

The Effects of a Voluntary Summer Reading Intervention on
Reading Activities and Reading Achievement

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Abstract

The causal effects of a voluntary summer reading intervention on children's reading activities and reading achievement were assessed in a randomized experiment involving 331 children in Grades 1 to 5. Children were pretested in the spring on a standardized test of reading achievement (Stanford 10th edition), the Elementary Reading Attitudes Survey (ERAS), and a reading preference survey. At the end of the school year, children were stratified by their grade level and classroom and randomly assigned to receive 10 books matched to their reading levels and preferences during summer vacation or after the administration of posttests. Children in the treatment group received books through airmail in July and August. In September, children were re-administered the reading test and completed a survey of their summer reading activities. Although the treatment group reported reading more books and participating in more literacy activities than the control group, there was no significant difference in reading achievement. Recommendations for enhancing the effects of voluntary reading through teacher-directed instruction and for conducting a replication study are discussed.

Keywords: voluntary reading, summer reading, randomized experiments

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Both common sense and correlational evidence support the notion that reading books will promote broad improvements in reading skills. According to the National Reading Panel ([NRP], 2000), “there are few beliefs more widely held than that teachers should encourage students to engage in voluntary reading and that if they did this successfully, better reading achievement would result” (p. 3-27). Supporting this conventional wisdom are multivariate analyses that isolate the unique contribution of reading trade books on reading growth in the elementary grades. In their study of fifth-grade students’ reading habits outside of school, Anderson, Wilson, and Fielding (1988) found that “reading books was the out-of-school activity that proved to have the strongest association with reading proficiency” (p. 297). Heys (1978) conducted a study of summer learning among a sample of 1,128 sixth- and seventh-grade students and found that the number of books read and time spent reading were both positively related to vocabulary scores after controlling for prior achievement and family background characteristics.

Despite correlational evidence linking wide reading of books to improved reading skills, few experimental studies have examined whether a well-designed voluntary reading intervention can encourage more reading and improve reading achievement among elementary school-aged children. The NRP (2000) attempted to synthesize the empirical research on studies that encouraged voluntary reading, but it was unable to find a sufficient number of quality experimental studies to justify a meta-analysis. Consequently, the Panel underscored the “need for rigorous experimental research on the impact of programs that encourage reading on different populations of students at varying ages and reading levels using several different reading outcomes” (p. 3-4).

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This experimental study examined the effects of a voluntary reading intervention on the reading activities and reading achievement of children in Grades 1 to 5. The study has several unique instructional and methodological characteristics. First, teachers played a key role in encouraging children to engage in more reading activities at home during summer vacation. Through end of school year reading lessons, teachers encouraged children to read 10 books during the summer, showed children how to respond to questions about their books on reading postcards, and continued to encourage reading at home through letters that were mailed to children's homes with each book. Second, the sample included children in Grades 1 to 5, which permitted an analysis of possible grade-level differences in the magnitude of treatment effects. Third, since the study examined the effects of voluntary reading in the summer, it provided information on whether the intervention increased reading activities rather than displacing different forms of reading practice that usually occur during the regular school year. The study design helps to address several unanswered questions in the research literature.

Although the relationship between voluntary reading and reading achievement has been consistently documented in the research literature, there is some debate about the conditions under which voluntary reading interventions improve reading achievement. One central issue is whether voluntary reading should be a purely "student-centered" instructional strategy, in which children are allowed to self-select books and encouraged to read on their own with little guidance from teachers. On one hand, proponents (Krashen, 2001) of voluntary reading interventions like sustained silent reading have argued that successful programs typically allow children to choose their own books, do not rely on extrinsic motivators, and do not make them accountable for what they read. Other researchers, however, have stressed the importance of involving teachers and matching appropriately challenging and interesting books to the skill level and preferences of

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individual children (Byrnes, 2000; Carver & Liebert, 1995; Pearson & Fielding, 1991; Stahl, 2004). In one review of uninterrupted sustained silent reading (USSR), Byrnes (2000) found larger achievement effects when teachers provided explicit skill instruction. Stahl (2004) noted that many children do not read independently during sustained silent reading time and often choose easy or hard books that fail to promote reading engagement. Carver and Liebert (1995) examined the effects of voluntary reading in a summer program, in which 43 students in Grades 3, 4, and 5 read fiction books for six weeks (Monday through Friday), 2 hours each day. The 60 hours of leisure reading time did not translate into higher reading levels, increased reading rate and efficiency, or vocabulary gains. When given the opportunity to choose their own reading materials, most students selected easy books, which were several grade levels below their independent reading level. Given the problems matching appropriately challenging books to children's reading levels, Carver and Liebert suggested that their intervention "was seriously flawed in that the apparent difficulty levels used to assign books were not the real levels as measured objectively by a readability formula" (p. 30). Previous research, therefore, suggests that some teacher involvement and careful monitoring of book matching procedures are potentially important ingredients of more effective voluntary reading interventions.

A second concern has focused on whether voluntary reading interventions are more developmentally appropriate for older children than younger children. If children cannot decode words on their own, there is no reason to believe that a voluntary reading intervention, in which children receive no support or feedback from teachers, would improve reading achievement. From a theoretical perspective, the self-teaching hypothesis (Share, 1995) suggests that decoding ability is like a "built-in teacher" that enables children to read new words independently and to acquire meaning from print. In Chall's (1983) stage theory of reading development, children

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who have mastered the ability to read words can also use reading as a tool for “learning the new.” In many ways, theories of reading development have motivated the sampling design of previous studies of voluntary reading. In reviewing research on the role of frequent reading and reading growth, Byrnes (2000) noted that most studies had included children in Grade 5 and above “presumably because many younger children are not yet fluent, independent readers” (p. 192). In the NRP’s review of voluntary reading, none of the 14 studies involved children in first grade. In addition, the two studies (Collins, 1980; Morrow & Weinstein, 1986) involving children in second grade showed no significant effect on reading achievement. A study involving children in Grades 1 to 5 would allow for an empirical test of possible grade level differences in the effects of voluntary reading.

