Children's Access to Print Material and Education-Related Outcomes

Findings From a Meta-Analytic Review

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LEARNING POINT Associates®

Children's Access to Print Material and Education-Related Outcomes: Findings From a Meta-Analytic Review

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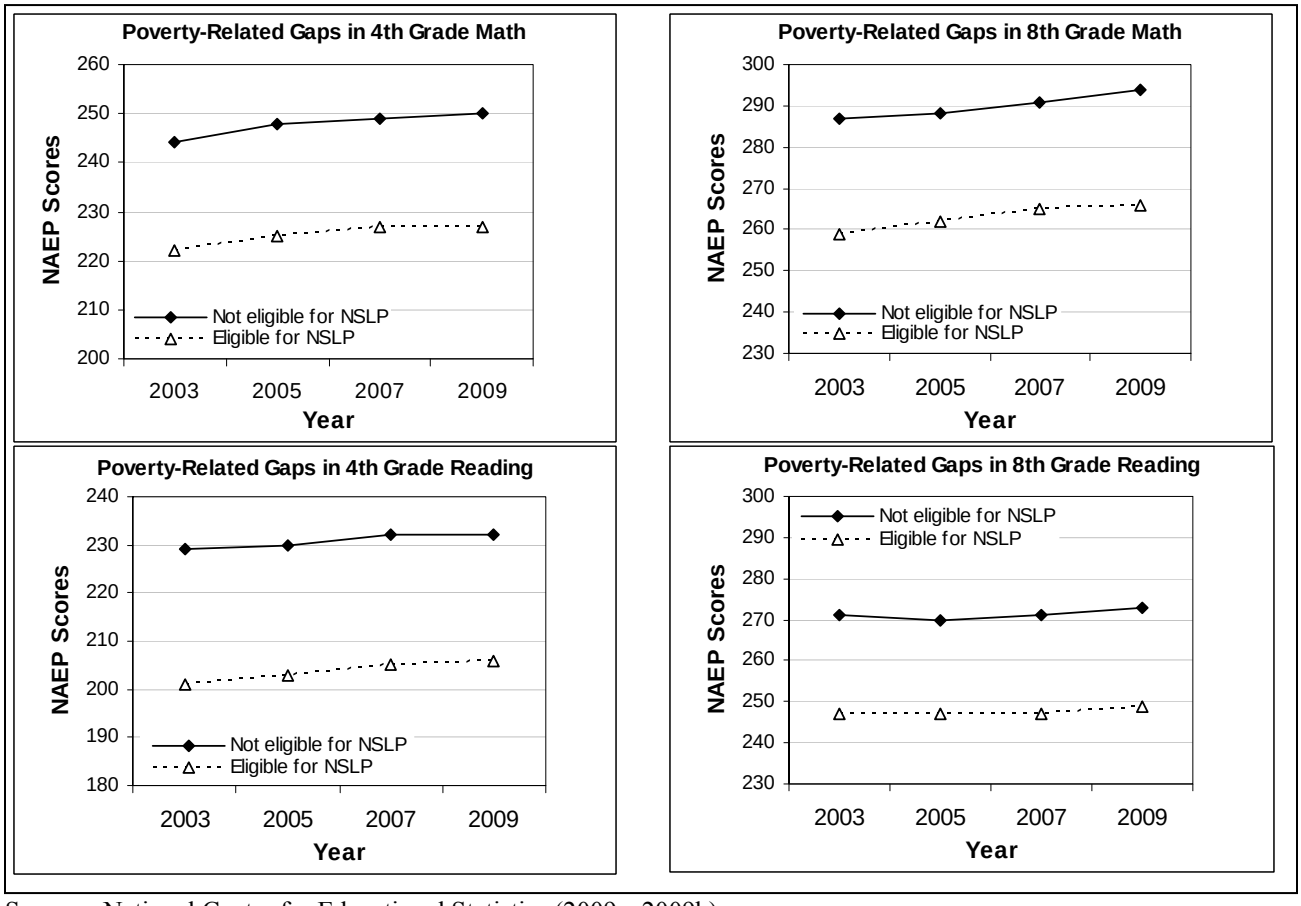
Section I: Introduction

One major emphasis of federal education policy since 2001 has been the effort to reduce and eliminate gaps in academic achievement among children of different racial/ethnic groups and children of families of different economic strata. The No Child Left Behind (NCLB) Act requires states to administer standards-based achievement tests to school children and to monitor students' performance on those tests, including the gaps in performance between racial, ethnic, and socioeconomic groups. Schools also are required to work to reduce and eliminate the achievement gaps, or they will face a series of corrective actions.

Data from the National Assessment of Educational Progress (NAEP) have continued to display gaps in achievement between various racial/ethnic groups and between students of different income levels (National Center for Educational Statistics, 2009a, 2009b). Examining the nationwide NAEP averages among students not eligible for free lunch and students who are eligible for free lunch (i.e., between children from middle-income families and children from low-income families) shows gaps of 24 to 31 points on mathematics and reading for Grades 4 and 8 students (see Figure 1).

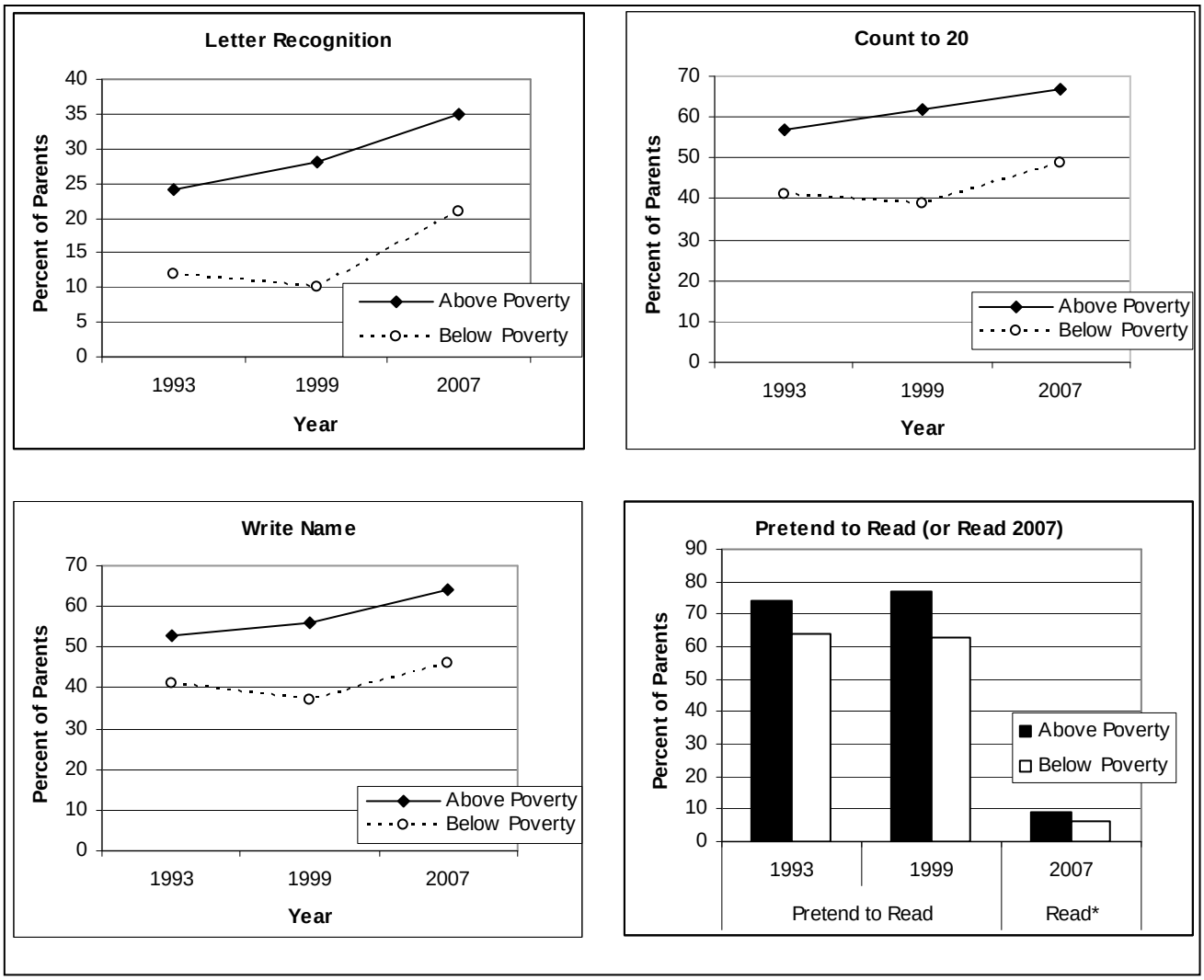
Figure 1. Income-Related Gaps in Achievement on NAEP, 2003–09



Sources: National Center for Educational Statistics (2009a, 2009b).
Note: NSLP, National School Lunch Program (provides free and reduced-priced lunches to children of families within lower income levels).

