Summer Reading and the Ethnic Achievement Gap

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Citation: Kim, J.S. (2004). Summer reading and the ethnic achievement gap. *Journal of Education for Students Placed at Risk, 9*(2), 169-188.

ABSTRACT

A number of studies have shown that low-income and minority students undergo larger summer reading losses than their middle-class and White classmates and that reading books is the only activity that is consistently related to summer learning. The purpose of this study was to explore whether reading summer books improved fall reading proficiency and whether access to books increased the volume of summer reading. The results from the multivariate regression analyses suggest that the effect of reading four to five books on fall reading scores is potentially large enough to prevent a decline in reading achievement scores from the spring to the fall. Furthermore, children who reported easy access to books also read more books. The findings have implications for designing school-based summer reading programs and for conducting future experiments that confirm the correlational findings from this study.

INTRODUCTION

Recent empirical work suggests that both descriptions and prescriptions of the achievement gap should focus on summer reading activities. The "faucet theory" (Entwisle, Alexander, & Olson, 2000), for example, suggests that opportunities to learn and access to educational resources are "turned on" for all children during the school year. As a result, learning gains made during the school year are remarkably similar for students from different social and economic backgrounds (Entwisle, Alexander, & Olson, 1997; Heyns, 1978; Murnane, 1975). However, when school is not in session during the extended June to August summer recess, the school resource faucet is "turned off," creating inequalities in educational opportunity and outcomes (Alexander, Entwisle, & Olson, 2001; Cooper, Nye, Charlton, Lindsay, & Greathouse, 1996). Research also suggests that summer learning is most consistently and strongly related to reading as measured by the number of books read and the frequency of leisure reading. In her pioneering work on summer learning in Atlanta, Georgia, Heyns (1978) concluded that "the number of hours spent on any single activity or a combination of activities is only marginally related to background; only reading is related to achievement" (p. 153).

Research on summer reading loss has prompted policymakers to adopt a number of strategies for encouraging children to read independently at home and increasing access to high-quality books. The most common intervention usually involves traditional summer school programs. Such programs focus heavily on the remediation of reading difficulties and the development of reading comprehension skills through a highly prescriptive curriculum and a combination of test and skills books (Roderick, Engel, & Nagaoka, 2003). In general, however, remedial summer programs produce short-term achievement gains that diminish over time (Grossman & Sipe, 1992), and the benefits are often larger for middle-class than low-income

students (Cooper, Charlton, Valentine, & Muhlenbruck, 2000). More recently, a number of states and districts have implemented summer reading programs that rely on prizes and rewards to encourage children to read during summer recess. For instance, in the Connecticut summer reading program, students write down the titles of any books read in a reading journal and schools receive recognition and awards if at least 60% of students turn in a reading journal (Connecticut State Department of Education, 2001). Similarly, the recently adopted No Child Left Behind Summer Reading Achievers program in the Atlanta Public Schools encourages children to read at least 10 books during the summer by rewarding summer readers with a variety of prizes, including free books and certificates of accomplishment (U. S. Department of Education, 2003).

Despite the popularity of summer reading programs, it is unclear how schools can effectively encourage children to read independently at home during summer recess. For example, a recent review of reading programs (National Reading Panel, 2000) intended to encourage leisure reading inside and outside of school concluded: "Despite the widespread acceptance of the idea that schools can successfully encourage students to read more and that these increases in reading practice will be translated into better fluency and higher reading achievement, there is not adequate evidence to sustain this claim" (pp. 3-28 Query: Are these the correct page numbers?). In particular, one study (Carver & Leibert, 1995) in the National Reading Panel's review evaluated a six-week library summer program, which used fast-food coupons to generate motivation to read among 43 students in Grades 3, 4, and 5. Participants were allowed to read easy fiction for two hours each weekday [Query: Is this correct? I guess weekdays, since a 7-day week would add up to 84 hours of reading.] for six weeks for a total of 60 hours of leisure reading. At the end of the program, there was no statistically significant

difference in reading proficiency and vocabulary knowledge between students in the treatment and control group. In general, incentive-based reading programs may also create perverse incentives for children to read only easy books to win prizes and to read books rapidly with little comprehension (McLoyd, 1979; McQuillan, 1997). As a result, a number of studies suggest that increasing access to a variety of interesting reading materials is more likely to encourage children to read outside of school (Krashen, 1993; Neuman, 1999).

This study was undertaken to explore whether reading books in the summer improves fall reading proficiency and whether access to books increases the volume of summer reading. There are three unique characteristics of the study design. First, the multiethnic sample includes low- and middle-income children from all four major ethnic groups (White, Black, Latino, Asian), permitting us to examine interactions between ethnicity and the two major question variables—summer book reading and access to books. The analyses include ethnicity interaction terms because recent research suggests that ethnic group membership is strongly related to academic performance (Steinberg, 1996) and summer learning loss (Phillips & Chin, in press) independent of children's social class and family background. Second, this study relies on data obtained from a survey of summer reading that directly asked students about their summer reading habits during the first week of school. Prior research, on the other hand, has relied on parental surveys of their children's summer experiences several months after the beginning of the school year, possibly undermining the reliability of measures of summer reading (Entwisle et al., 1997; Heyns, 1978; Karweit & Ricciuti, 1997; Phillips & Chin, in press). For example, Heyns (1978) surveyed parents in October, two months after summer vacation, and pointed out that "such responses contain an unknown amount of error, wishful thinking, and sheer conjecture" (pp. 165-166). Third, measures of reading frequency based only on instances when children can identify

the book title are often more valid indicators of book reading than data from close-ended survey questions (Allen, Cipielewski, & Stanovich, 1992; Anderson, Wilson, & Fielding, 1988; Guthrie, McGough, & Wigfield, 1994). Therefore, the measure of book reading relies on actual titles of books, which were identified in an electronic catalogue containing over 900,000 volumes of children's literature.