A third issue is related to the timing of voluntary reading interventions. Although most studies on voluntary reading have occurred during the regular school year, there is a compelling practical and methodological rationale for studying the effects of voluntary reading during the summer. Researchers have found considerable empirical evidence that summer vacation has larger negative effects on reading achievement for low-income children (Burkam, Ready, Lee, & LoGerfo, 2004; Cooper, Nye, Charlton, Lindsay, & Greathouse, 1996) and children from minority families (Heyns, 1978, 1987; Murnane, 1975). As a result, these cumulative summer learning losses explain a large portion of the gap in reading skills between low-income and middle-income children by the end of elementary school (Alexander, Entwisle, & Olson, 2001). There is additional evidence that voluntary reading of books and time spent reading promote reading gains during summer vacation (Entwisle, Alexander, & Olson, 1997; Heyns, 1978). For example, Heyns found that the “number of books read during the summer is consistently related to achievement gains; the strength of this relationship often exceeds that of SES (socioeconomic

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status) when prior achievement is controlled” (p. 119). This correlational evidence implies that increasing access to books would keep the “learning faucet” open (Entwisle, Alexander, & Olson, 2000, p. 17) for disadvantaged children, and voluntary reading of books would potentially improve reading engagement and achievement.

Since previous studies of voluntary reading have usually occurred during the regular school year and in classroom settings, the NRP (2000) noted the methodological difficulties in assessing whether the treatment (additional reading amount and practice) caused children to read more or simply displaced other types of reading practice. Therefore, the Panel underscored the need to compare voluntary reading programs “against procedures in which students actually read less” (p. 3-27). To overcome this methodological hurdle, it would be useful to examine the effects of a voluntary reading intervention during summer vacation when children are less likely to read on their own relative to the school year when they receive formal reading instruction and are engaged in various forms of reading practice in their classrooms.¹ An experimental study of a voluntary reading intervention in the summer would provide causal evidence that complements correlational research and studies conducted during the school year.

METHOD

Participants

A total of 331 children in a multiethnic K-6 public school participated in this study. The school is part of a large and diverse suburban district, which has witnessed a substantial increase in percentage of minority children during the past decade. Table 1 displays characteristics of the sample at the beginning of the experiment. White children made up less than half the sample, and about a quarter of the children received federally subsidized free lunches. Sixty-eight

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percent of the children were native English speakers, and Spanish was the primary language for 23% of the children.² Mean scores on a measure of attitudes toward recreational reading and reading achievement (comprehension and vocabulary) were also close to the national average in each of the five grades. The sample, therefore, included a demographically diverse group of children whose reading attitudes and reading achievement were similar to the national norm.

Design

The experimental study began with a total of 331 children in grades 1 to 5, who received parental consent to participate in the study and completed a standardized reading test and reading survey. Only 2 students in the school did not receive parental consent to participate in this study. In order to create two groups (treatment and control) of children who were similar in terms of their stage of reading development and their teacher's instructional practice during the school year, children were stratified by their grade level and English language arts classroom and then randomly assigned to receive 10 books during summer vacation (i.e., last week of June to first week of September) or after the administration of posttests in September.

Table 2 displays the baseline characteristics of the treatment and control group children for the full sample and for each grade level. The Elementary Reading Attitude Survey (ERAS, Recreation Subscale) and the Stanford10 reading test (total reading) were administered at pretest, and demographic data on children's sex, ethnicity, and free lunch status were obtained from the district's administrative data files. Overall, there was no significant difference between the treatment and control group on the pretest measures in Grades 1, 2, 3, and 5. Among children in Grade 4, however, the treatment group ($M = 29.41$, $SD = 5.44$) had significantly lower scores on the measure of reading attitudes than the control group ($M = 32.54$, $SD = 5.05$), $t(46) = -2.07$, $p = .044$.

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At posttest, the analytic sample included 279 students who completed both pre and posttest measure of reading achievement. Although 52 students moved during the summer and did not participate in posttests in September 2004, a chi-square analyses revealed no statistically significant relationship between attrition rates and experimental conditions, $\chi^2(1, 331) = .90, p = .34$. As an additional check on internal validity, the baseline reading scores of the treatment and control group students who were excluded from the analyses were also compared. There was no significant difference in the pretest reading scores between children who were lost to attrition in the treatment group ($M = 608.45, SD = 55.60$) and the control group ($M = 615.57, SD = 54.39$), $t(50) = -.46, p = .65$. In the analytic sample, there were a total of 138 children in the treatment group and 141 in the control group who had a pretest and posttest reading score.

Measures

There were two measures administered at pretest (June) and posttest (September). First, to assess treatment effects on reading achievement, the Stanford 10 reading test was administered before and after the experiment. Pretest scores were included as the covariate in analyses of posttest differences in reading achievement between the treatment and control group.

