study reading ability in vocabulary and comprehension, as well as attitude toward reading. Tests for significant interactions between performance and ethnicity or gender were conducted and are reported when such interactions were significant.

Controlling for pretest vocabulary scores, the ANCOVA for the Stanford 9 Vocabulary Test revealed that students in the experimental group (M = 24.01; SD = 5.09) had significantly higher scores on the posttest than the students in the control group (M = 22.99; SD = 6.07), $F(1, 630)$ = 16.37, $p < .001$.

Additional ANCOVAs, which controlled for the number of pages completed and corresponding pretest comprehension and attitude scores on final Stanford Comprehension and attitude scores, revealed that students in the experimental group had significantly greater comprehension scores, $F(1, 623)$ = 9.74, $p < .01$, and attitude scores, $F(1, 571)$ = 8.81, $p < .01$, than students in the control group (who were given a zero for number of pages completed). These findings suggest that participation in the PVRS program made a significant difference in students' comprehension and reading attitude.

Controlling for entry-level total metacognitive transfer vocabulary test scores and the number of pages completed by each student, an ANCOVA revealed that the experimental group had a significantly greater number of correct responses on this measure (M = 23.91; SD = 5.79) than did the control group (M = 22.82; SD = 5.56), $F(1, 401)$ = 4.83, p < .05.

Data also revealed that the program was similarly effective regardless of gender, ethnicity, or initial level of reading ability. Specifically, no significant interactions were found with condition and ethnicity or gender; moreover, the pattern of results remained the same when controlling for initial reading level. Hierarchical linear regression techniques, as well as ANCOVA's controlling for entry-level reading attitudes, reveal that entry-level reading attitudes did not mediate achievement on the vocabulary posttest between the students who received the program instruction and those who did not.

GRADE-BY-GRADE ANALYSES

Since ability measures were given to students based on grade level, further analyses of data were done on a grade-by-grade basis. Within a grade level, vocabulary achievement was measured through the usage of four widely accepted criteria for words. They were: Type I—words which frequently appear in students' texts; Type II—words which contain prefixes, suffixes, and roots; Type III—content-specific words; and Type IV—unusual or foreign-derivative words. Also within each grade level, specific comprehension strategies (e.g., drawing conclusions) were assessed in order to determine the impact that this program had on them. ANCOVAs were adjusted for pretest reading ability. Tests of the significant contributing effects of ethnicity or gender were reported when such differences affected posttest score performances.

Shown on the opposite page are the results of ANCOVAs for each grade level. Table 1 displays the Stanford vocabulary word type subset means and total vocabulary mean scores for control- and experimental-group students at each grade level. Table 2 displays the Stanford comprehension skill subset means and total comprehension mean scores for control- and experimental-group students at each grade level.

TABLE 1: Average Stanford Vocabulary Subset and Total Scores for Control- and Experimental-Group Students by Grade Level

	N	Type I	Type II	Type III	Type IV	Total
Third Grade Control	64	6.00 (1.38)	7.11 (1.80)	7.47* (1.89)	3.14 (1.10)	22.72* (5.20)
Experimental	72	5.97 (1.56)	7.11 (1.92)	7.72 (1.61)	2.94 (1.10)	24.75 (4.88)
Fourth Grade Control	60	3.90* (1.54)	4.32* (1.82)	6.00* (2.44)	7.68** (3.51)	21.90* (8.67)
Experimental	88	4.40 (1.15)	4.72 (1.46)	6.57 (2.03)	8.94 (2.58)	24.63 (6.41)
Fifth Grade Control	61	7.82 (1.84)	5.48 (1.55)	4.92 (1.76)	6.02 (1.28)	24.23 (5.26)
Experimental	74	7.49 (1.71)	4.80 (1.45)	4.89 (1.58)	5.70 (1.27)	22.80 (4.67)
Sixth Grade Control	94	11.22** (1.92)	6.05** (1.97)	3.81 (1.57)	1.30** (.91)	22.38** (4.90)
Experimental	117	11.84 (1.88)	6.91 (1.62)	3.94 (1.39)	1.64 (.85)	24.41 (4.25)

Note: ANCOVAs, * p < .05, ** p < .01. Standard Deviations are in parentheses.

