Abstract Title Page
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Title: A meta-analysis of K-8 summer reading interventions: The role of socioeconomic status in explaining variation in treatment effects

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Abstract Body

Limit 4 pages single-spaced.

Background / Context:

According to the recent administrations of the National Assessment of Education Progress (NAEP) reading test, low-income children score approximately three-fourths of a standard deviation lower, on average, than middle- and upper-income children in fourth- and eighth-grade (National Center for Education Statistics, 2007). Although there are many underlying causes of income-based disparities in reading achievement, social scientists have shown that low-income children tend to fall behind their economically disadvantaged peers during the summer months (Cooper, Nye, Charlton, Lindsay, & Greathouse, 1996; Entwisle, Alexander, & Olson, 2000). For example, in a meta-analysis that examined the impact of summer vacation on fall test scores, Cooper and his colleagues (1996) found that low-income children underwent larger summer losses in reading comprehension (d = -.27) than middle-income children (d = -.14).

Why do low-income children appear to lose more ground in reading achievement during the summer months? To address this question, social scientists have focused on inequalities in children's opportunities to read and to learn at home during the summer. Numerous empirical studies indicate low-income and working-class families own fewer books and spend less time discussing books with their parents than children from middle-income families (Burkam, Ready, Lee, & LoGerfo, 2004; Entwisle, Alexander, & Olson, 2000; Lareau, 1989). Given limited opportunities to read and discuss books at home, many low-income children are at-risk of falling behind in reading during summer vacation. To address this problem, several recent summer reading interventions have focused on providing children with more books and scaffolding reading experiences at home during the summer months. Although some of these home-based summer reading intervention studies have generated positive findings, no study has pooled results from these interventions to date. Thus, little is known about the overall effectiveness of school- and home-based summer reading interventions.

Purpose / Objective / Research Question / Focus of Study:

Since the publication of Cooper et al's (2000) comprehensive meta-analysis of summer school, there has been an increasing interest in understanding the impact of summer reading interventions on student outcomes. There are two major reasons why an updated review of summer reading interventions is needed. First, Cooper et al. (2000) underscored the major design flaws in previous evaluations of summer schools. In their review, they concluded that the "ambiguity associated with a lack of random assignment is the single greatest threat to the conclusions we have drawn from the summer school database" (p. 103). In our review, therefore, we included experimental and quasi-experimental studies with high internal validity and excluded single group pre-post evaluations, which were included in Cooper et al.'s (2000) meta-analysis of summer school.

Second, the enactment of the No Child Left Behind Act of 2001 encouraged policymakers to implement supplemental educational services after school and during the school to help close achievement disparities. Many of these services take place in children's home settings. In addition, since the publication of the 2000 National Reading Panel report, researchers have designed and implemented scaffolded summer reading interventions that are designed to increase children's access to books and promote effective independent use of comprehension strategies. Given these policy innovations, we hypothesized that the research literature would include more recent and rigorous evaluations of summer literacy interventions

that are both school- and home-based and that focus explicitly on improving reading achievement.

The purpose of this meta-analytic review is twofold. First, we estimate the impact of K-8 summer literacy interventions on reading achievement. We measure reading achievement using a composite outcome and specific measures of word reading and fluency, vocabulary, and comprehension. Second, we examine the moderating role of the socioeconomic characteristics of the sample on a composite reading outcome and reading comprehension. Although there is a growing literature on the negative impact of summer vacation on low-income children's reading achievement, little is known about the moderating role of children's socioeconomic status on the effects of interventions. This review updates a comprehensive meta-analysis of summer school (Cooper et al., 2000) and also extends prior work by including interventions that take place in the home setting.

Key construct definitions. Summer literacy interventions are designed to improve children's reading achievement through academic tasks that are implemented in home or school settings during summer vacation (McCombs et al., 2011). According to the RAND Research Reading Group's heuristic for reading comprehension, comprehension is shaped by the characteristics of readers, texts, activities, and the sociocultural context. Summer literacy interventions are typically focused on remediating the skills of K-8 students or preventing reading loss among low-income children, using texts tied to school curricula or using popular tradebooks that are selected by children or matched to children's interests.