Second, children were administered the Elementary Reading Attitude Survey at pretest and a survey of summer reading activities at posttest. To assess children's reading activities during summer vacation, the posttest survey asked children about (1) the number of books they read in the summer and (2) the frequency with which they engaged in 10 literacy activities at home. Measuring both reading volume (e.g, number of books) and time spent engaged in reading activities is important because the content, length, and complexity of children's books varies considerably across all grades (Guthrie & Greaney, 1991). For example, a fifth grader who reads five books is likely to spend more time engaged in independent reading than a first

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grader who reads the same number of books. In addition, previous research has relied on close-ended items on questionnaires to estimate the number of books children read at home (Donahue, Finnegan, Lutkus, Allen, & Campbell, 2001; Guthrie, Wigfield, Metsala, & Cox, 1999). Thus, obtaining approximate estimates on the number of books read would help validate the study findings with those from other self-reported data on children's reading volume (Chin & Phillips, 2004; Heyns, 1978). Although it was assumed that first- and second-grade children could also answer items on a survey about book reading, there was no reliable data to support this assumption since few studies of voluntary reading have involved younger children (National Reading Panel, 2000). Instead, the posttest survey included the 10 items from the Literacy Habits survey, which has been used in evaluations of summer programs for younger children from kindergarten to third grade (Paris et al., 2004).

Because there was no information on the psychometric quality of the posttest questions on reading activity for children in Grades 1 to 5, it was important to include a reliable pretest covariate that reduced error variance in the posttest measures of reading activity. Therefore, the Elementary Reading Attitude Survey (ERAS) was administered to all students because it has been used in national studies involving children in Grades 1 to 6 and has demonstrated alpha reliability coefficients above .80 (McKenna & Kear, 1990; McKenna, Kear, & Ellsworth, 1995). The analysis of covariance with the ERAS score as the covariate was designed to improve the precision of the estimated treatment effect on the posttest measures of reading activity. Details on each measure are described below.

Stanford Achievement Test, 10th Edition (Total Reading). The Stanford Achievement Test, 10th Edition, was normed in 2002 and designed to yield a reliable measure of general reading ability (reading vocabulary and comprehension). To reduce the administrative burdens

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placed on classroom teachers, the abbreviated battery, which contains a subset of items from the full battery, was administered in June and September of 2004. In June, English language arts teachers in Grades 1 to 5 administered the Stanford Achievement Test (10th Edition), Form A, Primary 1, Primary 2, Primary 3, Intermediate 1, and Intermediate 2. The pretest score was also converted into a Lexile range (+50Lexiles to -100Lexiles) around each student's observed reading score. In September, English language arts teachers in Grades 2 to 6 administered the following levels of the Stanford reading test: Primary 2, Primary 3, Intermediate 1, Intermediate 2, and Intermediate 3. KR-20 reliability coefficients for the total reading score ranged from .90 to .95, and test-retest reliabilities were above .92 in each of the five grades. Since the developmental standard scores were vertically calibrated using IRT (Item Response Theory), they represented an approximately equal interval scale across grades and were used in the ANCOVA of posttest scores.

Elementary Reading Attitude Survey (ERAS). Children's attitude toward recreational reading was assessed using the Elementary Reading Attitude Survey (ERAS) developed by McKenna and Kear (1990). Each item on the ERAS asks how children feel about a specific recreational reading activity (see Appendix 1). Children responded to each question by circling one of four Garfield cats whose facial expressions range from very happy to very unhappy. To create norms for each measure of reading, McKenna and Kear (1990) administered the survey to 18,138 students in Grades 1 to 6 in 95 school districts throughout 38 states and the internal reliability coefficient was .82 for the recreational subscale. For this study, the reliability coefficient for the ERAS (recreation subscale) was .78.

Reading Preferences Survey. Children were also asked to indicate their reading preferences on a 20 item checklist of reading genres, which was based on previous studies of

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children's reading preferences (Ivey & Broaddus, 2001; Monson & Sebesta, 1991; Worthy, 2002) and summaries of each book in the Scholastic Red and Blue Guided Reading Collection. Although the Scholastic Guided Reading collection includes a brief summary of each of the 520 books included in the collection, many of the categories (e.g., "realistic fiction") were too broad to match books to the more specific reading preferences of individual students. Therefore, a team of five English language arts teachers and the school reading teacher created more fine-grained categories and developed 20 codes representing different reading preferences that could be understood by children of different ages. On the reading survey, children were given the prompt, "I like to read books about" and then asked to place a check next to each category of books, including (1) animals, (2) food, (3) counting and telling time, (4) different jobs, (5) arts and crafts, (6) dinosaurs, (7) African-Americans, (8) Asians and Asian-Americans, (9) Latinos and Latino-Americans (Spanish speaking people), (10) Native-Americans, (11) fantasy and science fiction, (12) science, (13) shapes and colors, (14) traveling and transportation, (15) sports and games, (16) fairytales, legends, and folktales, (17) history, wars, and famous people, (18) books about other boys my age, (19) books about other girls my age, and (20) mystery. One representative title from each of the 20 preference categories is listed in the Appendix 2.

Number of Books Read in the Summer. To measure reading amount during summer vacation, the fall reading survey asked children: "During summer vacation, about how many books (picture books and chapter books) did you read at home?" Response options included (1) 0-1 book, (2) 2-3 books, (3) 4-5 books, (4) 6-7 books, (5) 8-9 books, (6) 10 or more books. This question is similar to items on voluntary reading that have appeared in the National Assessment of Educational Progress and studies on reading habits outside school (Cunningham & Stanovich, 1991; Donahue *et al.*, 2001; Guthrie *et al.*, 1999). The mean score for the treatment and control

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group was converted to a more precise estimate of the number of books read during summer vacation, using the following scale: (1.0) = 0-1 book, (1.5) = 1-2 books, (2.0) = 2-3 books, (2.5) = 3-4 books, (3.0) = 4-5 books, (3.5) = 5-6 books, (4.0) = 6-7 books, (4.5) = 7-8 books, (5.0) = 8-9 books, (5.5) = 9-10 books, (6.0) = 10 or more books.