TABLE 2: Average Stanford Comprehension Subset and Total Scores for Control- and Experimental-Group Students by Grade Level

	N	Main Idea	Remember Details	Inference	Sequence	Draw Conclusions	Meta Cognition	Total
Third Grade Control	63	4.57 (1.69)	7.41 (3.99)	3.62 (2.78)	6.97 (3.72)	11.48 (4.89)	4.42 (1.50)	38.46 (10.04)
Experimental	73	4.53 (1.58)	7.29 (4.19)	3.22 (3.23)	6.88 (3.61)	10.59 (4.75)	4.08 (1.52)	36.59 (9.76)
Fourth Grade Control	59	2.08* (1.32)	7.98* (3.24)	2.83* (2.05)	9.97* (5.98)	7.76* (3.41)	2.73* (1.56)	33.36* (13.30)
Experimental	86	2.40 (1.16)	8.31 (3.15)	2.94 (2.78)	11.05 (5.19)	8.63 (2.77)	3.24 (1.21)	36.57 (11.16)
Fifth Grade Control	60	6.57 (2.53)	7.80 (3.11)	9.00 (2.68)	-- --	7.18 (3.43)	6.15 (2.77)	36.70 (9.16)
Experimental	75	6.21 (2.32)	6.99 (2.64)	8.53 (2.56)	-- --	7.04 (3.50)	5.63 (3.02)	34.40 (9.76)
Sixth Grade Control	94	6.66* (2.01)	13.74* (3.75)	4.86* (2.05)	-- --	6.18* (1.87)	6.23* (2.12)	37.78* (9.59)
Experimental	116	6.88 (1.89)	14.40 (3.35)	4.96 (1.44)	-- --	6.45 (1.77)	6.35 (1.78)	39.07 (8.65)

Note: * p < .05, Standard Deviations are in parentheses.

THIRD GRADE

The total mean scores on the post-Stanford Total Vocabulary Subtest, which were adjusted for pretest performance on this measure, showed that the experimental group ($M = 24.75$, $SD = 4.88$) significantly outperformed the control group ($M = 22.72$, $SD = 5.20$), $F(1, 133) = 4.18$, $p < .05$, $\eta^2 = .03$. The experimental and control groups did not differ on post-Stanford Total Comprehension scores, $F(1, 133) = 4.18$, ns.

ANCOVAs on Type I, Type II, Type III, and Type IV words, controlling for initial ability differences, also showed that third-grade experimental-group students ($M = 7.72$, $SD = 1.61$) significantly outperformed control-group students ($M = 7.47$, $SD = 1.89$) on the posttest of the Stanford Vocabulary Type III Subtest, $F(1, 133) = 4.33$, $p < .05$, $\eta^2 = .03$. The non-significant effects on Type I and Type II words for third-grade students were expected as they are the most basic words of the English language that would have been experienced by the control group, as well as the experimental group from kindergarten through Grade 3. The non-significant effects on Type IV words were also expected because no student in the experimental group was taught strategies to learn Type IV words. The lessons focusing on these Type IV strategies in Powerful Vocabulary for Reading Success had not yet been taught by experimental-group teachers. These strategies were taught in the last eight lessons in the program but posttests were given in March/April of the school year, prior to this instruction.

FOURTH GRADE

As shown in Table 1, for students in the fourth grade, experimental-group students significantly outperformed control-group students on the Stanford vocabulary subsets of Type II words, $F(1, 145) = 3.99$, $p < .05$, $\eta^2 = .03$, and Type IV words, $F(1, 145) = 8.39$, $p < .01$, $\eta^2 = .06$. In addition, the experimental group ($M = 24.63$, $SD = 6.41$) significantly outperformed the control group ($M = 21.90$, $SD = 8.67$) on Total Vocabulary scores, $F(1, 145) = 6.86$, $p < .05$, $\eta^2 = .04$.

In the areas of the individual comprehension skills, fourth graders in the experimental group significantly outperformed control-group fourth graders on all six of the individual criterion reference comprehension skills on the Stanford Comprehension test.

Similarly, the Total Stanford Comprehension test mean score for experimental-group subjects was significantly higher than the control-group subjects' mean score (control $M = 33.36$, $SD = 13.30$; experimental $M = 36.57$, $SD = 11.16$), $F(1, 142) = 4.17$, $p < .05$, $\eta^2 = .03$.

Controlling for their initial attitudes, experimental- and control-group students did not differ on their post-reading attitudes. In addition, controlling for their initial total metacognitive transfer vocabulary score, fourth-grade students in the experimental and control groups did not differ on their post-study metacognitive transfer scores.