Although structural issues within the school system may be exacerbating achievement gaps by not providing sufficient support to children from low-income families (e.g., shortages of qualified teachers in low-income urban areas, lower tax base to support schools in impoverished areas), other national data suggest that children from lower income households actually *enter* kindergarten at a disadvantage. The National Household and Education Survey (NHES)—a nationally representative survey of households—asks parents of children ages 3–6 whether their child is able to do certain school readiness-related activities. Data from these surveys in 1990, 1993, and 2007 (years in which the questions were included) indicate that children from poorer families are less able to recognize their letters, count to 20, write their name, or read or pretend to read a book (see Figure 2).

Figure 2. School Readiness Skills Reported by Parents of Children Ages 3–6: Above Poverty Threshold and Below Poverty Threshold



Sources: Child Trends Databank (n.d.); Nord, Lennon, & Liu (2000); O'Donnell (2008).

Thus, as noted by Ryan, Fauth, and Brooks-Gunn (2006), "Young children are particularly vulnerable to the effects of deprivation, and the impacts can last through young adulthood" (p. 323).

What accounts for differences in school readiness among children of lower and higher income families? One contributing factor may involve the amount and types of interactions caregivers have with their preschool children, especially caregivers' reading to their children. This speculation is based on a growing body of research that suggests that caregivers who read to their preschool children help to provide their children with better vocabulary skills, more background knowledge, better expressive and receptive language abilities, and stronger phonological awareness (Bus, van Ijzendoorn, & Pellegrini, 1995; Scarborough & Dobrich, 1994).

Not only do NAEP and NHES data suggest that less affluent children are less likely to demonstrate academic performance at the level of their more affluent peers, but several studies suggest that less affluent children have access to fewer books and other reading materials. Studies by Allington, Guice, Baker, Michaelson, and Li (1995); Neuman and Celano (2001); Di Loreto and Tse (1999); and Smith, Constantino, and Krashen (1996) all have demonstrated that children from poorer families have fewer books in their homes, have fewer books available in the school and classroom library, and live farther from public libraries than do children raised by middle- and upper-income families.

These lines of research, taken together, form the premises of a logical argument (Krashen, 1993, 2004):

- Children from less affluent families do not perform as well on achievement tests compared with children of more affluent families.
- These gaps related to families' socioeconomic status are present even before children enter school.
- Reading to young children is related to stronger subsequent academic achievement.
- Children in low-income families have access to fewer reading materials than children of middle- and upper-income families.

The conclusion of the argument: One possible remedy to the socioeconomic gaps in academic achievement is to make sure that children of low-income families have access to high-quality, age-appropriate books. Having books can facilitate children's reading and shared reading between children and their caregivers.

In response to the circumstantial argument and some well-documented studies noting income-related achievement gaps and structural issues in the education system (e.g., Coleman et al., 1966), policymakers at the national, state, and local levels have allocated funds to programs designed to increase access to high-quality, age-appropriate reading materials for children of low-income families. Among the types of programs that receive such funds are bookmobiles, programs that support building more local libraries, programs for improving school and classroom libraries, and programs for the distribution of free children's books to children of low-income families.

As compelling as the argument favoring increased access to reading materials to children of low-income families may be, in the current policy environment, policymakers need more direct evidence that budgetary support for these programs is actually making an impact on children. The project described in this report provides an objective analysis of the research evidence on the relationship between children's access to print material and various outcomes. Specifically, the project is designed to address the following questions:

1. When examining all research studies conducted on the relationship between access to print material and various children's outcomes, what is the overall effect size for these relationships?
2. Do the studies designed to examine *causal* relationships between access to print material and children's outcomes show positive effects (i.e., do effects for experimental and quasi-experimental studies favor increasing children's access to print material)?
3. Do studies examining programs that facilitate children's ownership of print material in particular (as opposed to programs supporting the lending of reading materials to children) show impacts on various behavioral, educational, and psychological outcomes?
4. Finally, do certain characteristics of studies (e.g., research designs used, types of samples of children, types of programs, types of outcomes) relate to the strength of the relationships between access to print materials and children's outcomes?

Reading Is Fundamental (RIF), a nonprofit organization that receives federal funding to distribute books to low-income children, has contracted with Learning Point Associates to conduct an objective and rigorous research synthesis on the impact of print access on children's attitudes, motivations, reading behaviors, emergent literacy skills, and academic achievement. Findings from this synthesis may serve two functions: (1) provide information to policymakers regarding probable impacts of the Inexpensive Book Distribution Program (federal funding stream for RIF) and (2) provide RIF with information regarding target populations best served by these programs and program characteristics that produce the greatest impact.

This research synthesis project has three distinguishing features: (1) it includes a near exhaustive search for studies conducted on the issue of children's access to print material (including book distribution) and children's outcomes; (2) it includes valid statistical procedures for combining research findings from numerous studies into overall index of strength of the relationships (i.e., meta-analytic techniques); and (3) it incorporates the coding of study features to allow Learning Point Associates researchers to examine program, design, and sample characteristics related to effects.

Overall Summary of Findings

To date, this near exhaustive literature search has uncovered 11,616 potentially relevant research reports. Through a process of removing duplicates and screening out reports based on relevance to the topic, inclusion of primary research findings and suitability of reports' research designs to examine relationships between children's access to print and outcomes, the research team has identified and obtained 108 reports that included findings that could be meta-analyzed.

One subset of these 108 reports comprises those that examine the impact of *giving* print materials (i.e., books, magazines, or photocopies of books) directly to children to own. Such programs are most like RIF's biggest program, its "Books for Ownership" program. Reports of such studies are referred to here as *reports on programs that facilitate children's ownership of print material*. The literature search has uncovered 27 such reports.

Characteristics of reports, interventions, designs, samples, and outcomes were coded by two coders (one half of the reports were double-coded). Fifty-eight different types of outcomes were found within the studies. To simplify analyses, these outcomes were grouped into the following eight broader categories: attitudes toward reading, motivation to read, reading behavior, basic language abilities, emergent literacy skills, reading performance, writing performance, and general academic achievement (achievement on subjects other than reading and mathematics or broader indicators of academic achievement).

Findings presented in this meta-analytic research synthesis indicate that children's access to print material is positively *related* to each of the eight types of outcomes. Average weighted effect sizes for each outcome category were all within the "medium" range specified by Cohen (1988) (i.e., effect sizes all fell between $d = .20$ and $d = .80$), and none of the corresponding confidence intervals included the value of $d = 0$.

Focused analyses of just those reports that include studies using designs that allow causal inference show that, in general, making interesting print material available to children yields positive outcomes. However, this general impact does not extend to all categories of outcomes. Medium-sized positive impacts were found for attitudes towards reading, reading behavior, emergent literacy skills, and reading performance. Average impacts for motivation to read, basic language abilities, and writing performance were near zero. Impacts for general academic achievement could not be estimated because only one report of a rigorous study presented an impact finding.

The extensive literature search did identify several reports containing evaluations of RIF programs and processes; however, those reports tended to be more than 30 years old, unpublished, and no longer obtainable. Nor did the literature search find reports on non-RIF programs that shared the features of RIF's book ownership programs. However, 27 reports of studies that did include the distribution of books or other types of reading material (e.g., magazines) to children were obtained. The meta-analysis of findings from those reports show mixed findings. Across all eight types of outcomes, a medium-sized positive effect was evident. However, effects varied by type of outcome. A small effect (effect size less than .20 standard deviations) was found for basic language skills. Medium effect sizes were found for attitudes toward reading, reading behavior, emergent literacy skills, and reading achievement. A large effect size was found for motivation to read. The effect size for writing performance was near zero, and too few effects were found for general academic achievement (just one effect) to draw reliable conclusions. Readers are cautioned from generalizing these results to all book distribution programs, because many of the interventions included in these analyses included other types of programming in addition to the distribution of print materials.

Organization of This Report

Section II of this report provides the general overview and methodology for the project, including description of the process for identifying and locating potentially relevant research reports, the process for double screening reports based on abstracts and full-text copies of reports, the process for coding reports that met inclusion guidelines, and the general strategy for analyzing the collective findings from the reports. Many of the technical details for meta-analytic procedures are relegated to appendixes. Section III presents general descriptions of the types of reports that emerged following the literature search and screening process. Section IV presents the meta-analytic findings. The final section (Section V) addresses the original research questions with the meta-analytic findings and provides guidelines for interpretation of findings.

Section II: Project Overview and Methodology

Learning Point Associates, in consultation with RIF leaders, developed a project methodology that is rigorous and systematic. That methodology enabled the research synthesis team to estimate the overall relationship between children's access to print material and outcomes, to estimate impacts of programs designed to increase children's access to books (e.g., programs that facilitate children's ownership of print material), and to examine factors related to program impact. That methodology is described in this section of the report.

Within this section, the process used to search for relevant research reports will be described. This process involved the traditional approach (using literature databases) and less traditional approaches (seeking unpublished reports from scholars most familiar with this line of work). The double screening of report abstracts and full-text copies of reports also is outlined in this section.