Literacy Habits Survey. To supplement the question on reading volume, children were also administered questions asking how often they engaged in a series of literacy activities at home. The 10 item Literacy Habits Survey (Paris *et al.*, 2004) has been used with beginning readers from kindergarten to third grade in previous studies of summer learning and was administered to all students at posttest. The survey included 10 close-ended questions about literacy related activities at home (e.g., “During summer vacation, how often did you read for fun?”). Children were asked to choose from one of three options: (1) never or hardly ever, (2) about once a week, (3) almost everyday. The 10 item scale ($M = 17.76$, $SD = 4.15$) yielded an internal reliability coefficient of .76 and individual items are listed in Appendix 3.

Book Ownership. The fall survey also included a question about the number of books children reporting owning at the end of the experiment. This question was taken from a family literacy survey used by researchers at Tufts University (T. Katzir-Cohen, personal communication, April 15, 2004) and asked children, “Some homes have 0 books for kids while others have more than 50 books for kids. About how many books for kids do you have in your home?” Response options included (1) 0 to 10 books for kids, (2) 11 to 20 books for kids, (3) 21 to 30 books for kids, (4) 31 to 50 books for kids, and (5) more than 50 books for kids. The response to this question was used to create a binary variable indicating whether or not the child reported owning 0 to 10 books for kids.

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Materials. A total of 520 books from the Scholastic Guided Reading collection were used in the intervention for two reasons. First, this collection of books included a mix of high-interest fiction and non-fiction texts for children in Grades 1 to 6. The diverse collection of books accommodated the wide range of reading levels and interests of the children in the study. Second, there was information on the reading level of each book, which facilitated the matching of books to each child's reading level. In the Guided Reading collection, each book was placed into a holistic reading level based on multiple criteria developed by Fountas and Pinnell (2001). For example, all first-grade books were from the letter A to D collection, whereas fifth-grade books were from Q to W collection. In addition, each book was assigned a Lexile score, which is based on the semantic difficulty (word frequency) and syntactic difficulty (sentence length) of text (Chall & Dale, 1995). One advantage of the Lexile Framework (U. S. Department of Education, 2001) over traditional readability formulas is that texts and readers are placed on a common scale using a Rasch model (Rasch, 1980; Wright & Stone, 1979). Therefore, it is possible to determine whether the text difficulty of the book is within the child's independent reading level (+50 Lexiles to -100 Lexiles around the observed spring reading score).

Procedures

The intervention was carried out in four stages, and a chronology of events is described below.

Administration of Reading Tests. In the first week of June, teachers in Grades 1 to 5 administered the Stanford10 reading test to children during their English language arts period. All teachers received a testing manual and followed directions prescribed by Harcourt. Student scores were returned in the end of June and included a Lexile range for each child's independent reading level.

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Administration of Reading Surveys. In the second week of June, teachers administered the 10 item reading attitudes survey and the 20 item preference survey. Teachers followed scripted directions for administering the Elementary Reading Attitude Survey (part 1), which were taken from McKenna and Kear (1990). Next, teachers explained the directions for the preference survey, which began: “For the next question, you may check more than one answer.” This was followed by the statement “I like to read books about” and then a checklist next to each of the 20 reading categories. To help children understand these categories, teachers showed children a representative title for each category using one of the books from the Scholastic Guided Reading series appropriate to their grade level.

Administration of Reading Lessons. During the last week of school, English language arts teachers conducted one lesson to explain the goals of the study and to show children how to respond to questions on a reading postcard. Teachers introduced the lesson by telling children that they were part of a program in which each child would receive 10 books during the summer or in the fall. In the lesson, teachers read aloud from a picture book, and showed children how to answer three questions on the reading postcard. Children were asked to write down the title of the book and to check either the “yes” or “no” option after each of the following questions: (1) Did you finish reading your new book? (2) Did you like reading this book? (3) Was this book easy to read? Teachers also explained that children would receive a letter reminding them to read their books. Teachers concluded by explaining that the books, postcards, and letters were designed to encourage children to read for fun.

Random Assignment of Students to Experimental Conditions. In the last week of June, children were stratified by their grade and English language arts classroom and then randomly assigned to receive their books, postcards, and letters during the summer or in the fall after the

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completion of posttests. Children in the control group received their books and postcards after the administration of the posttests in late September. Since treatment and control group children were in the same classrooms and encouraged by their teachers to read books, this experiment examined the value-added of giving children free books to read at home during summer vacation. In other words, the only difference between the two groups was that the treatment group received additional resources (i.e., books, reading postcards, and letters to a parent/family member) during summer vacation whereas control students received these materials after fall posttests.

Matching Books to Readers. During the last week of June, data from the spring reading test and reading survey allowed us to match books to children's reading levels and preferences. A database (Microsoft Access) included information on each student's reading preferences and reading levels (Lexile Levels). Children's reading preferences were based on the 20 item spring preference survey and reading levels were based on the Lexile range around each student's observed score on the spring reading test. The database also included information on each of the 520 books in the Scholastic Guided Reading series. In particular, each book was assigned a guided reading level (A to Z), a Lexile level, and a reading category. A two-step algorithm was used to match books to children's preferences and reading levels. This first step identified a subset of books from the 520 Scholastic books that matched each student's reading preferences. In the second step, the algorithm identified books that were (1) within the guided reading level established for each grade (i.e., A to Z), and (2) within each student's independent reading level based on the spring reading score (i.e., +50 Lexiles to -100 Lexiles around the observed spring reading score).