FIFTH GRADE

As shown in Table 1, ANCOVAs controlling for initial ability differences showed no significant differences between the experimental and control groups on the post Stanford Vocabulary subset portions that measured Type I, Type II, Type III, and Type IV words.

This lack of significance may be due to the fact that teachers in the experimental group for fifth graders only taught Chapter 1 (the Type I word strategies) and did not develop experimental-group students' abilities to learn Type II, Type III, or Type IV words. By fifth grade all students would have learned the Type I words taught in the first 61 pages of the program, so no difference would be expected on these words. Importantly, at all other grade levels teachers taught Chapter 2 and in most cases Chapter 3 so that experimental-group students learned strategies to determine the meanings of Type II and III words. This can be shown by the number of pages of instructional text that were completed. While the mean number of pages completed for fifth graders was only 61 (23.63), the mean number of pages completed by third graders was 110.82 (53.51). The mean number of pages completed by fourth graders was 98.76 (33.50). The mean number of pages completed by sixth graders was 120.95 (18.63). Researchers observed that the fifth-grade teachers had to prepare for a standardized test, mandatory by the state, thus cutting the research project short by four weeks. The mean number of pages from Powerful Vocabulary for Reading Success completed by the total group was 111 ($SD = 36.5$).

As shown in Table 2, the control and experimental groups did not differ significantly in their scores on the comprehension measures. The two groups also did not differ on the Metacognitive Transfer Vocabulary Test (ability to determine the meaning of Type I–IV words that had never been taught in a passage which had not been read during the treatment period). Again, this difference was expected because fifth-grade experimental-group students were not taught strategies for gaining the meaning of Type II, III, or IV words. Controlling for their initial attitudes, fifth-grade experimental- and control-group students did not differ on their post-reading attitudes.

SIXTH GRADE

As shown in Table 1, for students in the sixth grade, experimental-group students significantly outperformed control-group students on the Stanford vocabulary sub-sets of Type I words, $F(1, 208) = 11.80$, $p < .01$, $\eta^2 = .05$; Type II words, $F(1, 208) = 14.66$, $p < .001$, $\eta^2 = .07$; and Type IV words, $F(1, 208) = 8.39$, $p < .01$, $\eta^2 = .06$. In addition, the experimental group ($M = 24.41$, $SD = 4.25$) significantly outperformed the control group ($M = 22.38$, $SD = 4.90$) on Total Vocabulary, $F(1, 208) = 21.32$, $p < .001$, $\eta^2 = .09$.

Similar to fourth-grade students, in the areas of the individual comprehension skills experimental-group sixth graders significantly outperformed control-group sixth graders on all five of the individual criterion reference comprehension skills on the Stanford Comprehension test. Similarly, the Total Stanford Comprehension test mean score for experimental subjects was significantly higher than the control-group subjects' mean score (control $M = 37.38$, $SD = 9.59$; experimental $M = 39.07$, $SD = 8.65$), $F (1, 232) = 4.94$, $p < .05$, $\eta^2 = .08$. Furthermore, controlling for initial reading attitudes, sixth-grade experimental students ($M = .62$, $SD = .23$) had significantly higher attitudes at the end of the treatment weeks than control-group students ($M = .56$, $SD = .20$), $F(1, 232) = 4.04$, $p < .05$, $\eta^2 = .02$.

QUALITATIVE DATA

The constant comparative qualitative analysis resulted in three major categories of responses. The most frequently occurring responses related to teachers' and students' enjoyment of the program, with teachers reporting an equal number of incidents in which they enjoyed the program and in which their students enjoyed the program. Included in this category was a large sub-population of teachers that reported finding the materials easy to implement in their classrooms. The second most frequently occurring responses related to a noticeable increase in students' use of new vocabulary words in situations outside of the vocabulary lessons. These statements included an increase in students' abilities to use newly learned words across content areas, to use new vocabulary words when responding to discussion questions, and to include this new vocabulary in their personal conversations.

The third category related to individual features of the program that had particular value for student learning. Approximately 13% of our respondents made unsolicited reports that the research materials were proving to be of significant value for special populations. To cite one participant, "We are having success with our special education population as the students are scoring very well on the lesson assessments."

Approximately 13% of our respondents made unsolicited reports that the research materials were proving to be of significant value for special populations.