This project included an examination of potential factors that might moderate the relationships between children's access to print/book distribution and outcomes. These potentially moderating factors are listed and defined in this section. Project team members were trained to code the relevant and empirical reports on these factors, and the process for coding of reports is described here.

This methodology section includes a general overview of the meta-analytic procedures employed to address the research questions using data from the relevant reports. Sufficient information is provided in this section to interpret findings presented in Section IV; however, most of the technical details and equations can be found in Appendix A.

Defining Types of Research Reports Included in This Review

For this research synthesis project, any primary research report that examined children's contact with print material and possible behavioral, educational, or psychological outcomes were considered "relevant."[1] However, to be included in this research synthesis, these reports also had to describe an *empirical* study involving children's access to print material and outcomes and present empirical findings from that study. That is, reports had to be "relevant" and "empirical."[2] Thus, according to the definition of "relevant" used for this research synthesis, reports considered "relevant" included studies of children age 0 through age 18 (i.e., newborn children through high school students). Reports of studies of adults, college students, or adults learning to

[1] A report of primary research is defined as a report that describes in detail the research methodology, the research sample, and findings. In instances where reports mention other research studies or reports, these cited studies or reports are considered "secondary." The report that cites these other studies would not be included in this research synthesis unless it also presents results of primary research. For those reports that just summarize findings from other studies/reports, Learning Point Associates' project team made every effort to obtain the primary research reports cited.

[2] The judgments of "relevant" and "empirical" represent initial screening criteria for reports to be included in this synthesis. As will be described later, secondary considerations also were included to exclude studies. These secondary considerations included whether the research design used in studies was sufficient for examining the print access-outcome relationship and whether research findings from the report were sufficient to calculate effect sizes.

read in a second language were excluded from this review, even though the cognitive mechanisms underlying the influence of print material on outcomes may be the same as with children.

Exclusion of "nonempirical" reports meant excluding policy briefs that recommend provision of books to children and other "research summaries" that describe studies conducted by researchers on the subject. However, if these policy briefs or research summaries cited primary research studies, Learning Point Associates' research synthesis team attempted to retrieve the cited reports of primary research.

A relatively broad pool of research reports result when this definition is applied. This domain of inquiry includes reports of national and international studies that tested children's reading abilities and asked the children (or their parents) to estimate the number of books they have at home (e.g., Myrberg & Rosén, 2008; White & Dewitz, 1996). Also included are studies that examine the influence of book lending programs, such as classroom libraries, school libraries or public libraries, and "book bag" programs (programs usually sponsored by schools that send "fun books" home with children—often to facilitate "shared reading" with parents—with the expectation that books are to be returned and exchanged for others). Reports of programs that provide reading material to children to own also are included in this broad area of inquiry.

The subset of reports that examine programs that *give* (rather than *lend*) reading materials to children represent a "special focus area of inquiry" for this project, because such programs are most similar RIF's *Books for Ownership* program. These reports are referred to within this report as *programs that facilitate children's ownership of print material*. Unlike the interim report for this project, the phrase "book distribution programs" is no longer used to describe these reports, because the programs can provide other types of print material (e.g., magazines, photocopies of books) and because few of the programs provide print material to children but exclude other type of literacy-related activities. This distinction will be important when interpreting findings from this meta-analytic research synthesis.

Sources for Research Reports

Learning Point Associates' research team attempted to find *every* report written on the subject of access to print material and children's outcomes, regardless of whether it is found in a peer-reviewed journal, a book, a government report, conference proceedings, or the file drawers of researchers. Accordingly, the search for reports includes the following sources: (1) databases of research literature using carefully designed search strings, (2) reference checks of reports obtained through database searches, and (3) personal requests made to researchers who may have done studies on this subject.

Databases Containing Citations and Abstracts of Research Reports

Searching literature databases for relevant research reports on this subject involved the following steps: (1) identifying potentially relevant databases, (2) creating a string of search terms and delimiters that could be fed into these databases to search for potentially relevant reports, and (3)

executing the database search and removing duplicate research reports that are identified by multiple databases.

Numerous databases exist that contain information on material written by scholars and researchers. Most of these databases include titles of the works, authors' names and institutions, the type of publication, and abstracts (or one-paragraph summaries) of the contents of the written piece. These databases tend to focus on specific types of written material (information on education-related topics, information on psychology-related topics, information on social science, and so on). Because this topic of inquiry (i.e., the relationship between children's access to print material and outcomes) is related to numerous research domains, search strings were run through all databases that were considered even *potentially* relevant.

With the help of a research librarian, the research synthesis team developed a list of all possible literature databases that may contain listings of reports on the subject of access to print material and children's outcomes. The list of databases that were searched is provided in Box 1.[3]

Box 1. Databases for Published Works on Book Access and Book Distribution Programs

- ArticleFirst
- Campbell Collaboration
- EBSCO Education Research Complete
- ECO
- EducationAbs
- ERIC
- Google Scholar
- GPOAccess.gov
- PapersFirst
- ProQuest ABI/INFORM
- PsycINFO
- SocINDEX
- Web of Science
- WilsonSelectPlus
- WorldCat
- WorldCat Dissertations

It should be noted that ERIC, GPOAccess.gov, ProQuest ABI/INFORM, and WorldCat Dissertations all contain reports that may not be published in academic journals, such as conference proceedings, Master's and doctoral dissertations, and government reports.

The search for relevant reports within these electronic databases requires a list of search terms that can phrased together with logical operators (e.g., "and," "or," "not") into a search string.

[3]As noted by one reviewer of the interim report for this project, UMI Dissertations Index is not listed among the databases here because the project's research librarian did not have access to that database. However, there is considerable overlap between the contents of that database and WorldCat Dissertations.

Care must be taken in creating this string of search terms so that the lists of reports that are identified do not contain so many irrelevant reports that the screening process becomes too burdensome, but broad enough so that all potentially relevant reports are identified.

The search string used by our research team was developed through collaboration with a consulting research librarian. After several initial strings were piloted on various databases, the project team agreed to this final search string for most databases:

> (books) AND (read*) AND (access* OR distribut* OR borrow* OR loan* OR availab*) AND (school* OR class* OR elementary OR "middle school" OR "junior high" OR prison* OR juvenile OR "day care" OR daycare* OR preschool* OR pre-school*).[4]

On the advice of the research librarian, this search string was altered slightly for PsychINFO to accommodate the different indexing structure used in that database:

> **books OR read* [in descriptor]** AND (access* OR distribut* OR borrow* OR loan* OR availab*) AND (school* OR class* OR elementary OR "middle school" OR "junior high" OR prison* OR juvenile OR "day care" OR daycare* OR preschool* OR pre-school*)

Running these search strings through the databases resulted in a total of 11,503 citations. Most of these citations included short summaries of the report, which are referred to as *abstracts.* Once the citations and abstracts were obtained, they were entered into an ACCESS database. This database later stored the judgments of screeners who determined whether each citation was relevant and empirical.

Checking References in Obtained Reports

As research-synthesis team members have screened empirical and nonempirical reports that touch on the relationship between children's access to print material and outcomes, they have kept a list of other reports that are cited but were not identified in the database searches. An attempt was made to track down these references as well.

The research team also has screened several influential books that review some of the studies on this topic:

- Elley (1992)
- Krashen, (1993/2004)
- McQuillan (1998)
- Neuman, Celano, Greco, & Shue (2001)
- Snow, Barnes, Chandler, Goodman, & Hemphill (1991)

Through screening references in reports identified through database searches and looking up references in these influential books, the research-synthesis team identified an additional 106

[4] The term "books" was used rather than "book" so that the search string would produce lists of reports but exclude reviews of specific books (i.e., "book reviews").

reports that may be relevant and contain data on the relationship between children's access to print material and various outcomes.

Search for Fugitive Literature—Contacting Researchers

Finally, the research team attempted to contact researchers who have done work or conducted studies related to children's access to print material and outcomes. These are researchers whose reports were uncovered in the database search and reference searches. We attempted to contact 14 of these researchers, requesting any unpublished works that are available to them that examine print access and outcomes. E-mails or letters were sent to these 14 researchers. To date, we have received responses from seven researchers, including five additional reports.