Postcard Data. To check on implementation, children were encouraged by their teachers to return a postcard after reading each book. Although this data is limited because it was collected only for children in the treatment group, it does indicate whether children were able to follow through on the procedures for mailing the postcards back to school. Over 70% of children in each of the five grades returned at least one postcard. As shown in Table 3, children returned an average of five postcards, and the return rates were higher in Grades 1 ($M = 6.19$) and Grade 2 ($M = 7.04$) than in Grade 3 ($M = 4.55$) and Grade 5 ($M = 4.76$). An analysis of variance on the mean number of postcards returned by students revealed a significant difference across grades, $F(4, 133) = 7.685, p < .001$. Pairwise comparisons with Bonferroni adjustments indicated significant differences between the mean for fourth-grade ($M = 2.22$) and each of the other grade levels. There was also no significant difference in the number of postcards returned by low-income ($M = 5.25$) and middle-income ($M = 5.00$) children, $t(136) = .357, n.s.$ The postcard data suggests that most treatment group children were able to follow through on the procedure for returning their postcards.

RESULTS

The data analyses addressed three research questions. First, did the intervention increase voluntary reading of books and literacy activities during summer vacation? Second, did the intervention improve reading achievement? Third, did the intervention increase access to books for low-income children?

Did the intervention increase voluntary reading of books and literacy activities during summer vacation?

Descriptive statistics in Table 4 suggest that the treatment group ($M = 4.72$) reported reading more books during the summer than the control group ($M = 3.45$). Converting the mean from the ordinal scale to an interval scale suggests that the treatment group read 8 to 9 books as

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compared to 5 to 6 books for the control group. Thus, the treatment group reported reading three more books, on average, than the control group. However, there was no difference between the treatment group ($M = 4.0$) and control group ($M = 4.05$) in Grade 4. An ANCOVA of the number of books read in the summer revealed a statistically significant main effect of condition, $F(1, 271) = 38.983, p < .001$, but no interactions between condition and grade, $F(4, 263) = 1.486, n.s.$, nor between condition and free lunch status, $F(1, 269) = .006, n.s.$ An ANCOVA of the Literacy Habits measure revealed a significant main effect of condition, $F(1, 271) = 5.787, p = .017$, but no significant interactions between condition and grade, $F(4, 263) = .126, n.s.$, nor between condition and free lunch status, $F(1, 269) = .155, n.s.$ Results from analyses of fall reading survey data suggested that children in the treatment group reported reading more books and engaging in more literacy related activities than control children.

Did the intervention improve reading achievement?

An ANCOVA of posttest reading scores with pretest reading scores as the covariate revealed no statistically significant treatment effects for condition, $F(1, 276) = .79, p = .36$. Neither the interaction between condition and grade, $F(4, 268) = 1.90, p = .11$, nor the interaction between condition and free lunch status was significant, $F(1, 274) = .11, p = .74$. Table 5 displays pretest and posttest means on the Stanford10 reading tests by grade and free lunch status. Hedge's g index (1985) was computed by taking the difference between the mean of the treatment and control group on the posttest adjusted means divided by the pooled posttest standard deviation. Although there was no significant treatment effect on posttest reading scores, the magnitude of the effect size was smaller in Grade 1 ($ES = -.01$) and Grade 2 ($ES =$

.07) than in Grade 3 ($ES = .13$) and Grade 5 ($ES = .31$). In addition, the effect size in Grade 4 ($ES = -.34$) was atypical of the pattern showing relatively larger treatment effects in the upper elementary grades.

Did the intervention increase access to books for low-income children?

Table 6 shows that low-income children ($M = 2.97$) reported owning significantly fewer books, on average, than middle-income children ($M = 4.15$) at the end of the experiment. In addition, a significantly larger percentage of low-income children reporting owning 0 to 10 books ($M = 18\%$) relative to their middle-income classmates ($M = 3\%$), $t(273) = 2.975$, $p = .004$. Comparison of mean differences between treatment and control groups on the measure of book ownership revealed one significant finding. Among low-income children, 3% of treatment group children reported owning 0 to 10 books relative to 32% of control group children, $t(60) = -3.182$, $p = .003$. These results suggest that the intervention reduced the number of low-income children who reported owning 0 to 10 children's books.

DISCUSSION

The main findings suggest that children who received 10 books, postcards, and letters from their teachers reported reading more books and engaging in more literacy activities than children in the control group. Two findings revealed positive treatment effects on measures of children's reading activity during summer vacation. First, the results suggest that children in the treatment group reported reading three more books, on average, than control children. Second, the treatment group also reported spending more time participating in literacy activities at home, such as reading books and stories at bedtime, than the control group. However, since self-reported data are often unreliable and plagued by social desirability biases, the results from the current study should be compared to other survey research. Two relevant studies provide a basis

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of comparison. In Heyns's (1978) study of summer learning among sixth- and seventh-graders in the Atlanta public schools, parents reported that their children read an average of 5 books in the summer. In a recent ethnographic study of parenting practices (Chin & Phillips, 2004), fourth- and fifth-graders living in an ethnically diverse neighborhood in Los Angeles reported reading an average of nearly 4 books during the summer. In these two studies, self-reported data by parents and students suggest that upper elementary school children may read an average of 4 to 5 books during summer vacation. These figures are similar to the mean number of books that children in this study reported reading in the absence of an intervention. On average, control group children in fifth-grade reported reading between 4 to 5 books and fourth-graders reported reading 5 to 6 books. Overall, these findings suggest that the intervention increased voluntary reading of books during the summer and that self-reported data on reading activities in Grades 4 and 5 are similar to results obtained from other survey research.