METHODS

District Context and Procedures for Recruiting Schools

The sample was drawn from 18 ethnically diverse elementary schools in the Lake County Public Schools (LCPS), a large, suburban district located in a mid-Atlantic state. Although there are over 119 elementary schools (K-6) in LCPS, the 18 elementary schools were chosen to yield a sample that was diverse with respect to ethnicity and socioeconomic status. For example, in the 18 schools, the percentage of students receiving free- and reduced-price lunch (i.e., the poverty rate) ranged from a low of 2% to a high of 71%. LCPS recently implemented a summer reading program that requires all rising sixth-grade students to read a book during the summer and provides parents with a recommended summer reading list.[1] To hold students accountable for completing their "summer homework assignment," LCPS requires students to write a story or report about their summer book, and several schools ask parents to sign a form verifying that their child read a book during summer vacation. This summer reading survey was administered,

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Footnotes

[1] LCPS elementary school principals and teachers give students a recommended summer reading list at the end of fifth grade to encourage summer book reading. According to the elementary coordinator of English/Language Arts, a committee of LCPS teachers selected the 130 book titles on the list based on the following inclusion criteria: age appropriate concepts, a balance of fiction and nonfiction, and the availability of multiple paperback copies in the public library. The book list includes traditional children's classics (e.g., *Stuart Little*) as well as several Newbery Award books, which the American Library Association awards to the author who makes the most "distinguished contribution to American literature for children." The reading list is heavily publicized in LCPS, and teachers give all students the list at the end of fifth grade as part of an end-of-year package to be sent home to parents. The purpose of the summer reading list is twofold: to increase the volume of book reading and to guide parents in encouraging their children to read high-quality literature.

in part, to evaluate the effectiveness of the LCPS summer reading program and to explore the broader questions about summer book reading and the ethnic achievement gap.

To make valid generalizations about achievement differences across ethnic groups, strategies must be in place to ensure that a sufficient number of minority and low-income students are sampled (Weinberger, Tublin, Ford, & Feldman, 1990). In the current study, several procedures were used to generate administrators' support, recruit principals, involve teachers, and encourage high student participation. First, I developed administrative support among school officials by speaking at the LCPS Minority Student Achievement Committee meeting, where I discussed the relationship between summer learning and the ethnic achievement gap. Second, I worked closely with two LCPS administrators to make initial contacts with the 18 school principals, and met with school principals twice during summer to explain the purpose of the study and the procedures for administering the survey. Third, I met with teachers one week prior to the administration of the survey in late August to discuss the study goals and the potential benefits of participation, such as the completion of final reports disaggregated for each school and classroom. Other strategies for increasing response rates included the use of parental consent forms with school stationery (Mobers & Piper, 1990). Given the ethnic and linguistic diversity in Lake County, permission slips were translated into Spanish and four other languages to help non-English speaking parents understand the goals of the study. Many of the strategies for obtaining high response rates were effective, since nearly 84% of students received parental consent to participate in the study. Broken down by ethnicity, participation rates were above 80% for Whites (86%), Latinos (84%), and Asians (87%), and somewhat lower for Blacks (70%).

Data and Measures

Data on student achievement scores and student background characteristics were obtained from LCPS administrative files, and the summer reading survey provided information on the volume of summer book reading, access to books, and accountability policies intended to encourage independent reading.

Measure of Reading and Writing Proficiency. To control for prior skill differences in reading and writing, both of these measures were obtained from a criterion-referenced assessment administered to all fifth-grade students in May 2002. The spring reading test includes 42 items that assess a student's ability to use word analysis strategies, to understand printed materials, and to understand the elements of literature. The writing assessment includes both multiple-choice items and a direct writing prompt, which are intended to assess skills in composition, written expression, and language usage and mechanics. Descriptive statistics on the spring assessments were as follows: $M = 460$, $SD = 55$ for reading, and $M = 476$, $SD = 58$ on the writing test.

During the last week of September 2002, Lake County administered the Stanford Achievement Test Series, Ninth Edition (Stanford 9). Fall reading scores are from a 50-item total reading test, including 30 reading comprehension items and 20 reading vocabulary items. The scaled scores on the Stanford 9 total reading assessment ranged from 469 to 798 ($M = 682$, $SD = 37$).

Measures of Student Background Characteristics. The research literature documents consistent differences in reading skill based on gender (Willingham & Cole, 1997), English proficiency (August & Hakuta, 1997), special education status (Koretz & Hamilton, 2000), and ethnicity and socioeconomic status (Donahue, Finnegan, Lutkus, Allen, & Campbell, 2001; Phillips, Crouse, & Ralph, 1998; White, 1982). Therefore, student background characteristics

were used as control variables in subsequent analyses that examined the relationship between summer book reading and fall reading performance. I obtained student-level information on each of these background characteristics and created dummy variables for sex (1 = male, 0 = female), primary home language (1 = English, 0 = not English), special education status (1 = learning disabled or emotionally disabled, 0 = no special education), and receipt of free- and reduced-price lunch (1 = yes, 0 = no). Finally, the categorical codes for ethnicity identified whether a student was White, Black, Latino, or Asian.

Measures of Summer Book Reading. In addition to prior reading proficiency and student background characteristics, the summer reading survey was administered to gather additional information on children's reading attitude and summer reading activities. The survey included an item related to reading attitude adapted from McKenna's Elementary Reading Attitude Survey (ERAS) (McKenna, Kear, & Ellsworth, 1995). Students were asked to respond to the statement, "I read books during summer vacation because I like to read." Students were asked to choose from one of the following options: 4 = yes, yes (strongly agree), 3 = yes (agree), 2 = no (disagree), and 1 = no, no (strongly disagree).

Students were asked an open-ended question about the quantity of summer book reading: "What are the titles of some books you read during summer vacation? You can list up to 5 titles." Each of these book titles was also entered into the Lake County Public Library database developed by the SIRSI Corporation. The electronic catalogue includes 964,865 volumes of juvenile and young adult fiction and non-fiction.[2] If the book title appeared in the database, it was counted as part of a continuous variable ranging from 0 books to 5 books. The continuous

[2] Lake County Public Library's FY 02 materials inventory indicated ownership of 359,554 volumes of juvenile nonfiction, 548,293 volumes of juvenile fiction, and 14,627 volumes of juvenile reference materials. It also indicates 1,025 copies of young adult nonfiction, 41,366 copies of young adult fiction.

variable was also re-coded into one of three categories, including heavy-readers (4-5 books), moderate-readers (2-3 books), and light-readers (0-1 book).