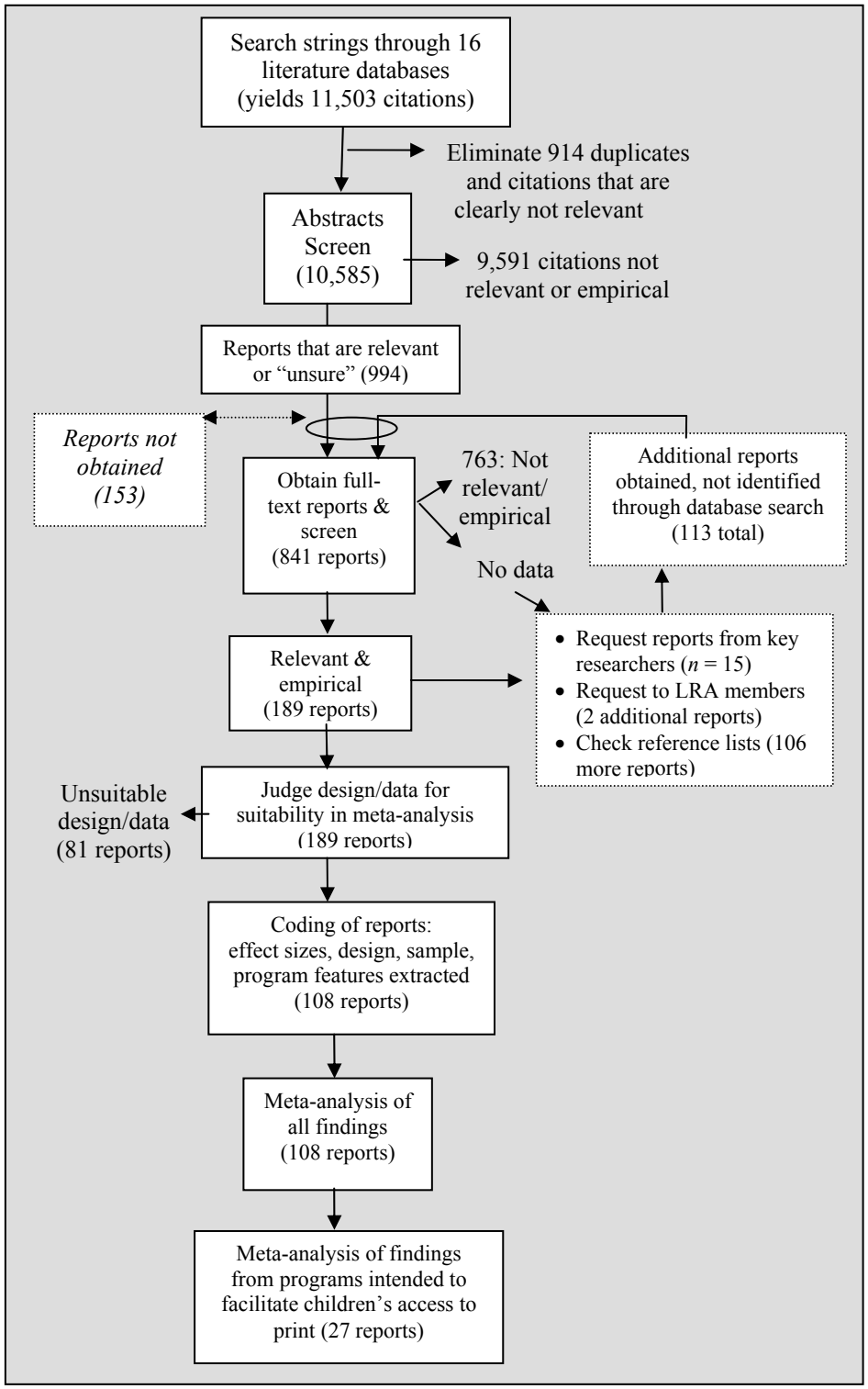
Requests for unpublished or hard-to-find reports were also sent to the electric mailing list used by members of the Literacy Research Association (LRA, formerly the National Reading Conference), a professional organization made up of scholars in the field of reading and literacy. This request yielded two additional reports.

The reports identified through these three search approaches—search of literature databases, reference checks, and contacting researchers in this field—constituted the initial pool of potentially relevant reports. The project team then screened the reports to verify reports' relevance to this topic of inquiry and inclusion of research findings.

Screening Abstracts and Reports

The screening of 11,616 potentially relevant citations involved a four-step process. First, the citations and abstracts were "prescreened" by the project manager to remove duplicate listings of the same report that were identified by different databases and to remove citations that were clearly not relevant. Second, the remaining citations and abstracts within the database were divided up among eight trained screeners so that each citation/abstract would be independently reviewed by two screeners. This step was referred to as the "abstract screen." The third step involved obtaining the full-text reports of citations that were not screened out in the first two stages and screening those reports using the same types of judgments used for the abstract screen. This third step was referred to as the "full-text screen." Finally, during the fourth step, the project manager removed those reports that had insufficient research designs, insufficient data, or had findings that were presented elsewhere in another format. The screening process is summarized in Figure 3, and the following sections provide more detail on the screening process.

Figure 3. Results of Research Synthesis Report Screening Process



Prescreening of Citations

In coordination with the project's database manager, the project manager obtained a list of all 11,616 reports that were identified as potentially relevant using the three literature search approaches. Ninety-six of the reports in this pool were identified as duplicates and removed. The project manager then reviewed the entire list of remaining citations and screened out citations that were clearly not relevant to this project. These citations included citations from journals or magazines that were clearly unrelated to children, education, or reading (e.g., articles from the journal *Woodworking*), "primers" for primary school children from the 1800s, and scholarly letters written by philosophers in the 1700s and 1800s. As a result of this prescreening process, an additional 824 citations of reports were removed, leaving the number of potentially relevant reports at 10,696.

Abstract Screen

Prior to beginning abstract screen, two meetings were held with those project team members who would be doing the screening. The purpose of these meetings was to provide an overview of the project, to describe types of reports that were being collected, to discuss the decision rules for including reports in the review, and to discuss how to navigate the ACCESS database. At the end of the second meeting, a list of 25 sample citations and abstracts were distributed to team members, and each team member was asked to independently make two judgments for each abstract. Screeners first were to judge whether the abstract suggested that the citation was relevant to the subject of children's access to print material and outcomes. For this judgment, screeners categorized the abstract as *not relevant*, *relevant—access to print*, *relevant—book distribution*, and *do not know.* Second, screeners were to determine whether each abstract contained primary research findings. Screeners categorized each abstract as *no data*, *primary research findings*, *research findings listed from another source*, and *do not know*.

This initial batch of 25 abstracts used for this training exercise was taken from the larger pool of citations, and the batch included four abstracts that were clearly relevant and empirical, four abstracts that clearly were neither relevant nor empirical, and 17 abstracts for which the appropriate judgments were not immediately obvious. Screeners reconvened at a third meeting to discuss their ratings. Although inter-rater agreements were not calculated, screeners were able to identify the abstracts of reports that were clearly relevant/empirical and clearly not relevant/empirical. For the 17 abstracts that were less clear, team members discussed their ratings and the project manager provided his judgments and further elaborated on the decision rules. The project manager emphasized to the screeners that at this stage of the project, there was no allowance for inference. If screeners felt uncertain about any judgment, they were to mark "do not know." Abstracts judged "do not know"—by any screener—would automatically proceed to the next "round" of screening (full-text screen). Once all questions were answered and screeners felt comfortable with their understanding of the decision rules, each screener was provided a list of citations to judge (each citation had a unique identification code). On several occasions, screeners consulted the project manager regarding questionable cases (e.g., making judgments on the basis of the screeners knowledge of the journal in which report appeared, making judgments of abstracts written in foreign language).

Each abstract was independently judged by two screeners, and the citations were distributed to screeners in such a way that all screeners "co-screened" abstracts with each of the other screeners.[5]

Reports with abstracts that were judged by either screener to be relevant and contain research findings proceeded to the next level of review. So too did citations for which either screener marked *do not know*. All other citations were removed from the pool of potentially relevant/empirical studies.

The calculations of percent agreement for the abstract screening process show a high level of correspondence in judgments of "relevance." In 90.2 percent of abstracts judged by different screeners, the judgments were exactly the same. For 6.2 percent of the abstracts, at least one screener indicated that he or she was "not sure" about the relevance of the report for this inquiry.

For judgments of whether the report contained empirical data, percent agreement was not as high. Exact same judgments were made on 70 percent of the abstracts. On 10.7 percent of abstracts, at least one rater indicated uncertainty regarding whether the report contained actual findings. For the remaining 19.2 percent of the abstracts, screeners disagreed about whether or not an abstract indicated empirical findings within the report, and only a small percent of these disagreements (3 percent of disagreements) reflected uncertainty regarding whether the report contained primary or secondary data. Those abstracts for which screeners showed disagreement also proceeded to the full-text screen.

Full-Text Screen

Efforts were made by research staff and the team's research librarian to obtain full-text reports of abstracts that made it through the abstract screen ($N = 1{,}107$). The projects reference librarian was able to obtain 955 of these reports.[6,7] These reports were also distributed among screeners, and each report was judged independently by two screeners. Again, screeners were asked to err on the side of inclusion by marking *do not know* if they had any uncertainty regarding the relevance of a report or whether it contained research findings.

Screener consistency for full text judgments was not as strong as for the abstract review. For relevance judgments, screeners made consistent judgments for 64 percent of the reports, were

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[5] This training process and distribution of citations to groups of screeners occurred several times. The initial training was conducted with the four original screeners, as described. Additional screeners had to be added to the project when it became apparent that some of the screeners did not have enough time to complete their assigned abstracts. Two of the additional screeners were trained simultaneously, using the method described here, and the remaining two screeners were each trained individually using an abbreviated training process (only one "project overview" meeting was held).

[6] During the review of full-text reports, screeners kept notes on other potentially relevant reports that were not identified through database searches. The 106 reports are included in the number cited for abstract review (i.e., 11,616).