Summary of Findings

The major findings of this research investigation were:

- While there were some differences on the various measures at the grade level, students overall in Grades 3–6 of the experimental group had significantly higher scores on the Stanford 9 Vocabulary posttest than did control-group students.

- Students overall in Grades 3–6 of the experimental group had significantly greater comprehension scores at the study's conclusion than did their control-group counterparts, taking into account the level of exposure to the PVRS program (as measured by the number of pages completed).

- Students overall in Grades 3–6 of the experimental group, controlling for the number of pages of this program completed, had significantly more positive attitudes toward reading than did control-group students.

- This program was effective regardless of student gender, ethnicity, or initial level of reading ability.

Conclusions

Data also suggests that such instruction may assist students in overcoming the "fourth–grade slump" and in transferring vocabulary–building skills from reading more narrative text to reading more expository text.

The purpose of this investigation was twofold: (1) to assess the effectiveness of the Powerful Vocabulary for Reading Success program in teaching Type I, II, III, and IV words to all levels of students; and (2) to ascertain whether these students could then utilize these newly-acquired words in the learning of other words, as well as in their attempts to read texts new to them. As the data presented in the Results section of this report demonstrates, the answers to both questions are "yes." Data also suggests that Grade 3–6 students can independently apply these newly acquired skills to novel texts, which have a readability level that is one grade level above their grade placement. These findings suggest that teaching vocabulary through a program that includes direct instruction in Vocabulary Building Clusters I, II, III, and IV may overcome the limitations of past programs. This program was highly and significantly effective for (a) students from high, medium, and low socioeconomic neighborhoods, as assessed by the schools; (b) students with higher and lower entering reading levels; and (c) girls and boys. Data also suggests that such instruction may assist students in overcoming the "fourth-grade slump" and in transferring vocabulary-building skills from reading more narrative text to reading more expository text. Mimicking the national pattern, fourth-grade control-group subjects in this sample experienced "the fourth-grade slump," meaning that they made little or no gain in reading ability as compared to their baseline reading ability.

In the numerous research investigations that have been conducted in the area of vocabulary, various components of the Powerful Vocabulary for Reading Success program have been assessed as to their importance relative to students' abilities to learn the meaning of words. For example, direct instruction has consistently been found to be an effective strategy for vocabulary learning. This investigation was unique from prior studies, however, in that it assessed the effect of not a single measure but rather the usage (and integration) of five components within a single program and their effects on vocabulary and comprehension achievement. These components were described in the Procedure section of this document. This study's data provides the literacy community with valuable information relative to vocabulary instruction. This data led to the following conclusions:

1. Rather than vocabulary being only a small part of a larger literacy lesson (as occurred in control-group classrooms), when vocabulary (which contains the learning principles of the Powerful Vocabulary Reading for Success program) is directly taught for approximately 20–25 minutes a day, students in Grades 3–6 will learn the meaning of a significantly greater number of words than peers whose instruction is not research-based, systematic, and direct.

2. A vocabulary program that teaches all four types of words and does so with a unifying theme (e.g., only multiple-meaning words are taught in one lesson while only prefixes are taught in a subsequent lesson), as is found in the Powerful Vocabulary Reading for Success program, produced significantly greater vocabulary growth in these four classifications of English word types. This finding was true for students in Grades 3, 4, and 6.

3. When confronted with unfamiliar words in unfamiliar texts that were written at (and one year above) students' grade-level placements, the experimental-group students determined the meaning of a significantly greater number of words than students in the control group who did not receive instruction from the Powerful Vocabulary for Reading Success program.

4. The linkage between vocabulary growth and reading comprehension success is a strong one at Grades 4 and 6. In these grades, after students

participated in the Powerful Vocabulary for Reading Success program for twenty-two weeks, improvements in vocabulary were seen alongside improvements in reading comprehension.

5. While it was noted that in general, experimental subjects learned significantly more Type I, II, III, and IV words than control-group students, the Powerful Vocabulary for Reading Success program, in less than a year's time, produced especially large gains in Type II words (morphologically analyzed) and Type IV words (words with unusual word histories, letter combinations, and/or sounds). As shown in the comprehension findings of this investigation (see #4), this ability may manifest itself in these students' increased comprehension proficiencies.