In addition, summer reading interventions can take place in either school or home settings. In a comprehensive meta-analysis of summer school programs, Cooper et al. (2000) noted that most summer school programs are designed to remediate academic weaknesses in the core subjects of reading or mathematics. More recently, researchers and policymakers have also designed and implemented more cost-effective home-based summer literacy interventions (Allington et al., 2010). Home-based literacy interventions often encourage children to engage in independent book reading activities during the summer months. Some home-based summer literacy interventions also scaffold home book-reading with teacher or parent – scaffolded activities (White & Kim, 2008).

Research Questions:

We are still in the process of coding all the studies that will be included in our meta-analytic review. Our preliminary analysis is based on 27 experimental and quasi-experimental studies. For the 2010 conference, we will finish coding all the studies and update our results.

Our goal in this proposal is to address three related research questions: (1) What is the impact of summer literacy interventions on a composite (aggregate) measure of reading achievement and measures of word reading (decoding and oral reading fluency), vocabulary, and comprehension? (2) Does the type of summer intervention—school-based and home-based—moderate treatment effects? (3) Does the socioeconomic status of the sample moderate the effects of school-based interventions on reading comprehension?

Research Design:

Meta-analysis. The goal of meta-analysis is to combine the results of independent studies and to identify potential study-level moderators that explain variability in treatment effects (Cooper, 2010). To conduct a meta-analysis, each study-level treatment effect must be converted to a standardized mean difference, or, effect size. In this study, we computed Cohen's *d* for each study (i.e., the difference between the treatment and control group divided by the pooled standard deviation). We used a shifting unit of analysis to ensure that effect sizes were

independent. Thus, for the reading composite measure, we created a mean reading outcome for each study by aggregating effect sizes within each study. For the analyses involving specific reading measures, we used the one effect size per study that was motivated by the research question.

Data Collection and Analysis:

Inclusion Criteria. Because our primary goal was to assess the causal impact of summer literacy interventions on student outcome measures, we included only experimental or quasi-experimental studies. In addition, we sought to determine whether certain program elements tend to have greater impact on students' reading achievement. As such, we were open to studying a diverse set of summer programs offered in a variety of settings. We include studies of organized programs that 1) took place over the summer vacation, and 2) served K-8 students. These criteria encompass (a) *traditional summer reading interventions in settings outside children's homes*, including public school districts, programs run by nonprofits in community centers, or by public libraries, and (b) *home-based summer reading interventions* that provide learning resources to students for use in the home.

We did not search for studies on learning programs taking place during the intersession of a year-round, or "balanced," school year calendar for two reasons: 1) the nine-month school calendar is more common than the balanced school year calendar, and 2) while much research documents that students' achievement scores decline over summer vacation, the research base on the academic effects of a balanced school calendar is less conclusive (Cooper, Valentine, Charlton, & Melson, 2003). We excluded early childhood and high school programs because these programs tend to have different goals compared to K-8 programs.

Literature Review. In June 2011, we began our literature search using three strategies: 1) searching electronic databases and targeted internet sites, 2) reviewing relevant reference lists, and 3) soliciting research reports from targeted states and school districts. We restricted all searches to studies published after August 1998 because this was the final month included in Cooper et al.'s literature search for their 2000 meta-analysis.

Electronic Database and Internet Searches. We searched the electronic databases of Academic Search Premier, Education Abstracts, ERIC, PsycINFO, EconLit, and ProQuest Dissertations and Theses. Our searches contained two sets of key words or phrases; the first set was designed to identify studies that met our programmatic inclusion criteria ("summer program*," "summer school*," "summer reading," "summer literacy," "summer enrichment," "summer remedia*," "summer instruction*," "summer education*," "summer learning") and the second set was designed to narrow the results to studies more likely to meet our methodological inclusion criteria ("*experiment*," "control*," "regression discontinuity," "compared," "comparison," "field trial*," "effect size," "evaluation"). These searches yielded 1691 results, which we exported to Refworks for review and elimination of duplicates. We also searched the public online databases of Child Trends LINKS, What Works Clearinghouse, and the Harvard Family Research Project's Out-of-School Time Database. We then read each study's abstract and downloaded the complete study when appropriate. To date, 27 studies have been coded and included in this preliminary analysis.