[7] Overall, the reports that could not be obtained tended to be older and not published in journals, books, or book chapters. A full analysis of reports that could not be located is provided in Appendix B.

inconsistent on 31.2 percent of the reports, and indicated "do not know" on 4.6 percent of the reports. On the judgments on whether reports contained empirical findings, screeners were consistent on 69.7 percent of reports, inconsistent on 26.5% percent of the reports, and uncertain for 3.7 percent of the reports. Reports for which there was disagreement or uncertainty were forwarded to the project manager for adjudication.[8]

During this process of adjudication, several types of reports were encountered that required further specification to the rules for inclusion. These questionable types of reports include "book flood" studies, reports of studies that use the Author Recognition Test or Title Recognition Test as a proxy for exposure to print material, reports of studies that examine the relationship between access to print and adult outcomes, and reports of studies that embed items on print material in the home and trips to library within a broader survey or questionnaire while aggregating items at the broader level.

Reports of "Book Flood" Studies. Some of the reports that produced uncertainty among the screeners involved book floods to school or classroom libraries. The research team attempted to base inclusion on whether or not children were able to take books home (i.e., if students were able to take books home with them, the report was to be included). However, because of the lack detail provided on this point within the reports, it was decided to include the reports that focus on book floods but to code for this feature so that can be examined at a later date. Elley and colleagues have performed several of these studies in developing countries (e.g., Fiji, South Africa, Sri Lanka) where children learned to read in a language other than the one spoken in their homes (see Elley & Mangubhai, 1983; Elley, 1991). Neuman (1999) has also conducted several studies involving floods of books to preschool classrooms.

Reports of Studies Using the Author Recognition Test or Title Recognition Test. Another cause for uncertainty among the reports being screened involved accessibility, as defined by Cunningham, Stanovich, West, and colleagues (e.g., Cunningham & Stanovich, 1991). To these researchers, *access to print* refers to the degree to which people or children can recognize actual book titles or authors from a list of intermingled real titles/authors and nonactual titles/authors. Underlying Stanovich and Cunningham's Author Recognition Test (ART) or Title Recognition Test (TRT) is the inference that those who have been exposed to names of authors and books will be better able to distinguish the real books/people from the foils. This test has been adapted for use by children for use as a proxy for exposure to print material. Because this is a proxy measure for actual access to print material and because the correlation between this measure and children's actual access to print is uncertain (i.e., probably not a perfect correspondence), the research team decided not to include the ART/TRT studies in this review.

Reports of Studies That Embed Print-Access Items Within the Larger Questionnaire. The research team uncovered several studies—mostly correlational studies—in which children's access to books in the home, school, and library were embedded within broader questionnaires on families' literacy-related activities or aspects of the home environment. Some of these broader questionnaires involve items on literacy-related play (making words with blocks), shared reading

[8] Altogether, 390 reports (or 40.9 percent of the 953) were forwarded to the project manager for adjudication. Actual disagreement rate (excludes judgments of uncertainty) across screeners was 28.8 percent.

by caregivers and children, and frequency/volume of reading by caregivers. The uncertainty arises when report findings do not disaggregate the relationships involving just the print-access items but focus instead on the broader aggregate scores as the variable of interest.

Reports that contain findings from these broader questionnaires were included if the access-related items made up one third or more of the overall questionnaire items (e.g., reports by Cooper, Roth, Speece, & Schatschneider, 2002; Speece, Ritchey, Cooper, Roth & Schatschneider, 2004).[9] However, these studies were coded differently from studies in which the entire measure focuses on children's access to print materials. Whether effect sizes differ among these types of studies was examined in moderator analysis (see Section IV).

Reports of Studies Examining Adult Samples. A final source of uncertainty involved the target age of the population under investigation. The research team uncovered several studies (e.g., Camiciottoli, 2001; Sanders, Zacur, Haecker, & Klass, 2004) involving adults as research subjects. Given that the focus of this project is children's outcomes, the project manager judged reports involving adult research subjects as not relevant.

The abstract, full-text, and adjudication process resulted in a total of 189 reports that were considered to be both relevant to the topic of this synthesis and contain primary research findings.

Removal of Reports Due to Design and Data Deficiencies

The literature search, screening, and adjudication process resulted in the identification of 189 relevant and empirical reports. These were subsequently reviewed by the project manager. Although all reports were relevant and contained primary research findings, 81 were subsequently screened out because the research design used was insufficient to examine the relationship between children's access to print materials, because the findings reported could not be translated into an effect size, or because the study and findings were presented in another report.

Among the reports that were screened out at this stage, 31 were screened out because of design deficiencies (i.e., the design used in the research study was not capable of producing data that addresses relationship between children's access to print material and outcomes). Many of these were "action research projects" conducted by graduate students in schools of education. In these projects, practicum students attempt to set up programs within classrooms or schools intended to increase Grades K–12 students' motivation to read or reading achievement by increasing the

[9] The choice of one third represents a compromise. On the one hand, the project team wanted to include studies in which children's access to print material was a "major" component of their construct model and items within the measure had high internal consistency. However, several measures used in large national studies—such as the Bradley and Caldwell (1984) Home Observation for Measurement of the Environment (HOME)—examine numerous aspects of cognitive stimulation that children receive at home. For studies using the HOME aggregate scores, the relative weight of items involving children's access to print within the overall measure suggests a focus on a broader construct—one focusing on cognitive stimulation within families—rather than importance of print material per se. The project team settled on the decision rule of "one third" as indicative that print access was a major component.

number of books in their school or classroom libraries. Every one of these action research projects used pre-post designs (i.e., data are collected on students prior to implementation of the program and after implementation of the program), but none utilize a comparison group or use age-normed tests (both of which control for normal maturation of children). Because the findings from these action research projects could be interpreted as being a "time effect" rather than an impact of the program, these reports were removed from the pool of 189. Another subset of reports were removed from the pool because they only examined parents' or students' self-reported outcomes following implementation of a program. Lack of a comparison group renders these findings useless for the present investigation. Finally, three reports were removed because the studies involved comparisons across cohorts of students without sufficient baseline data or control variables.

A number of reports were also removed when further examination of measures used in the studies indicated that children's access to print material constituted less than one third of the overall predictive measure (see footnote 9). In other instances, reports were removed because the findings reported could not be translated into effect sizes. Such instances usually involved cursory reporting of findings in text (e.g., "the program improved students' reading habits") without being accompanied by descriptive or inferential statistics.[10]

Finally, a number of reports were screened out at this stage because the research findings were already made available in other reports. For example, Lance's (1994) chapter presents the same information as found in Lance, Welborn, and Hamilton-Pennell (1993). These types of duplicative reports could not be identified earlier in the screening process.

As a result of this final screening step, an additional 81 reports were removed from the pool of studies. This left 108 reports that were included in this meta-analytic research synthesis.

Coding of Reports

Characteristics of the 108 reports were coded by two project team members. This process involved multiple steps as well. First, the specific characteristics to be coded had to be identified and codes created to capture specific categories for each characteristic. These characteristics and the codes were printed on coding sheets identified by separate colors for different levels of analysis. Second, the two coders were trained on the process of coding, on the definitions of report characteristics and separate categories for each characteristic, and on the methods of calculating effect sizes from report findings. Part of this training involved the joint coding of a group of reports by the two coders and resolving coding discrepancies. During the third step, the reports were distributed between the coders such that one half of the reports were double-coded. Discrepancies in coding were resolved by the project manager. Codes for the reports were entered into SPSS for analysis. Further details on these steps are provided in the following sections.

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[10] A general statement regarding an "increase" or a "decrease" was considered insufficient for translation to an effect size. There were instances where reports included a statement regarding a "significant increase" or a "statistically significant" increase where a conservative effect size estimate could be used.

Identification of Important Characteristics and Creating Coding Sheets

Characteristics of reports and studies were created jointly by project team members and RIF leadership. These characteristics are presented in Table 1. The actual coding sheets—indicating "levels" of these characteristics and specific categories for each characteristic—can be found in Appendix D.

Training of Coding Team

Both coders had been involved in the report screening process, and so they were familiar with the background of the project. A meeting was held with these coders to discuss the process of coding reports, to provide definitions of the report characteristics being coded and the types of categories used for each characteristic, and to provide guidelines on calculating effect sizes. Once coders expressed an understanding with the characteristics and coding categories and felt comfortable calculating effect sizes from report findings, they were each given seven reports to code independently. The team reconvened a week later to discuss their coding decisions. Code discrepancies were discussed and resolved. The project manager clarified points of misunderstanding regarding the meaning of the characteristics, the hierarchical clustering of coding sheets, and calculation of effect sizes.

Consistency in Coding

The reports were then distributed between the coders. Half of these reports were double-coded, allowing the research team to gauge consistency of judgments among the coders. As coding of reports proceeded, the coding sheets were revised slightly to accommodate unexpected categories that were found among the reports.