6. Teaching students to infer is a key facet of the Powerful Vocabulary for Reading Success program. This instructional emphasis created, within experimental-group students, a metacognitive awareness as to the steps necessary to infer the meaning of Type I, II, III, and IV words, as well as to derive inferential meanings.

7. At the end of one year's participation in Powerful Vocabulary for Reading Success, experimental students who were functioning below grade level at the study's inception increased their scores on vocabulary and comprehension tests at the same rate as peers in their class who were performing at or above grade level.

8. The need for intense vocabulary instruction extends into middle school. Even above grade-level sixth graders, when receiving daily, direct vocabulary instruction, significantly outperformed ability-matched control subjects (on informal and standardized tests of vocabulary and comprehension).

APPENDIX A: An Inventory of Reading Attitude

Name: _____ Date: _____

School: _____

Teacher: _____ Grade Level: _____

TO STUDENTS: This sheet has some questions about reading that can be answered Yes or No. Your answers will show what you usually think about reading. After reading each question, please circle the answer.

Yes   No   1. Are you interested in what other people read?

Yes No   2. Do you like to read when other people are reading?

Yes No   3. Is reading one of your favorite things to do?

Yes No   4. Do you think you are a good reader?

Yes No   5. Do you like to read aloud?

Yes No   6. Do you like to tell stories?

Yes No   7. Do you like to read all kinds of books?

Yes No   8. Do you like to answer questions about things you have read?

Yes No   9. Do you think it is a waste of time to make rhymes with words?

Yes No   10. Do you feel that reading is important?

Yes No   11. Do you use context clues to figure out a word you do not know?

Yes No   12. Do parts of speech help you learn vocabulary words?

Yes No   13. Do you think it is important to know the history of a word to figure it out?

Yes No   14. Do you think the sounds of a word can tell you its meaning?

Yes No   15. When you come to a long word you have never seen, the first thing you should do is sound it out. Do you agree?

Yes No   16. Are all of these prefixes: *ing*, *pre*, *un*?

References

Beck, I. L., Perfetti, C. A., & McKeown, M. G. (1982). Effects of long-term vocabulary instruction on lexical access and reading comprehension. *Journal of Educational Psychology*, *74*(4), 506–521.

Biemiller, A. (2003). Vocabulary: Needed if more children are to read well. *Reading Psychology*, 24, 323–335.

Block, C. C., & Mangieri, J. N. (2005). *Powerful Vocabulary for Reading Success, Grades 3–6*. New York, NY: Scholastic.

Daniels, M. (1994). The effect of sign language on hearing children's language development. *Communication Education*, *43*(4), 291–298.

Dole, J. A., Sloan, C., & Trathen, W. (1995). Teaching vocabulary within the context of literature. *Journal of Reading*, *38*(6), 452–460.

Kameenui, E., Carnine, D., & Freschi, R. (1982). Effects of text construction and instructional procedures for teaching word meanings on comprehension and recall. *Reading Research Quarterly*, *17*(3), 367–388.

Leung, C. B. (1992). Effects of word-related variables on vocabulary growth through repeated read-aloud events. In C. K. Kinzer & D. J. Leu (Eds.), *Literacy research, theory, and practice: Views from many perspectives: Forty-first Yearbook of the National Reading Conference.* (pp.491–498). Chicago, IL: The National Reading Conference.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Thousand Oaks, CA: Sage.

McKeown, M. G., Beck, I. L., Omanson, R. C., & Perfetti, C. A. (1983). The effects of long-term vocabulary instruction on reading comprehension: A replication. *Journal of Reading Behavior*, *15*(1), 3–18.

McKeown, M. G., Beck I. L., Omanson, R. C., & Pople, M. T. (1985). Some effects of the nature and frequency of vocabulary instruction on the knowledge and use of words. *Reading Research Quarterly*, *20*(5), 522–535.

NICHD (2001). Report of the National Reading Panel. National Institute for Child Health and Development. Washington, DC: NICHD.

Rinaldi, L., Sells, D., & McLaughlin, T. F. (1997). The effects of reading racetracks on the sight word acquisition and fluency of elementary students. *Journal of Behavioral Education*, *7*(2), 219–233.

Senechal, M. (1997). The differential effect of storybook reading on preschoolers' acquisition of expressive and receptive vocabulary. *Journal of Child Language*, *24*(1), 123–138.

Stahl, S. A., & Fairbanks, M. M. (1986). The effects of vocabulary instruction: A model-based meta-analysis. *Review of Educational Research*, *56*(1), 72–110.