In July of 2002, I conducted focus groups with students in fourth and sixth grade to develop questions related to book access. During these discussions, students indicated that they usually found books to read in their homes, their local public library, and the local bookstore. These findings were in line with international surveys showing that skilled readers usually had easy access to books in the home, public libraries, and bookstores, and school than children in developing countries (Elley, 2001). Hence, students were asked to assess three statements: (a) "It's easy for me to find books to read at home during summer vacation," (b) "It's easy for me to go to the library during summer vacation," and (c) "It's easy for me to buy books to read during summer vacation." To assess attitudes about each statement, students were allowed to choose from one of the following options: 4 = yes, yes (strongly agree), 3 = yes (agree), 2 = no (disagree), and 1 = no, no (strongly disagree). In August 2002, these questions were field-tested during a pilot administration with two sixth-grade classrooms to determine whether students chose extreme answers (e.g., "yes, yes," or "no, no"), a problem associated with surveys of younger children (Riley et al., 2001). The responses were evenly distributed across the four choices, indicating that students were able to distinguish among the four options. Results from the three questions were summed to create a single measure of children's access to books, ranging from 3 to 12 (M = 8.38, SD = 2.07). The 12-point composite measure of book access was used to create three categories, including a group for low-access (3-6 score), medium-access (7-9 score), and high-access (10-12 score). Finally, to assess the LCPS accountability policy for encouraging summer book reading, a close-ended question asked whether students wrote a story

or report about their summer book (1 = yes, 0 = no) or obtained a parental signature for reading a summer book (1 = yes, 0 = no).

Descriptive Statistics

As illustrated in Figure 1, the ethnically diverse sample includes 970 White students (58%), 177 Black students (10.5%), 221 Latino students (13.1%), and 319 Asian students (18.9%). There are several background differences across the four ethnic groups. Virtually all White students speak English at home, and fewer than 5% qualify for free- and reduced-price lunch; however, by comparison, nearly half of all Black students [Query: Could you insert the actual % here and following?] and slightly over half of Latino students (%) receive a meal subsidy. And, not surprisingly, fewer than half of Latino (%) and Asian students (%) count English as their primary home language. These figures suggest that a much larger percentage of minority students, especially Black and Latino students, are economically disadvantaged than White students, suggesting that ethnicity may be related to summer reading independent of socioeconomic status.

[Insert Figure 1 here]

Figure 2 displays the average test scores on the spring reading and writing assessment and the fall reading assessment by ethnic group membership. Since different scales underlie the spring and fall assessments, scaled scores were converted to z-scores with a mean of 0 and a standard deviation of 1. As can be seen in the first three bars, the average scores for Whites on all three assessments are about one-fourth to one third of a standard deviation unit (*SD*=??) above the mean. For Black and Latino students, mean z-scores are nearly one half of a standard

deviation (*SD*=??) lower than the mean on all three assessments, whereas the mean scores for Asians are near the average (*SD*=??) for all test-takers. Although the ethnic differences on the spring and fall tests appear large, the magnitude of the ethnic gap between White and minority students are similar to those observed on the National Assessment of Educational Progress (Donahue et al., 2001).

[Insert Figure 2 here]

As shown in Figure 3, there are an equal percentage of light-, moderate-, and heavy-readers among White students; a slightly higher proportion of light-readers than moderate- and heavy-readers among Black and Latino students; and a substantially larger proportion of heavy-readers than light- or moderate-readers among Asian students. To the extent that book reading develops comprehension and vocabulary skills, it appears that a larger fraction of Asian students benefit from increased summer reading.

[Insert Figure 3 here]

Figure 4 depicts some similarities and differences across the four ethnic groups. First, it is important to note that nearly half of all students in each of the four ethnic groups reported medium-access to summer books. Furthermore, close to one third of White (%), Black (%), and Asian (%) students reported that it was easy to find books at home and the public library or to purchase books at the bookstore. However, a larger percentage of Latino students (28%) found it difficult to find books to read during the summer. These descriptive statistics underscore

findings from prior research, which suggests that access to literacy materials may be a greater obstacle to Latino students due in part to economic and linguistic barriers (Ferguson, 2002; Madrigal, Cubillas, Yaden, Tam, & Brassell, 1999).

[Insert Figure 4 here]

Figure 5 shows the percentage of students who wrote a story/report about their summer book or obtained a parental signature verifying they had a read a book during summer vacation. Fewer than half of all students (%) and a substantially smaller fraction of minority students (%) completed either follow-up activity. While these accountability policies represent a simple, cost-effective strategy for encouraging summer reading, their effect on summer book reading are limited given the low rate of follow-through among most students.

[Insert Figure 5 here]

Data Analysis

Since the descriptive analyses revealed ethnic differences in student background and summer reading, I fit a series of ordinary least squares (OLS) models to explore two questions in greater depth: First, is there a relationship between fall reading scores and the number of books read during summer vacation? Second, is there a relationship between reading volume and access to books? The multivariate regression analyses allow us to isolate the relationship between the main question variables and the outcome, controlling for student background characteristics. Each regression analysis includes OLS models with main effects and ethnicity interaction

variables, which explore whether the effects of summer reading and access to books differ across ethnic groups. As part of the data analytic plan, I also performed diagnostics to check the assumptions underlying each OLS model and to assess the inter-correlations among the independent variables.[3] Indeed, since my analyses are based on non-experimental data, high correlations among the independent variables (i.e., multicollinearity) may produce large standard errors and imprecise estimates of the parameter estimates in the linear model (Lewis-Beck, 1980). Therefore, I identified those parameter estimates with a square root of the variation inflation factors (VIF) greater than 2, which usually indicates high multicollinearity and problems in estimating precise standard errors (Kleinbaum, Kupper, & Muller, 1998). Each table of results includes the parameter estimate and the standard error as well as the square root of the variance inflation factor.

RESULTS

(1) Is there a relationship between summer book reading and fall reading scores, controlling for student background characteristics? Does this relationship depend on ethnicity?