There was 92 percent agreement between the coders' judgments on the double-coded reports. The project manager adjudicated all coding inconsistencies. For all reports, the project manager also checked all codes for report characteristics that appeared most challenging for the coders. Three additional corrections were required.

Table 1. Characteristics of Reports That Were Coded for This Research Synthesis

Level of Information	Characteristic
Report-level information	Author
	Year of publication
	Type of publication
	Report peer reviewed
Program/Intervention information (completed only if study examines an intervention or program)	Program type (i.e., ownership/lending)
	Children given choice of books
	Books screened for appropriateness
	Books provided to all students at site or just some
	Range of children's ages
	Number of distributions per year
	Number of weeks separating distributions
	Distribution tied to school year?
	Guidance given to parents?
	Program involve parent-child shared reading?
	Formal questions provided to guardians to ask child?+
	Program aligned with graded tests/assignments?+
	Sponsor of program
	Program require matching community funds?+
	Program involve broader community events?+
	Program encourage volunteer involvement?+
	Provision of print material supplement other types of programming?
Research design information	Research design
	Unit of assignment*
	Unit of analysis*
	Units randomly selected?
	Number of districts*
	Number of schools*
	Number of classrooms*
	Number of students*
	Type of school setting

Table Continues…

Level of Information	Characteristic
Sample information	Number of boys and girls
	Percent of sample considered "highly mobile"
	Number with low SES? (+ source of SES information)
	Racial and ethnicity characteristics of sample
	Percent of sample for whom dominant language is second language
	Percent of sample living with disabilities
	Range of children's ages [SCHOOL LEVEL OF SAMPLE]
	Attrition rate in sample*
Effect size information	Specific outcome examined
	Reliability of outcome measure
	Category of outcome
	Test statistic serving as basis for effect size calculation
	Reliability of predictor measure*
	Lag between pre- and postmeasures
	Effect size

Note: *, characteristic coded for use in meta-analyses but not a feature examined during moderator analysis; +, potential moderator that was subsequently dropped because of lack of variability. SES, socioeconomic status.

Calculation of Effect Sizes

The Learning Point Associates research team used Cohen's *d*-index as the preferred effect size metric (Cohen, 1988). Conceptually, the *d*-index reflects the difference between the treatment group's average score and the comparison group's score scaled in terms of the standard deviation of each group. For example, a *d*-index of +.60 indicates that 6/10 of a standard deviation separates the averages of the two groups (see illustration of *d*-index in Figure 4).

There are different ways of calculating the *d*-index, depending on the type of design used in a research study and the types of data provided within the report. An overview of the technical methods used to convert study findings to the *d*-index is presented in Appendix A.

In general, the research-synthesis team used conversion methods that were most closely aligned with the raw data (e.g., using means and standard deviations rather than *F*-statistics). When faced with choices regarding calculated effect sizes, research team members generally chose the more conservative approach (i.e., approach that yielded effect size closest to 0). "Null findings" reported in text of reports were entered as $d = 0$.

Data Entry

Judgments written on coding sheets were then hand-entered into a SPSS data file by one project team member. Each "case" contains report-level information, design-related information, intervention-related information (if applicable), sample-level information, and a separate effect

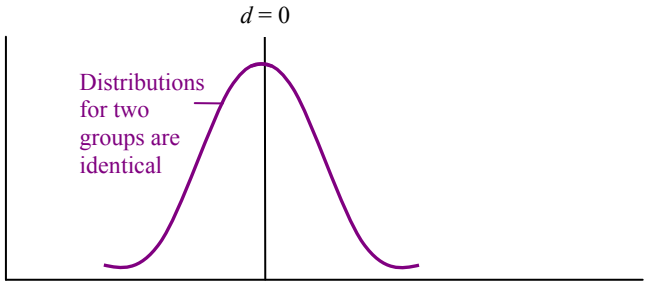
size for a given outcome. The resulting data file contained 628 cases and 94 variables (each report characteristic reflects a separate variable). The project manager randomly chose 11 of the 108 reports (a 10 percent sample) and checked the data entry for those reports. No data entry errors were found.

Winzorizing Outliers

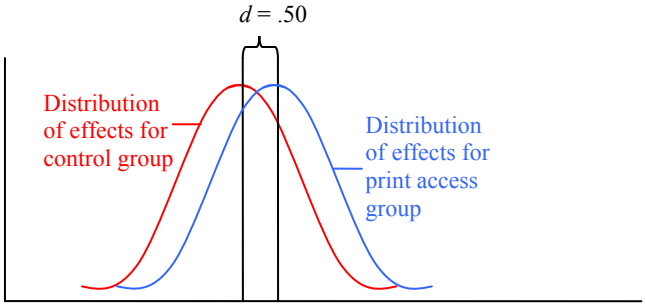
Effect sizes that fall far outside the range of other effect sizes may produce inflated estimates of aggregated effect size. One procedure for "reigning in" extreme values (referred to as "winzorizing") is the Grubbs procedure (Grubbs, 1969) or "the maximum normed residual test." This procedure examines each effect size, determines if it exceeds what would be expected in a normal distribution, and sets those extreme values to its next nearest "neighbor." As a result of this procedure, effect sizes less than $d = -1.71$ were given this value (changed just one effect size), and effect sizes greater than $d = +2.60$ were set at this high value (changed 13 effect sizes). These changes impacted only 2.6 percent of all effect sizes. All data files contained both nonwinzorized and winzorized values. However, findings are based on winzorized values.

Figure 4. Examples of Possible Relationships Between Children's Access to Print Material and Reading Performance

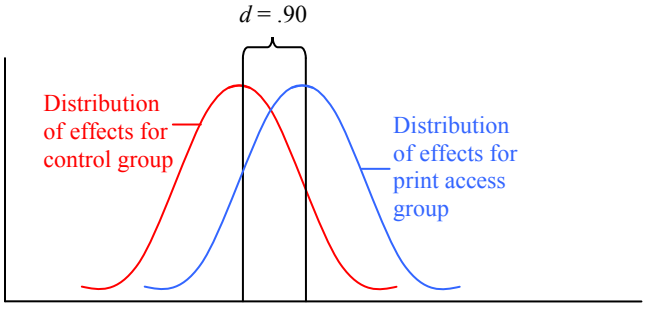
A. Example with no apparent effect.



B. Example with average effect size = .50.



C. Example with average effect size = .90.



Creating Sample-Level and Sample Within Outcome Category-Level Data Sets

This "master" data file was used as the source for four additional data sets. Each of these additional data sets represents different aggregations of effect sizes for different types of analyses. These "analyzable" data sets were as follows:

- All effect sizes aggregated by independent sample
- All effect sizes aggregated by independent sample within outcome category
- Effect sizes for reports of programs that facilitate ownership of print materials, by independent sample
- Effect sizes for reports of programs that facilitate ownership of print materials, by independent sample within outcome category

The first "analyzable" data set was used to examine overall relationships between access to print materials and outcomes. In these data sets, each independent sample contributed only one effect size. That one effect size for a given sample represented the average effect within that sample, perhaps averaging out the various effects that may have been found for different types of outcomes.

The second data set was created to obtain a better understanding of effects of access to print material on the specific outcomes. For that data set, data were aggregated by sample within each outcome category. That is, for each outcome category (e.g., attitudes toward reading, reading performance), each sample contributed a single effect size.[11] This data set was used to examine average weighted effect sizes within each category, confidence intervals, and the homogeneity of effects (i.e., whether there existed sufficient variation among the effect sizes for that category to conduct a moderator analysis).

The third "analyzable" data set was much like the first, except that it contained just those reports that involved an intervention that distributed books or other reading materials to children to own. This data set was used to examine whether such interventions had an overall impact on children's outcomes, in general. This data set also contained effects aggregated at the sample level.

The last data set was similar to the second, except that it too contained effect sizes for just those reports that examined impacts of programs designed to facilitate children's ownership of print material. This data set had effects aggregated by sample within outcome category, allowing separate analyses for each outcome category (within each category of outcomes, each sample could only contribute one effect size).

[11] Creation of outcome categories is discussed in Section III.

Analysis Strategy

To analyze the effects sizes to address the research questions underlying this research review, three types of meta-analytic summary statistics were calculated: the average weighted effect size, the 95 percent confidence interval, and Hedges's test for homogeneity of effects (Hedges's *Q*). In instances where Hedges's *Q* statistic suggests a significant amount of variability in effects, moderator analyses were then conducted. A summary of types of analyses conducted for the various research questions is provided in Table 2. These calculations were performed using both fixed effects and random effects models.[12] Though results from both of these types of models are reported in tables, random effects results are the effects that are focused on in text and are presumed to reflect most accurately the underlying parameters.[13]

Average weighted effect sizes (indicated throughout this report by d_w) represent the average effect size for a group of reports, after weighting the effect sizes by the number of units within samples. Larger studies—those that include more children or schools—have larger weights than do studies that include small numbers of children.