Although increased access to books and exposure to print should be expected to improve children's reading achievement, the treatment group performed no better than the control group on a standardized test of reading comprehension. The non-significant treatment effects and the mean effect size of .04 suggest that the intervention did not improve the reading skills of children in Grades 1 to 5. Furthermore, the small effect sizes for Grade 1 ($ES = -.01$) and Grade 2 ($ES = .07$) suggest that beginning readers are unlikely to benefit from a voluntary reading intervention, in which they receive no assistance from teachers, parents, or tutors in decoding unfamiliar words and monitoring their comprehension (Juel, 1996; Stahl, 2004). Among fourth-grade children, there was also no difference between the treatment and control group on the measure of book reading. In addition, the effect size ($ES = -.34$) based on the Stanford reading test favored the control group over the treatment group. These aberrant findings may be related to systematic

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differences in the two groups at the beginning of the experiment. Previous research (Greaney & Hegarty, 1987; Guthrie & Greaney, 1991) suggests that reading attitudes are a significant predictor of the amount of book reading independent of children's sex, reading achievement, and press for leisure reading at home. Thus, the baseline differences in the reading attitudes of the treatment and control group children in fourth-grade underscore the need for a randomization plan that explicitly matches children on both affective and cognitive measures. Given the limited treatment effects and the problems with the fourth-grade sample, this study underscores the need to strengthen the efficacy of voluntary reading interventions and the design of future studies.

Implications for Voluntary Reading Interventions

In the past, voluntary reading programs such as uninterrupted sustained silent reading (USSR) have sought to allocate more instructional time to free reading activities in school or home. Children are usually allowed to self-select books, are encouraged to read silently and independently, and are not evaluated on their comprehension of texts (Brynes, 2000; National Reading Panel, 2000). Simply allocating more time for silent reading, however, does not guarantee that children will engage with texts and comprehend the books they choose to read (Carver & Leibert, 1995; Pearson & Fielding, 1991; Stahl, 2004).

To strengthen the efficacy of voluntary reading programs, teachers could scaffold silent reading activities by instructing children how to use strategies to monitor their comprehension of text (Meichenbaum & Biemiller, 1998; Pressley, 2002; Rosenshine & Meister, 1994). The goal of improving children's engagement with text may be especially relevant in a voluntary reading intervention that combines teacher-directed lessons in the last month of school with student-initiated reading activities during the summer. During classroom lessons, teachers could instruct children to use multiple strategies to deepen their reading comprehension, offer opportunities for

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guided practice with fiction and non-fiction texts, and encourage children to use comprehension strategies while reading books during summer vacation. Providing children with more books and instructing them how to monitor their comprehension of text would nurture engaged readers who read for enjoyment and learning (Baker, Dreher, & Guthrie, 2000; Guthrie & Anderson, 1999; Stahl, 2004). Since some empirical studies suggest that reading gains on standardized tests are larger when teachers combine instruction with independent reading activities than when no instruction is provided (Byrnes, 2000), future research should examine whether scaffolding voluntary book reading activities with comprehension strategy instruction enhances children's reading skills during summer vacation.

Limitations and Future Research

This study has four limitations that should guide future research. First, children's self-reported data on their summer reading activities should be validated with additional measures, including reading diaries and parent surveys. Although it is labor intensive to collect detailed information on the number of minutes children spend reading books, studies based on reading diaries often yield precise estimates of reading amount that are positively and significantly associated with reading growth (Anderson, Wilson, & Fielding, 1988; Guthrie & Greaney, 1991). Collecting diary data on children's leisure reading activities before and after an intervention study would also provide more accurate measures of changes in reading amount that result from efforts to encourage voluntary reading of books (National Reading Panel, 2000). In addition, surveying parents about their children's reading activities during the summer would provide another estimate of leisure reading at home. Research on summer learning has shown that parents' responses to questions about their children's reading activities at home (e.g., the number of books read, time spent reading each day) predict reading growth even after children's

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initial reading skills are statistically controlled (Burkam et al., 2004; Heyns, 1978; Phillips & Chin, 2004). Multiple sources of data would help validate the findings on children's self-reported measures of their reading activities during summer.

Second, summer programs typically yield small effect sizes that cannot be detected with experiments involving small samples. The effect sizes in Grade 3 ($ES = .13$) and Grade 5 ($ES = .31$) are similar in magnitude to the effect size of .16 from experimental studies on remedial summer school programs (Cooper, Charlton, Valentine, & Muhlenbruck, 2000) and provide useful information for a power analysis. The magnitude of these effect sizes suggests that a voluntary reading intervention would have smaller effects on children's reading skills than guided oral reading activities and comprehension strategy instruction, which provide children with more teacher guidance and support (Kuhn & Stahl, 2003; National Reading Panel, 2000; Rosenshine & Meister, 1994). Thus, an experiment would require approximately 500 students and a pretest that is correlated .80 with the posttest to have sufficient power (.80) to detect "small" effect sizes between .10 and .20 standard deviations (Cohen, 1988).