Table 1 displays the results of two OLS models that examined the impact of summer book reading on fall reading performance, holding constant student background characteristics. To begin, there is a positive and statistically significant relationship between spring reading and writing scores and fall reading scores. Several other background variables, however, are negatively associated with fall scores. Controlling for other variables in the model, students who do not speak English at home have lower scores than English-speakers (B = -4.21, t = -2.81, p <.01); students with learning and emotional disabilities have lower scores than regular education

[3] The residual analyses examine whether the residuals were normally distributed, homoscedastic, and independent (Hoaglin, Mosteller, & Tukey, 1983). For each OLS model, the scatterplot of the studentized residuals by the fall predicted fall scores display random and equal scatter of the points around the zero line for the residuals. In other words, there was no systematic pattern in the residual plot.

students (B = -14.63, t = -6.43, p < .0001); and students receiving free- and reduced-price lunch have lower scores than their middle-income classmates (B = -6.65, t = -3.47, p < .0001). Among the ethnicity variables, only Black students have statistically significantly [Query: Is this phrasing correct?] lower fall reading scores, on average, than White students (B = -9.53, t = -4.46, p < .0001). Furthermore, the coefficient for Black is larger than the other measures of disadvantaged student status except special education status. Finally, reading attitude is positively and statistically significantly associated with fall reading scores (B = 4.28, t = 6.30, p < .001). The final coefficient in column 1 includes the main effect of summer book reading on fall reading performance. The statistically significant coefficient for books read (B = .96, t = 2.50) suggests that reading one book is positively associated with a 1-point improvement on fall reading scores. The second column presents results from the second OLS model, including interaction terms for ethnicity and books read. None of these ethnicity interaction terms are statistically significant, suggesting that the positive relationship between summer book reading and fall reading scores is similar across all ethnic groups. Given the R-square statistic of .65, both models explain a substantial proportion of the variability in fall reading scores.

[Insert Table 1 here]

Understanding the magnitude of the effect of book reading on fall reading scores is also possible by comparing the standardized mean difference in reading scores between (1) heavy-readers and moderate-readers and (2) heavy-readers and light-readers. The last two rows in Table 2 suggest that heavy-readers had fall reading scores that are, on average, 4.49 points higher than moderate-readers and 2.57 points higher than light-readers, holding constant all other

background characteristics. These regression coefficients, however, are not easy to interpret like effect size metrics, which express mean differences in standard deviation units. One can compute effect size estimates by dividing each regression coefficient by the standard deviation on the fall reading test (37 scaled-score points). This simple calculation yields a standardized mean difference of .12 between heavy-readers and moderate-readers and .07 between heavy-readers and light-readers. Although these effect sizes appear small by conventional social science standards (Cohen, 1988), the magnitude of the difference between heavy- and light-readers is similar to effect sizes obtained from meta-analyses of Title I (Borman & D'Agostino, 1996) and a number of popular educational interventions (Light, 1983; Mayer & Peterson, 1999).

[Insert Table 2 here]

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2. Is there a relationship between access to books and summer book reading, controlling for student background characteristics? Does this relationship depend on ethnicity?

Table 3 presents the results from two multivariate regression analyses that explored the relationship between access to books and summer book reading. Among the student background variables, only two variables are positively and significantly associated with book reading. Controlling for other factors, Asian students read more books, on average, than White students, and reading attitude is positively related to summer book reading. Furthermore, book access exerts a positive and significant effect on summer book reading independent of other student characteristics. The coefficient for access to books suggests that a one-unit increase on the 12-point access scale would be positively associated with a .14 increase in book-reading. In other words, a 7-point increase on the access scale would imply a one-book increase in the volume of summer reading. The second OLS model includes ethnicity interaction terms, which are listed in

the final three rows. The Black by Access coefficient suggests that the relationship between access to books and the volume of reading is steeper for Black students than for White students. This finding has important implications since it implies that increasing access to books in the summer may benefit Black students more than White students. However, this finding should be interpreted with extreme caution, since the square root of the variance inflation factor associated with the standard error estimate for each ethnicity by access interaction term is larger than 2, suggesting high multicollinearity among the independent variables.

[Insert Table 3 here]

From a policy perspective, it is useful to understand the magnitude of the difference in book reading among students who reported low-, medium-, and high-access to summer reading materials. To do this, a subsequent regression analysis included two dummy variables, which explored differences in book reading between students who reported (1) high-access and low-access to books and (2) high-access and medium-access to books. As shown in the bottom two rows of Table 4, the negative and statistically significant coefficient for low-access suggests that there is nearly a one-book difference between students who reported low- and high-access to summer books, all other things being equal. The difference between students who reported medium- and high-access is still negative and statistically significant, but the magnitude of the difference in books read is smaller (B = -.51, t = 3.27, $p < .001$). Although these results strongly suggest positive effects of book access on book reading, the results are merely correlational and additional experiments are needed to determine whether increased access to summer books *causes* students to read more.

[Insert Table 4 here]

The final OLS models in Table 5 explore whether two LCPS accountability policies were positively related to the volume of summer book reading. The regression coefficients for each accountability policy suggest that students who fulfilled teacher requirements by writing about their summer book or obtained a parental signature are predicted to read more books than their classmates who did not complete these activities. Moreover, these relationships are robust across models with ethnicity interaction terms (not shown). These findings have implications for the design of summer reading programs, since policymakers have relied on prizes and rewards rather than accountability mechanisms to encourage children to read. In other words, it appears that students may read more during the summer if teachers and parents hold them responsible for doing so.

[Insert Table 5 here]

DISCUSSION

In this study of summer reading and the ethnic achievement gap, I administered a survey to over 1,600 students in a multiethnic suburban district to explore the relationship between (1) summer book reading and fall reading performance, and (2) access to reading materials and the volume of summer book reading. The main findings corroborate much prior work on summer reading loss, suggest some school policies for increasing summer reading, and highlight future research needs.