Confidence intervals (abbreviated "95% CI" throughout this report) indicate the "the region in which a population parameter is likely to be found" (Rosenthal & Rosnow, 1991, p. 616). That is, readers can be confident that the "true effect size" lies within the range indicated by the lower and upper bounds of the confidence interval. Size of the confidence intervals is influenced by variability of effect sizes found in reports uncovered during the literature search and by the number of effect sizes. By convention, confidence intervals including a value of 0 are interpreted to mean "no relationship" (Cooper, 2010).

Hedges's *Q* statistics also were calculated. These statistics indicate the "homogeneity" of effect sizes (i.e., whether the variability in effect sizes is great enough to suggest that they do not represent a single "population" of effects). Following convention, the *Q* statistics calculated for this review provided a gauge of whether sufficient variability in effects existed to warrant a search for potential moderating factors (Cooper, 2010). When *Q* statistics were not statistically significant, no moderator analyses were conducted.

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[12] Calculation of random-effects parameters was based on procedures outlined by Lipsey and Wilson (2001). At times, these calculations will suggest adding no additional random effects variance to models. In such instances, interpretations of relationships will be based on fixed effects models (corrected for nested data).

[13] Unlike fixed effects models, which assume that variability in effects is the result of sampling error alone (i.e., variability among the samples within studies), random-effects models add an additional variance component to "random effects" or other nonspecified factors that may influence effect size estimates. Experts recommend using random-effects models for reviews such as this one. The random-effects model expands the confidence intervals to allow for more uncertainty.

Table 2. Summary of Data Sets and Statistics Used to Address Research Questions

Research Question	Data Set Used	Statistics Calculated
1. What is effect size for the relationship between children's access to print material and outcomes?	All effect sizes aggregated by sample	d_w, 95% CI, Q
Overall effect size for each type of outcome category	Effect sizes aggregated within sample within outcome category	d_w, 95% CI, Q
2. Do the studies that employ rigorous designs show positive effects?	All effect sizes aggregated by sample—restricted to studies using "rigorous" designs	d_w, 95% CI, Q
3. Are there impacts among programs that facilitate children's ownership of print materials?	Only reports on programs that facilitate children's access to print material; effect sizes aggregated within sample	d_w, 95% CI, Q
Effect sizes for each outcome category	Only reports on programs that facilitate children's access to print material; effect sizes aggregated within sample, within outcome category	d_w, 95% CI, Q
4. Are there characteristics within studies that moderate relationships between access to print material and outcomes.	All effect sizes aggregated within sample	$Q_{between}$ (i.e., $Q_{total}-Q_{within}$)
Moderator analyses for each outcome category.	Effect sizes aggregated within sample within outcome category	$Q_{between}$ (i.e., $Q_{total}-Q_{within}$)

Note: d_w, average weighted effect size; 95% CI, 95% confidence interval; Q, Hedges's Q statistic.

Section III: Description of Reports and Characteristics of Reports

The literature search and screening process uncovered 108 unduplicated research reports that address the issue of children's access to print material and outcomes. In this section, we describe those reports and characteristics in the reports. We also provide a description of how effects from various outcomes were organized into various categories.

Levels of Aggregation: Reports, Samples, and Effect Sizes

Altogether, 108 reports were uncovered that were relevant to this topic and contained empirical findings. Researchers who wrote those reports examined the print access-outcome relationship among 160 independent samples of children, and 628 effect size estimates were provided for those samples within the reports.

The description of the unique features of the reports can be grouped according to four levels: features of the reports themselves, features of study or research design, features of the samples examined, and features of the effect sizes within the reports. In addition, for those reports that involved evaluating the effects of an intervention designed to improve children's access to print material, features of those interventions are defined and described as well.

Report-Level Features

Authors and Research Collaborations. For these reports, 94 different authors are listed as the "primary investigator" or "lead author." An attempt was made to identify not just the primary authors but also distinct research teams as well. These teams were distinguished through patterns of research collaborations between authors (authors serving as primary and secondary authors on the same reports), apparent relationships among dissertation advisors and students, and between researchers working within the same federally funded research center. Seven such research teams were identified within the obtained reports:

- Allington and McGill-Franzen (two reports included in this review)
- Center for Study of Reading (six reports in this review; includes McCormick, Mason, Meyer, and Phillips)
- Cooper, Jacobson, and Speece (three reports in this review)
- Elley, Ng, and Mangubhai (five reports in this review)
- Gambrell and Morrow (five reports in this review)
- Krashen, Constantino, McQuillan, and Pilgreen (seven reports in this review)
- Whitehurst, Lonigan, and Zevenbergen (four reports in this review)

Publication "Vehicle." Publication "vehicle" refers to the means by which a research report is disseminated to the public. Categories of "vehicles" and the numbers of reports obtained from each type of vehicle are presented in Table 3. Relative percent of reports and effect sizes coming from each vehicle type are presented as well. These different vehicles typically have different

standards of expert review (i.e., other researchers providing critical feedback to the publication source on the quality of the work and whether conclusions drawn from the research are supported by the findings). The vehicles also vary in terms of how accessible they are for various audiences. These "vehicles" were categorized as "accessible" if they are distributed to libraries or widely disseminated. These included reports found in journals or books. Other types of reports were classified as "less accessible."

Table 3. Publication Vehicles for Reports Included in This Review

Publication Vehicle	Accessibility of Vehicle to Audiences	Number of Reports	Percentage of Reports	Percentage of Effect Sizes
Journal articles	Accessible	66	61.7%	59.7%
Book chapter	Accessible	7	6.5%	4.1%
Book	Accessible	7	6.5%	9.2%
Report produced by government agency	Less accessible	4	3.7%	3.0%
Report produced by government-funded group	Less accessible	7	6.5%	14.5%
Report produced by program developer	Less accessible	1	0.9%	0.3%
Report produced by independent researcher(s)	Less accessible	3	2.8%	2.5%
Conference presentation	Less accessible	4	3.7%	4.5%
Dissertation or Master's thesis	Less accessible	8	7.5%	2.1%

Specific Journals and Peer Review. The 66 reports that were found in journals represent a diversity of disciplines. A total of 44 different journals are represented. Disciplines include the following: reading and literacy research, education, educational psychology, psycholinguistics, communication, and medicine/pediatrics. Most of these journals obtain the feedback and opinions of other scholars ("peer reviewers") on the quality of the research before deciding whether to accept the manuscript for publication.[14] At one level, most of the publication types listed—with the possible exception of reports by independent researchers and reports by program developers—require some form of review. Government agencies typically have expert review panels that screen reports for quality. Some government funding agencies also require review of manuscripts prior to dissemination. Abstracts of conference presentations are often screened by program committees prior to acceptance (depending on the conference), and doctoral or Master's

[14] An attempt was made to obtain the publication standards for journals. Forty-nine of the 66 indicated that they sent reports to peer reviewers. It was unclear whether the remaining 26 percent of journals required expert review of reports.

candidates are usually required to defend their dissertation or thesis before a faculty committee. Thus, most reports uncovered in this review have probably undergone some check for quality.

Design Features

A summary of numbers of reports and effect sizes for the various categories representing the features related to research designs are provided in Table 4. General descriptions of these features and categories are provided in the following sections.

Research Design. The type of research design used within study reports is important and not just as a potential factor that may show relationships with overall findings. Rather, coding the research designs used in study reports allows the research team to focus on the possible causal connection between children's access to print and outcomes. Studies within research reports are coded as employing (1) a correlational/descriptive design, (2) a simple comparison of two sites, (3) nonequivalent group design with each group having a larger number of units, (4) nonequivalent group design with units that appear similar, (5) nonequivalent control group design with an attempt to match units between the groups, (e.g., research participants matched for potentially influential demographic variables, pretest scores), (4) a short time series design, (5) assignment of units to groups based on a "randomlike" procedure, and (6) true randomized design with units assigned to conditions at random. Each of these types of designs is described in the sections that follow.[15]

As indicated in Table 4, the majority of effect sizes uncovered were produced by correlational or descriptive designs, which include surveys and analyses of national and international literacy assessment data (relating children's scores with numbers of books in the home). Data from these designs can provide information regarding the relationships between variables (e.g., children's access to print material and an outcome), but not whether one variable causes another.

Other types of designs involve contrasts between groups that differ on a particular feature. These include: (a) simple comparisons between two sites, (b) comparisons of nonequivalent groups (with larger number of units), and (c) nonequivalent group designs with units thought to be similar. Although some researchers attempt to draw causal inferences from these designs, little attempt is made to verify equivalence between the groups or sites. Research methodologists do not consider these types of designs as capable of implying causal relationships since other factors that distinguish these two groups also may influence the outcome of interest.

[15] As noted previously, reports of studies that examine amount of growth among children exposed to increased access to print without employing a comparison group or test norms were excluded from this review. The findings from such studies can be interpreted as being attributed to either access to print material or simply time (i.e., normal maturation effects).