Third, there are methodological and theoretical reasons to conduct a replication study involving children in the upper elementary grades. In planning a replication study based on the initial power calculations, a sample of approximately 500 children could be drawn from Grades 1 to 5 in one large elementary school or from a single grade across multiple school sites. Since a central goal of an applied educational intervention is to enhance external validity, there is a strong rationale for conducting a randomized field trial involving a large number of elementary schools. The key question then becomes: which grade should be sampled from each school? As noted earlier, the smallest effect sizes were observed in Grades 1 and 2. Although it is unclear precisely why the effects were smallest in the early grades, it is clear that younger children are

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“learning to read” (Chall, 1983) and instruction is focused on helping children decode words and read connected text with speed, accuracy, and oral expressiveness. Thus, a voluntary reading intervention that assumes children can independently decode words and read fluently may be developmentally inappropriate for younger children. In this regard, the National Reading Panel (2000) concluded that “independent silent reading is not an effective practice when used as the only type of reading instruction to develop fluency and other reading skills, particularly with students who have not yet developed critical alphabetic and word reading skills” (p. 13). Since the ability to decode words is established among most normally developing third-grade children (Daane, Campbell, Grigg, Goodman, & Oranje, 2005; Fryer & Levitt, 2005), there is a strong rationale for targeting a voluntary reading intervention in Grade 3 and above.

Fourth, if the primary goal of a voluntary reading intervention is to prevent reading loss during summer vacation, future experiments should involve low-income children, minority children, and poor readers. Giving children free books to read is a potentially effective strategy for keeping the learning faucet open for disadvantaged children when schools are closed for summer vacation. Among low-income children in this study, only 3% of the treatment group reported having ten or fewer books at the end of the experiment compared to 32% of the control group. Over time, policies that increase children’s access to books and opportunities to read may have larger positive effects on the reading skills of low-income and minority children. Recent analyses of the Early Childhood Longitudinal Survey (ECLS-Kindergarten Cohort of 1998) indicate that parents of low-income children (Burkam et al., 2004) and Black and Latino children (Fryer & Levitt, 2004) reported owning fewer books than parents of middle-class and White children. Fryer and Levitt’s regression analyses of ECLS-K data suggest that measures of family socioeconomic status and the number of books in a child’s home explain a substantial part of

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achievement gap in reading between White and minority children. If print exposure were increased over multiple summers, the cumulative impact might be larger for low-income and minority children who own fewer books and have fewer opportunities to read at home than middle-class and White children. However, claims about the efficacy of voluntary reading interventions will require evidence from a larger experiment that addresses the instructional and methodological limitations of the current study. Ultimately, findings from this study support an agnostic stance on the effectiveness of voluntary reading interventions and offer guidance for future research.

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Appendix 1

Elementary Reading Attitude Survey (Recreation Subscale)

1. How do you feel when you read a book on a rainy Saturday?
2. How do you feel when you read a book in school during free time?
3. How do you feel about reading for fun at home?
4. How do you feel about getting a book for a present?
5. How do you feel about spending free time reading?
6. How do you feel about starting a new book?
7. How do you feel about reading during summer vacation?
8. How do you feel about reading instead of playing?
9. How do you feel about going to a bookstore?
10. How do you feel about reading different kinds of books?

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Appendix 2

A List of Representative Book Title from Each of the 20 Genres Used to Categorize the 520 Books in the Guided Reading Series

Letter	Color	Book Title	Author	Subject
S	R	Sweet Clara and the Freedom Quilt	Hopkinson, Deborah	African Americans
T	R	Navajo Long Walk	Armstrong, Nancy	American Indians
B	R	Who Lives in the Arctic?	Canizares, Susan and Pamela Chanko	Animals
N	B	How is a Crayon Made?	Charles, Oz	Arts and Crafts
R	B	Jar of Dreams, A	Uchida, Yoshiko	Asians
P	B	Encyclopedia Brown Carries On	Sobol, Donald J.	Boys
F	R	Monster Math Picnic	Maccarone, Grace	Counting / Telling Time
N	B	Dinosaur Named Sue, A: The Find of the Century	Robinson, Fay et al	Dinosaurs
V	B	Harry Potter and the Chamber of Secrets	Rowling, J.K.	Fantasy / Science Fiction
M	R	Cloudy With a Chance of Meatballs	Barrett, Judi	Food
O	R	Hundred Dresses, The	Estes, Eleanor	Girls
O	R	Story of Ruby Bridges, The	Coles, Robert	History / Famous People
V	B	How I Came to Be a Writer	Naylor, Phyllis Reynolds	Jobs
S	B	Salsa Stories	Delacre, Lulu	Latino / Spanish Speaking
O	B	Animal Shelter Mystery, The	Warner, Gertrude Chandler	Mystery
I	B	Sun's Family of Planets, The	Fowler, Allan	Science
E	B	Box Can Be Many Things, A	Rau, Dana Meachen	Shapes / Colors
F	B	Soccer Game!	Maccarone, Grace	Sports
Q	B	American Tall Tales	Osborne, Mary Pope	Tales / Legends
R	B	Lewis and Clark	Sullivan, George	Traveling / Transportation

Appendix 3

Literacy Habits Survey Adapted for Voluntary Summer Reading Intervention

1. During summer vacation, how often did you visit the public library?
2. During summer vacation, how often did you write letters to people?
3. During summer vacation, how often did you write stories or poems at home just for fun?
4. During summer vacation, how often did you read newspapers or magazines?
5. During summer vacation, how often did you read at home for fun?
6. During summer vacation, how often did you play word games like Scrabble or Hangman?
7. During summer vacation, how often did you your parents help you read and write at home?
8. During summer vacation, how often did you read books or stories at bedtime?
9. During summer vacation, how often did you read books?
10. During summer vacation, how often did you help your brothers or sisters (or other relatives like cousins) read and write at home?

Footnotes

¹This assumption seems credible because fewer than 10% of elementary school children attended summer school in the Early Childhood Longitudinal Survey-Kindergarten Cohort of 1998 (ECLS-K). According to Burkham et al. (2004), fewer than 10% of students from low, middle, and high socioeconomic status families attended either a mandatory/required summer school program or a voluntary/optional summer school program. Consequently, most children do not receive formal reading instruction in a school setting during summer vacation.