Similar to prior research summer learning by Heyns (1978), Entwisle, Alexander, and Olson (1997), and Phillips and Chin (in press), I found that the volume of summer book reading was positively related to fall reading achievement independent of prior reading and writing skills and student background characteristics. This finding also underscores a prominent line of work by reading researchers who have demonstrated strong and consistent links between reading books and gains in reading proficiency during the elementary grades (Anderson et al., 1988; Cunningham & Stanovich, 1998; Greaney, 1980). The benefits of reading books during summer vacation were also consistent for all ethnic groups. In particular, reading 4 to 5 books had significantly larger effects than reading 3 or fewer books. The magnitude of the difference in fall reading scores between heavy-readers (4-5 books) and light-readers (0-1 book) was computed by dividing the coefficient for light-readers by the standard deviation of the fall reading test. Although this is a very preliminary attempt to estimate the possible impact of summer book reading on fall reading performance, the effect size of .12 is potentially large enough to prevent summer reading loss, since a prior meta-analysis of summer learning loss (Cooper et al., 1996) suggested that fall reading scores are, on average, .10 standard deviations lower than spring reading scores. In other words, summer reading programs that motivate children to read independently at home represent a potentially cost-effective strategy for preventing reading loss.

The second set of analyses revealed that access to books was positively associated with the volume of summer book reading independent of student background characteristics. Since my measure of access was based on three questions that asked children whether it was easy to find books at home and the public library, and whether it was easy to buy books, the results have several policy implications. For instance, extending hours at local public libraries and opening school libraries might be a first step toward improving access to books during summer recess.

There is also a need to increase book ownership among low-income and minority families, given the large disparity in home reading materials based on socioeconomic status and ethnicity (Ferguson, 2002).[4] Toward this end, private foundations can play a key role in purchasing literacy materials for low-income families and the neighborhood institutions that serve disadvantaged children (Neuman, 1999). Efforts to increase book ownership among disadvantaged families, such as "Reading is Fundamental" (RIF), can also help to narrow the disparity in book ownership and possibly increase the number of books children actually read. Moreover, my analyses provide some tentative evidence that increasing access to books may have larger effects on the number of books Black children read, although this finding is confounded by a number of factors.

If summer book reading can prevent summer reading loss, and if increased access to books promotes summer book reading, how can schools encourage children to read independently at home? There are several possible strategies suggested by prior research and the current findings. Recent analyses of the Prospects study of Title I (Phillips & Chin, in press) found that first-grade students made larger summer reading gains if their teachers encouraged them to extend their learning by doing projects, writing reports, and publishing their writing. Based on these findings, Phillips and Chin assert that "rewarding teachers for sending an activity-based, shortened 'summer curriculum' home with children and parents on the last day of school might be a relatively inexpensive way to help summer drop-off among disadvantaged students" (p. 22). Indeed, my results suggest that schools can encourage children to read more by also requiring them to complete a short writing activity based on their summer reading activities or having parents monitor their children's summer reading. Moreover, there are

[4] Ferguson (2002) surveyed over 40,000 students in 15 multiethnic suburban districts and found that 79% of White students reported having at least 100 books in their home compared to 40% of Blacks, 29% of Latinos, and 47% of Asian.

several examples of summer reading programs that rely on teachers to encourage students to read and write throughout the summer. For example, teachers in one Title I school located in Greenwich, Connecticut, developed "summer reading packets" to reverse the "summer dip" (Baron, 1999). Teachers subsequently mailed books to children and asked them to respond to the books they read on postcards, which were then mailed back to the teachers. Similarly, Title I teachers in Columbia, Missouri, developed a "Summer Reading Pals" program (Borduin & Cooper, 1997). During the last weeks of school, teachers assessed children's text reading level and administered an interest survey to guide the selection of appropriately difficult and interesting books. Every other week during summer recess, teachers kept in touch with students by mailing books and writing personal notes to encourage students to read, and students were asked to complete a writing activity and then mail their responses back to their teacher. By the end of the summer, each student had an opportunity to read between 12 to 14 books. Using Title I federal funds, the program cost $50 per child for books and $25 per child for postage to mail the books and letters. Teachers administered the same reading assessment at the beginning of the new school year and found that all participants maintained or improved their reading skills. These small-scale summer reading programs underscore the central role teachers play in providing students with access to a diverse and appealing collection of reading materials, and encouraging students to read and write throughout the summer.

Despite the promising study findings, the correlational nature of my analyses prevent us from making causal inferences about the effects of summer book reading on reading skills and the impact of access to books on reading volume. One way, of course, to obtain more clear-cut evidence about the effectiveness of summer reading is to conduct an experiment, in which students are randomly assigned to a summer reading program and an alternative program such as

traditional summer school. Experimental evidence would supply researchers and policymakers with a more credible estimate of the impact of book reading on fall achievement and verify my non-experimental results. Based on prior research and my findings, an experimental study might fruitfully explore whether students who receive free books and teacher encouragement to read throughout the summer actually read more books and perform better on measures of reading proficiency than students assigned to a traditional summer school program. Results from an experimental study would produce evidence on the most cost-effective strategies for preventing summer reading loss. Such a study is certainly needed to confirm the promising yet preliminary findings from the current study.

ACKNOWLEDGMENTS

I wish to thank Professor Frederick Mosteller for providing extensive guidance and critical feedback on the preparation of this manuscript. This study was funded by a grant from the Andrew W. Mellon Foundation to the Center for Evaluation at the American Academy of Arts and Sciences in support of its program, *Initiatives for Children*. The views and opinions expressed in this paper are solely those of the author.