Coding Studies. In our preliminary analysis, we developed a protocol to code each study for design (randomized experiments or quasi-experimental designs), sample characteristics (more than 50% low-income), intervention characteristics (school- or home-based summer reading interventions), and effect size characteristics (word reading = decoding and oral fluency, vocabulary, reading comprehension, and composite reading).

Findings / Results:

Statistical analyses. We made an a priori decision to employ a random effects model in analyzing the data. Because summer reading interventions vary along a number of dimensions and because we were interested in making inferences back to the population of studies from which our studies were sampled, we used a random effects model to pool effect sizes. The random effects model includes both a within-study weight (inverse of the study variance) and a between study-variance component. We also conducted moderator analyses to examine whether a study-level characteristic was associated with variability in effect sizes.

Combined effects for total reading composite, word reading, vocabulary, and comprehension. Our preliminary analysis consisted of 27 experimental or quasi-experimental evaluations of summer reading interventions. The grand study-level mean on the reading composite measure was .045 (CI = .028, .132), which was statistically significant. The Q-statistic of 44.14 ($p < .01$) was also significant and the I-squared value of 41% indicated low to moderate heterogeneity among effect sizes. Inspection of specific outcomes indicated a statistically significant and positive mean effect size for word reading, $d = .178$ (CI = .061, .295) and the Q-statistic allowed us to reject the null hypothesis of homogenous effects $Q_{23} = 39.98$, p < .05). Similarly, the effect size for reading comprehension was also positive, $d = .27$ (CI = .087, .453). The Q-statistic of 55.19 ($k = 14$) and I-squared statistic of 75% indicated moderate to high heterogeneity in effect sizes. On the basis of these findings and a priori hypotheses about the diversity of summer literacy interventions, we conducted moderator analyses to identify study-level characteristics that explained the variability in reading comprehension effect sizes.

Moderator variables for reading comprehension. First, the socioeconomic status of the children in the summer reading interventions was a significant moderator of effects on reading comprehension. Samples with more than 50% low-income children yielded a larger mean effect size, $d = .409$ (CI = .173, .646), than samples with a mix of income levels, $d = -.062$, (CI = -.256, .133), $Q_b(k = 1) = 5.17$, $p < .05$. Second, we found no differences in mean effect sizes for home-based interventions, $d = .255$ (CI = -.03, .54), and school-based interventions, $d = .289$ (CI=.035, .543), $Q_b(k = 1) = .03$, n.s.

We also conducted separate analyses for school-based and home-based summer reading interventions. There were too few studies to examine whether socioeconomic status moderate effects in home-based programs. However, for school-based programs, studies with more than 50% low-income children yielded a larger mean effect size, $d = .53$ (CI = .161, .905), than studies with samples that had a mix of income levels, $d = -.062$ (CI = -.256, .133), $Q_b(k = 1) = 5.23$, $p < .05$.

Conclusions:

Although the findings from this meta-analysis are preliminary, they provide suggestive evidence that summer reading interventions can improve K-8 students' reading achievement, both in word reading and comprehension. The results also indicate that studies with a majority of low-income children yielded greater benefits on measures of reading comprehension than studies with socioeconomically mixed samples. In particular, school-based summer reading interventions generated significantly larger gains for studies with mostly low-income children. In our final analysis, we hope to extend this preliminary analysis in two ways. First, we will test the robustness of this finding by expanding the pool of coded studies and, and second, we will probe whether study design explains variation in treatment effects.

Appendices

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Appendix A. References

References are to be in APA version 6 format.

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Appendix B. Tables and Figures

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