²The sample also included children whose primary language was neither English nor Spanish. The other languages included the following: Amharic (n=1), Arabic, (n=3), Cambodian (n=1), Chinese (n=1), Hindu (n=1), Korean (n=1), Nepali (n=1), Farsi (n=2), Tagalog (n=2), Telugi (n=1), Thai (n=1), Urdu (n=8), Vietnamese (n=4).

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Table 1

Characteristics of the Children (n = 331) at the Beginning of the Study

Student Characteristics	%
Female	50
White	42
Receives free lunch	23
Primary language is English	68
Primary language is Spanish	23

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TABLE 2

Means and Standard Deviations for the Treatment and Control Group on Pretest

Reading Measures, By Grade Level

Student Characteristics	<i>Treatment</i>		<i>Control</i>		<i>t</i>	<i>n</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
All Grades						
ERAS (Recreation Subscale)	30.29	5.45	30.81	5.20	-0.88	328
Stanford 10 (Total Reading)	54.93	28.59	52.82	28.61	0.67	331
Grade 1						
ERAS (Recreation Subscale)	31.97	5.69	31.20	4.99	0.60	69
Stanford 10 (Total Reading)	54.57	25.20	51.17	25.17	0.56	70
Grade 2						
ERAS (Recreation Subscale)	29.00	6.99	30.63	5.60	-1.00	60
Stanford 10 (Total Reading)	57.18	22.03	50.31	29.43	1.01	60
Grade 3						
ERAS (Recreation Subscale)	30.00	4.53	29.32	5.31	0.59	73
Stanford 10 (Total Reading)	47.58	33.49	47.92	30.93	-0.05	74
Grade 4						
ERAS (Recreation Subscale)	29.41	5.44	32.54	5.05	-2.07*	48
Stanford 10 (Total Reading)	55.30	30.08	49.62	30.51	0.66	49
Grade 5						
ERAS (Recreation Subscale)	30.53	4.54	30.93	4.90	-0.37	78

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Stanford 10 (Total Reading)	60.32	29.83	63.03	26.04	-0.43	78
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Note. ERAS = Elementary Reading Attitude Survey. Stanford 10 reading scores are in National Percentile Ranks. Three children did not complete the ERAS at baseline.

* $p < .05$

TABLE 3

Average Number of Postcards Returned by the Treatment Group, By Grade Level and Free Lunch Status

Student Characteristics	<i>M</i>	<i>SD</i>	<i>n</i>
All Grades	5.06	3.46	138
Grade			
1	6.19	3.36	32
2	7.04	3.17	23
3	4.55	3.48	31
4	2.11	2.16	19
5	4.76	3.13	33
Free Lunch			
No	5.00	3.47	106
Yes	5.25	3.49	32

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TABLE 4

Average Number of Books Read During Summer Vacation by the Treatment and Control Group, By Grade Level and Free Lunch Status

Student Characteristics	Treatment			Control		
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>
All Grades	4.72	1.68	137	3.45	1.89	139
Grade						
1	5.16	1.57	32	3.39	2.06	28
2	5.00	1.54	23	3.64	2.08	22
3	4.77	1.74	30	3.41	1.76	34
4	4.00	1.80	19	4.05	2.06	22
5	4.45	1.68	33	3.00	1.56	33
Free Lunch						
No	4.82	1.64	105	3.56	1.87	108
Yes	4.38	1.79	32	3.03	1.92	31

Note. One student in the treatment group and two students in the control group did not complete this item on the fall reading survey.

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TABLE 5

Means and Standard Deviations for the Pre and Posttest Reading Scores and Effect Sizes,

By Grade Level and Free Lunch Status

Student Characteristics	Treatment		Control		Effect Size
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>Hedge's g</i>
All Grades ^a					
Pretest	618.86	51.06	614.89	53.08	
Posttest	624.54	53.18	618.58	52.82	0.04
Grade 1 ^b					
Pretest	567.81	36.59	558.50	40.37	
Posttest	567.56	41.03	558.82	39.09	-0.01
Grade 2 ^c					
Pretest	605.52	28.71	593.04	38.27	
Posttest	608.48	33.55	593.67	29.06	0.07
Grade 3 ^d					
Pretest	624.06	48.88	616.50	41.25	
Posttest	634.84	41.61	622.38	36.26	0.13
Grade 4 ^e					
Pretest	641.79	38.64	629.55	39.52	
Posttest	642.32	33.14	643.00	43.00	-0.34
Grade 5 ^f					
Pretest	659.58	37.90	667.18	31.76	

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	Posttest	671.06	38.80	667.21	35.87	0.31
Free Lunch (no) ^g						
	Pretest	627.32	49.17	624.36	51.47	
	Posttest	632.98	52.71	628.37	50.66	0.03
Free Lunch (yes) ^h						
	Pretest	590.84	47.72	581.26	44.98	
	Posttest	596.56	45.10	583.84	45.79	0.07

^a n = 279. ^b n = 60. ^c n = 47. ^d n = 65. ^e n = 41. ^f n = 66. ^g n = 216. ^h n = 63.

TABLE 6

Average Number of Books Low- and Middle-Income Children Reported Owning at

Posttest

Survey question (posttest)	<i>Low-Income</i>			<i>Middle-Income</i>			<i>t</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>n</i>		
Mean Number of Books Owned	2.97	1.38	62	4.15	1.10	213	-6.229	0.000

Note. Income level was determined by lunch ticket eligibility.