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Figure 1

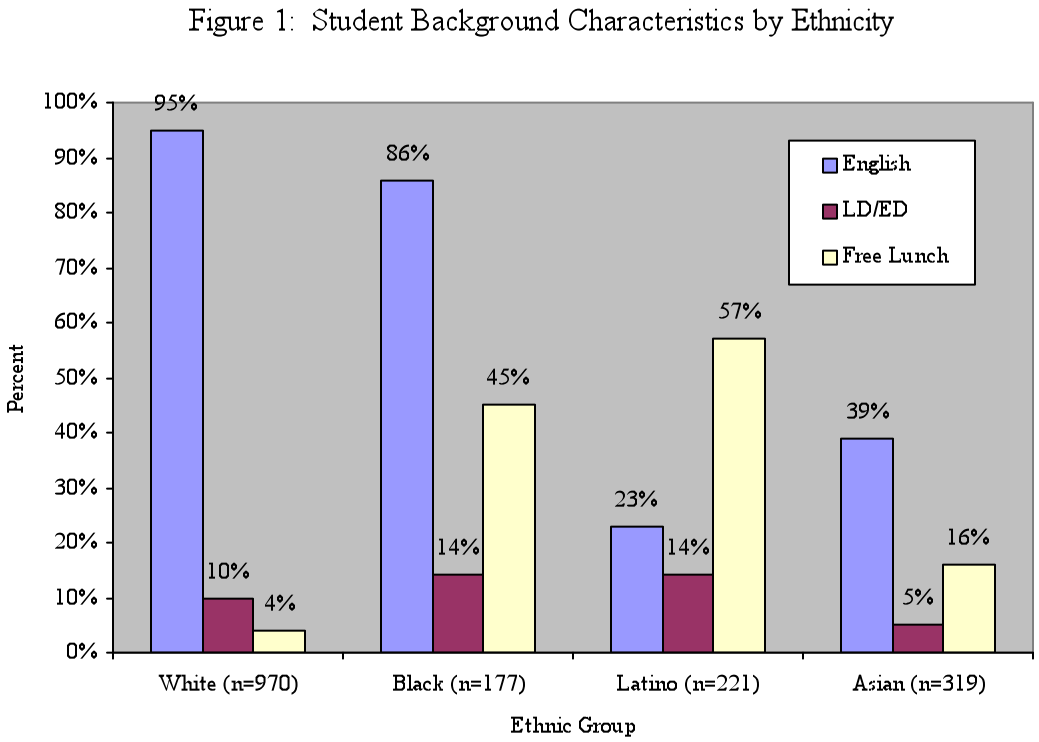
Figure 1: Student Background Characteristics by Ethnicity
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percent
95%
10%
4%
86%
14%
45%
23%
14%
57%
39%
5%
16%
English
LD/ED
Free Lunch
White (n=970)
Black (n=177)
Latino (n=221)
Asian (n=319)
Ethnic Group

Figure 2

Figure 2: Mean Achievement Test Scores (z-scores) by Ethnicity

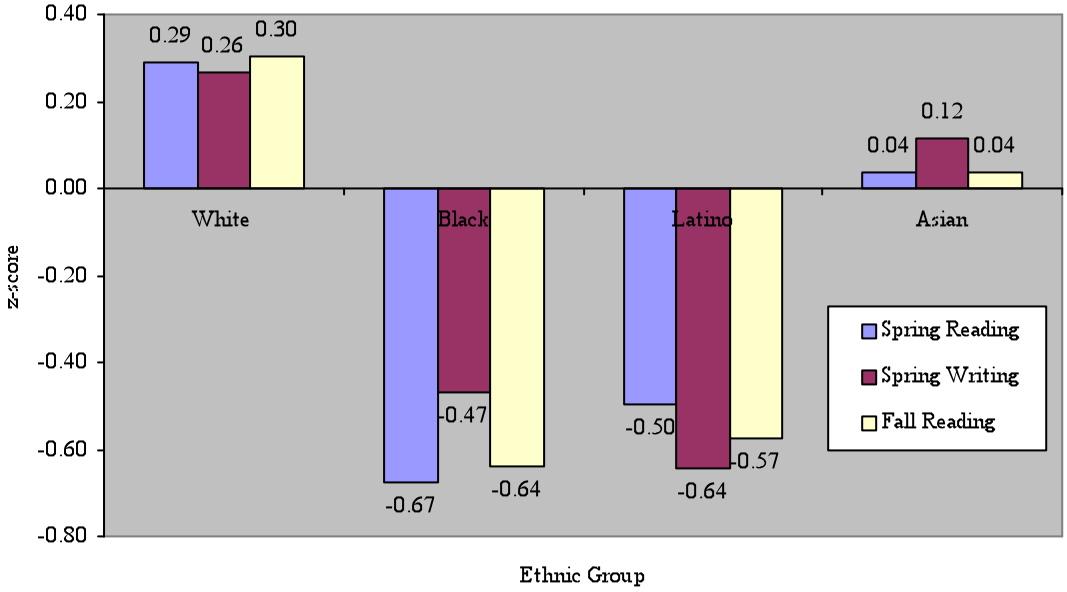

Figure 3

Figure 3: Percentage of Light-Readers (0-1 Book), Moderate Readers (2-3 Books), and Heavy-Readers (4-5 Books) by Ethnicity

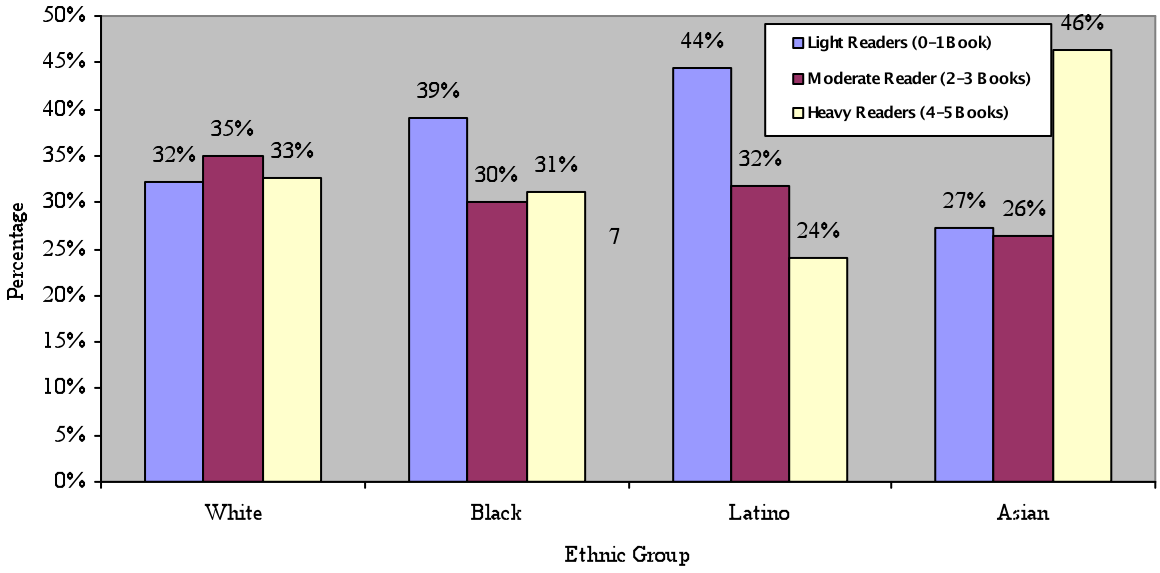

Figure 4

Figure 4: Percentage of Students Reporting Low-Access (3-6), Medium-Access (7-9), and High-Access (10-12) to Summer Books by Ethnicity