Strauss, A., & Corbin, J. (1998). *Basics of qualitative research: Grounded theory procedures and techniques* (2nd edition). Newbury Park, CA: Sage.

Tomesen, M., & Aarnoutse, C. (1998). Effects of an instructional programme for deriving word meanings. *Educational Studies*, *24*(1), 107–128.

White, T. G., Graves, M. F., & Slater, W. H. (1990). Growth of reading vocabulary in diverse elementary schools: Decoding and word meaning. *Journal of Educational Psychology*, *82*(2), 281–290.

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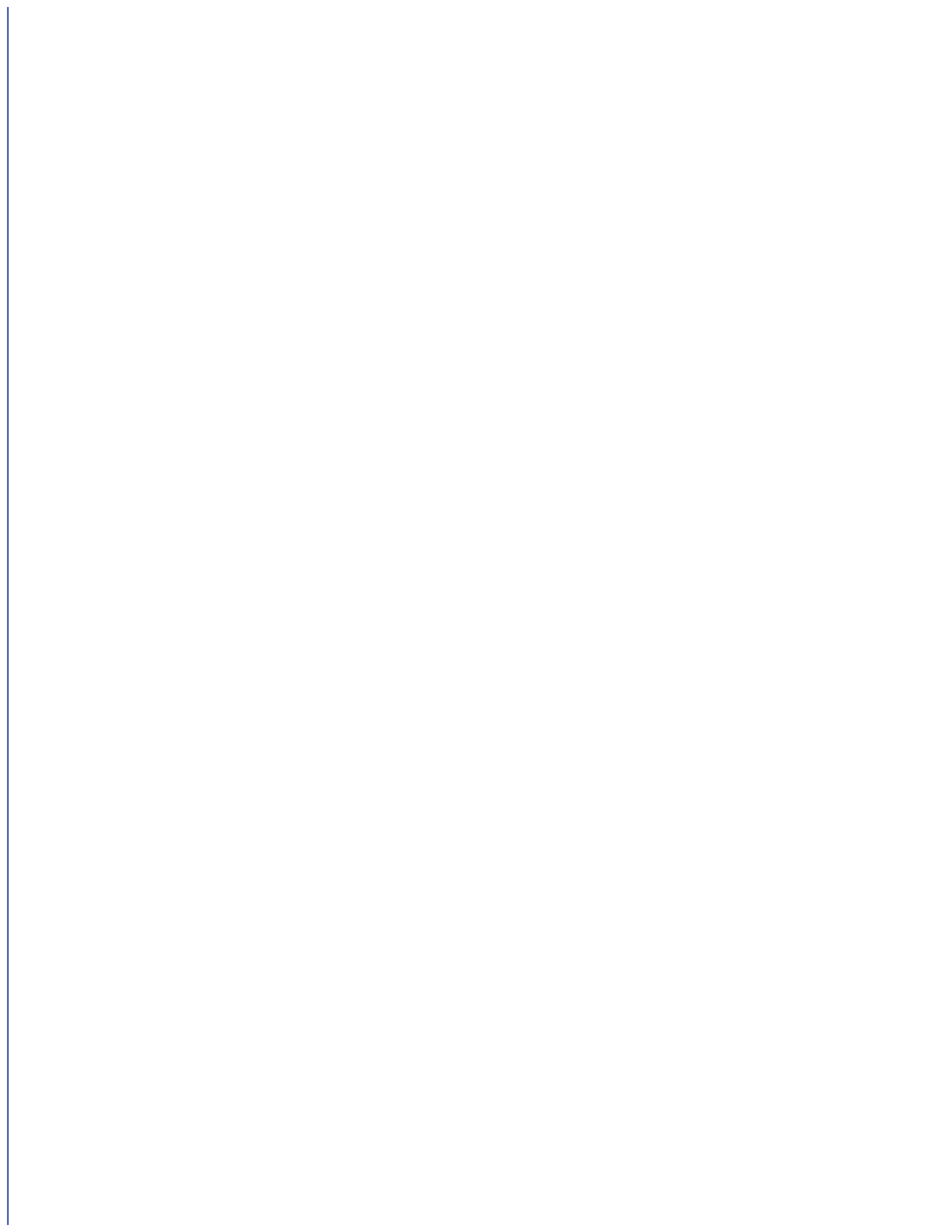
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