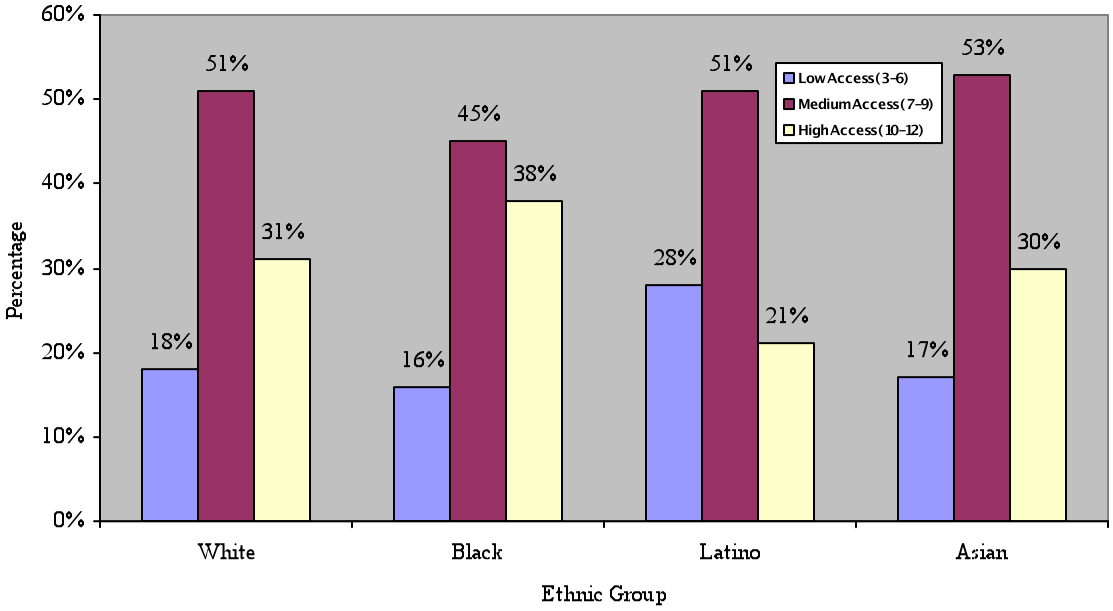

Figure 5

Figure 5: Percentage of Students Writing Story/Report and Obtaining Parental Signature for Summer Book

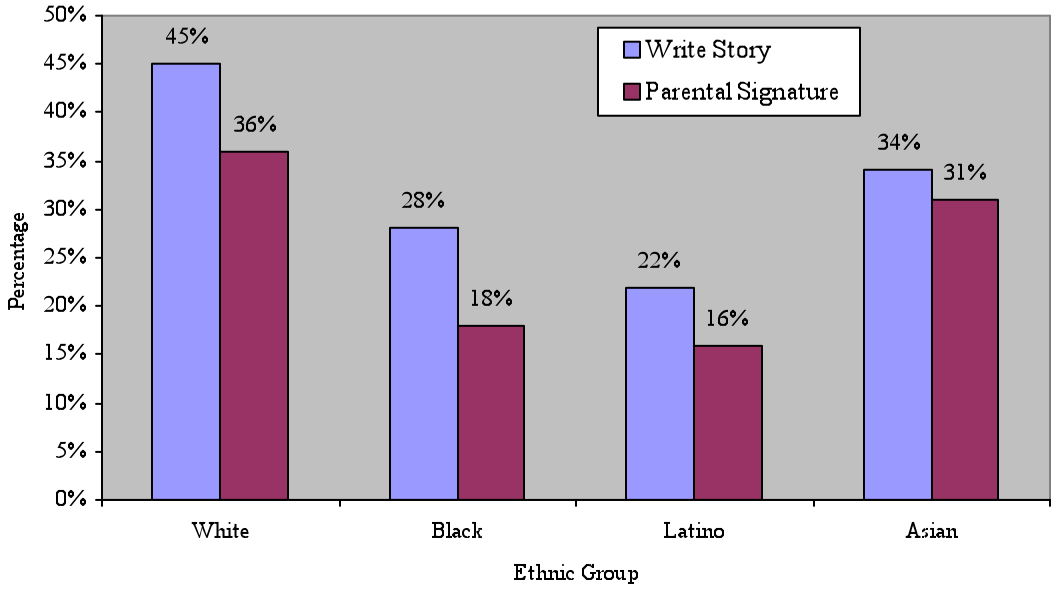

TABLE 1

Multivariate Analysis of Fall Reading and Volume of Book Reading

Variables	*Main Effect*	*Sqrt (VIF)*	*Interaction Terms*	*Sqrt(VIF)*
(Constant)	456.42		455.90	
	(6.87)***		(6.93)***	
Reading (Spring)	0.30	1.35	0.30	1.35
	(.01)***		(.01)***	
Writing (Spring)	0.16	1.42	0.16	1.42
	(.01)***		(.01)***	
Student's Primary Language (Not English)	-4.21	1.40	-4.17	1.40
	(1.93)*		(1.94)*	
Learning Disabled/Emotionally Disabled	-14.63	1.09	-14.81	1.09
	(2.28)***		(2.28)***	
Free- and Reduced-Price Lunch	-6.65	1.24	-6.69	1.24
	(1.92)***		(1.92)***	
Black	-9.53	1.13	-6.56	1.82
	(2.14)***		(3.45)~	
Latino	-3.55	1.33	-0.68	1.85
	(2.37)		(3.31)	
Asian	-1.69	1.23	-1.99	2.09
	(1.85)		(3.16)	
Sex	2.34	1.04	2.42	1.04
	(1.20)~		(1.20)*	
Reading Attitude	4.28	1.13	4.30	1.13
	(.68)***		(.68)***	
Books Read (Listed Title, SIRSI Catalog)	0.96	1.16	1.25	1.46
			(.48)*	
Black * Books Read (Listed Titles)			-1.22	1.78
			(1.10)	
Latino * Books Read (Listed Titles)			-1.37	1.64
			(1.09)	
Asian * Books Read (Listed Titles)			0.04	2.11
			(.88)	
F-statistic	246.42**		193.75**	
R-square	0.65		0.65	

Standard errors in parentheses. Note: ~p < .10, *p < .05, **p < .01, ***p < .001

TABLE 2
Multivariate Analysis Comparing the Impact of Book Reading Between
Heavy-Readers and Moderate-Readers/Light-Readers

Variables	*Main Effect*	*Sqrt (VIF)*
(Constant)	461.68	
	(7.34)***	
Reading (Spring)	0.30	1.36
	(.01)***	
Writing (Spring)	0.16	1.42
	(.01)***	
Student's Primary Language (Not English)	-4.25	1.40
	(1.93)*	
Learning Disabled/Emotionally Disabled	-14.67	1.09
	(2.28)***	
Free- and Reduced-Price Lunch	-6.62	1.24
	(1.92)***	
Black	-9.61	1.13
	(2.14)***	
Latino	-3.63	1.33
	(2.37)	
Asian	-1.75	1.23
	(1.85)	
Sex	2.38	1.04
	(1.20)*	
Reading Attitude	4.22	1.13
	(.68)***	
Books Read 0-1	-4.49	1.31
	(1.62)**	
Books Read 2-3	-2.57	1.19
	(1.47)~	
F-statistic	226.09***	
R-square	0.65	

Standard errors in parentheses. Note: ~p < .10, *p < .05, **p < .01, ***p < .001

TABLE 3
Multivariate Analysis of Reading Volume and Access to Books

Variables	*Main Effect*	*Sqrt (VIF)*	*Interaction Terms*	*Sqrt (VIF)*
(Constant)	-2.98		-2.75	
	(.47)***		(.48)***	
Reading (Spring)	0.0005	1.35	0.0006	1.36
	(.0009)		(.0009)	
Writing (Spring)	0.0054	1.40	0.0054	1.41
	(.0009)***		(.0009)***	
Student's Primary Language (Not English)	0.16	1.40	0.15	1.40
	(.13)		(.13)	
Learning Disabled/Emotionally Disabled	-0.10	1.09	-0.12	1.09
	(.15)		(.15)	
Free- and Reduced-Price Lunch	-0.09	1.24	-0.10	1.24
	(.13)		(.13)	
Black	0.19	1.13	-1.23	4.61
	(.14)		(.58)*	
Latino	-0.06	1.33	-0.03	4.03
	(.16)		(.48)	
Asian	0.37	1.22	-0.34	4.68
	(.12)**		(.47)	
Sex	-0.25	1.03	-0.25	1.03
	(.08)**		(.08)**	
Reading Attitude	0.54	1.21	0.54	1.21
	(.05)***		(.05)***	
Access to Books	0.14	1.19	0.11	1.47
	(.02)***		(.03)***	
Black * Access			0.16	4.65
			(.07)*	
Latino * Access			-0.01	3.90
			(.06)	
Asian * Access			0.08	4.66
			(.05)	
F-statistic	50.25***		40.21***	
R-squared	0.27		0.28	

Standard errors in parentheses. Note: ~p < .10, *p < .05, **p < .01, ***p < .001

TABLE 4
Multivariate Analysis Comparing the Impact of Book Access on Summer Reading

	Main Effect	*Sqrt (VIF)*
(Constant)	-1.53	
Reading (Spring)	0.0004	1.36
	(.0009)	
Writing (Spring)	0.0056	1.40
	(.0009)***	
Student's Primary Language (Not English)	0.15	1.40
	(.13)	
Learning Disabled/Emotionally Disabled	-0.11	1.09
	(.15)	
Free- and Reduced-Price Lunch	-0.10	1.24
	(.13)	
Black	0.23	1.13
	(.14)	
Latino	-0.07	1.33
	(.16)	
Asian	0.38	1.22
	(.12)**	
Sex	-0.25	1.03
	(.08)**	
Reading Attitude	0.60	1.15
	(.05)***	
Low Access (3-6 Score)	-0.89	1.98
	(.20)***	
Medium Access (7-9 Score)	-0.51	1.86
	(.17)**	
F-statistic	44.74***	
R-squared	0.27	

Standard errors in parentheses. Note: ~p < .10, *p < .05, **p < .01, ***p < .001

TABLE 5

Multivariate Analysis of Reading Volume and Writing About Summer Book/Obtaining Parent Signature

Variables	*Main Effect*	*Sqrt (VIF)*	*Main Effect*	*Sqrt (VIF)*
(Constant)	-2.49		-2.53	
	(.46)***		(.46)***	
Reading (Spring)	0.0005	1.35	0.0004	1.35
	(.0009)		(.0009)	
Writing (Spring)	0.0055	1.40	0.0058	1.40
	(.0009)***		(.0009)***	
Student's Primary Language (Not English)	0.17	1.40	0.17	1.40
	(.13)		(.13)	
Learning Disabled/Emotionally Disabled	-0.09	1.09	-0.11	1.09
	(.15)		(.15)	
Free- and Reduced-Price Lunch	-0.04	1.24	-0.07	1.24
	(.13)		(.13)	
Black	0.28	1.13	0.33	1.13
	(.14)*		(.14)*	
Latino	-0.08	1.33	-0.05	1.34
	(.16)		(.16)	
Asian	0.40	1.23	0.39	1.23
	(.12)**		(.12)**	
Sex	-0.25	1.03	-0.28	1.03
	(.08)**		(.08)***	
Reading Attitude	0.69	1.04	0.67	1.04
	(.04)***		(.04)***	
Wrote Story/Report	0.37	1.02		
	(.08)***			
Parental Signature			0.47	1.02
			(.08)***	
F-statistic	48.44***		38.71***	
R-squared	0.26		0.27	

Standard errors in parentheses. Note: ~p < .10, *p < .05, **p < .01, ***p < .001, ns-p>.10