Table 4. Features of Research Designs in Reports

Feature of Report	All Reports and Effects (*N* = 108 Reports; 628 Effects)		Reports of Studies Using Rigorous Designs (*N* = 30 Reports)		Reports on Interventions That Distribute Print Material(s) (*N* = 27)	
	Number of Reports (%)	Number of Effect Sizes (%)	Number of Reports (%)	Number of Effect Sizes (%)	Number of Reports (%)	Number of Effect Sizes (%)
Design type						
Correlational/descriptive	57 (53.4%)	235 (37.4%)	—	—	1 (3.7%)	1 (0.5%)
Comparison between two sites	11 (10.3%)	65 (10.4%)	—	—	5 (18.5%)	16 (7.93%)
Nonequivalent groups- large number of units	1 (0.9%)	21 (3.3%)	—	—	2 (7.4%)	0 (0.0%)
Nonequivalent groups with similar groups	5 (4.7%)	41 (6.5%)	—	—	2 (7.4%)	20 (9.9%)
Other, nonrigorous	1 (0.9%)	3 (0.5%)	—	—	0 (0.0%)	0 (0.0%)
Nonequivalent groups with matched units*	7 (6.7%)	42 (6.7%)	7 (23.3%)	42 (6.7%)	1 (3.7%)	4 (2.0%)
Short time series*	1 (0.1%)	1 (0.1%)	1 (3.3%)	1 (0.1%)	0 (0.0%)	0 (0.0%)
Assignment based on randomlike procedure*	6 (5.6%)	63 (10%)	6 (20%)	63 (10%)	6 (22.2%)	63 (31.2%)
Random assignment*	16 (15.0%)	143 (22.8%)	16 (53.3%)	143 (22.8%)	11 (40.7%)	97 (48.0%)
Other rigorous types*	2 (1.9%)	15 (2.4%)	1 (3.3%)	15 (2.4%)	1 (3.7%)	1 (0.5%)
Unit of analysis						
Countries	2 (1.9%)	7 (1.1%)	—	0 (0.0%)		0 (0.0%)
U.S. states	2 (1.9%)	2 (0.3%)	—	0 (0.0%)		0 (0.0%)
School districts	0 (0.0%)	0 (0.0%)	—	0 (0.0%)		0 (0.0%)
Schools	1 (0.9%)**	29 (4.6%)	1 (3.3%)	4 (1.5%)		0 (0.0%)
Classrooms	1 (0.9%)**	3 (0.5%)	—	3 (1.1%)		0 (0.0%)
Students	96 (89.7%)	587 (93.5%)	29 (96.7%)	256 (97.3%)		202 (100%)

Table Continues…

Feature of Report	All Reports and Effects (N = 108 Reports; 628 Effects)		Reports of Studies Using Rigorous Designs (N = 30)		Reports on Interventions That Distribute Print Material(s) (N = 27)	
	Number of Reports (%)	Number of Effect Sizes (%)	Number of Reports (%)	Number of Effect Sizes (%)	Number of Reports (%)	Number of Effect Sizes (%)
Selection of units						
Convenience	54 (50.5%)	300 (47.7%)	12 (40%)	114 (43.3%)	12 (44.4%)	98 (48.5%)
Based on eligibility	30 (28.0%)	156 (24.8%)	10 (33.3%)	71 (27%)	11 (40.7%)	64 (31.7%)
Randomly from population+	10 (9.3%)	70 (11.15%)	2 (6.7%)	8 (3.0%)	1 (3.7%)	4 (2.0%)
Not specified	4 (3.7%)	37 (5.9%)	3 (10.0%)	36 (13.7%)	0 (0.0%)	0 (0.0%)
Other	9 (8.4%)	65 (10.4%)	3 (10.0%)	34 (12.9%)	3 (11.1%)	36 (17.8%)
Country in which study conducted						
United States	84 (78.5%)	412 (65.5%)	24 (80.0%)	185 (70.7%)	24 (88.9%)	159 (78.7%)
Other country	23 (32.5%)	216 (34.4%)	6 (20.0%)	77 (29.3%)	3 (11.1%)	43 (21.3%)
Setting						
Urban	27 (25.2%)	166 (26.4%)	10 (33.3%)	74 (28.1%)	12 (14.4%)	79 (39.1%)
Suburban	5 (4.7%)	30 (4.8%)	3 (10.0%)	26 (9.9%)	2 (7.4%)	11 (5.4%)
Rural	4 (3.7%)	34 (5.41%)	1 (3.3%)	28 (10.6%)	1 (3.7%)	17 (8.4%)
Mixed	26 (24.3%)	155 (24.7%)	5 (16.7%)	27 (10.3%)	4 (14.8%)	22 (10.9%)
Not specified	45 (42.1%)	243 (38.7%)	10 (33.3%)	108 (41.1%)	8 (29.6%)	73 (36.1%)

Note: *, a *rigorous* research design; +, population reflects chosen group of units, rather than all eligible units in country, and so on.

Reports uncovered during the literature review also revealed three other types of research designs that are referred to as "strong quasi-experimental" approaches. These designs include: (a) nonequivalent group design with a priori effort to match groups on the basis of potential causal factors, (b) short time series analysis, and (c) a randomlike assignment to groups.[16] Done correctly, these designs attempt to create a comparison group that is as similar to the treatment group as possible, except for the intervention.[17] The research community considers these strong quasi-experimental approaches capable of suggesting causal relationships, provided that efforts to equate groups (or time series) are done systematically (Shadish, Cook, & Campbell, 2002).

One other type of design involves the random assignment of units (i.e., schools, teachers, classrooms, children) to conditions based on a random method. Underlying this approach is the assumption that given large enough sample sizes, units having characteristics that can influence the outcome are equally likely to appear in either condition. One condition receives the intervention, while the other—the control condition—does not receive the intervention. Because the units within conditions are assumed to be equal except for the experience of the intervention, differences between groups are considered to be *caused* by the intervention.

For this review, correlational/descriptive studies and simple comparisons among groups are considered *nonrigorous* approaches. Effect sizes from studies using these approaches are included in meta-analyses focusing on the simple relationships between the variables. They are not included in meta-analyses that examine the potential causal role of children's access to print material. Studies using "strong quasi-experimental designs" and designs featuring randomized assignment to conditions are considered *rigorous*. That is, researchers can infer *causal relationships* (e.g., children's access to print "causes" the outcome) from effect sizes from studies using these types of designs.[18] Altogether, 58 percent of effect sizes came from studies using nonrigorous designs, and 42 percent of effect sizes came from studies using rigorous research designs.

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[16] In this context, "randomlike" assignment involves assignment of children to conditions using a nonrandom, yet impartial procedure. For example, one report of a study assigned children on the basis of child's last name (A–M in one condition, N–Z in another). Another report had assigned children of parents registering for kindergarten on odd days of the month to one condition, while children of parents registering on even days were assigned to the other.

[17] Time series designs attempt to introduce an intervention after a sufficient number of baseline observations are done. Children's postintervention data are compared with the baseline data to determine treatment effect. In these designs, investigators must indicate that only the intervention of interest changed during the course of the time series. Introduction of a comparison group—which did not experience the intervention—makes it easier to attribute cause to the intervention.

[18] The Institute of Education Sciences at the U.S. Department of Education considers only studies employing "strong quasi-experimental" or "experimental" research designs as rigorous enough to evaluate the impact of educational interventions. Thus, reviews of research reported as part of the What Works Clearinghouse (WWC) purposely exclude all studies that employ descriptive or correlational designs from consideration. The logic underlying the WWC approach is that only studies that employ strong quasi-experimental or experimental designs examine the relationship between presumed causes and effects while also controlling for other plausible causal factors. For this meta-analytic research synthesis, the general relationship between children's access to print material and outcomes is of interest, as is the potential causal role played by access to print. For this reason, reports of studies employing correlational (i.e., descriptive), quasi-experimental, and experimental designs all are included in the review.

Units of Analysis. Another feature of the research design involves the unit of analysis. Studies found in reports examined relationships across nations (e.g., nationwide score on the an assessment administered by the International Association for the Evaluation of Educational Achievement—referred to as IEA—and nationwide average on number of books in the home), across U.S. states, across schools, classrooms, and students. Nearly all effect sizes (587 of 628 or 93.5 percent) come from studies that analyzed data at the child level (e.g., each child contributes one data point for each of the variables being examined).

It should be noted that there were numerous instances where the unit of assignment to conditions did not always match the unit of analysis, and the appropriate statistical techniques for addressing these types of data had either not been developed or were not used. Adjustments to sample weights were conducted using procedures outlined by Hedges (2009) to correct for this nesting of data. [19]

Process of Selecting Units. The way in which the sample of children was selected for the study may be important for determining the degree to which a study's results can be generalized to the broader population. Results produced from samples chosen at random from the population can be generalized to population, given that the sample is large enough. The way in which the samples were chosen were coded as (1) sample of convenience (i.e., not at random, but easily available units), (2) sampled on the basis of eligibility requirements (e.g., only children whose caregivers agreed to allow them to be tested or children whose caregivers fall within a certain income level), (3) chosen at random, (4) other, and (5) unspecified. Only in several rare instances, such as investigations involving the IEA, NAEP, or PIRLS (assessment used in "Progress in International Reading Literacy Study"), did researchers attempt to draw random samples to improve the generalizability of the study.

Setting of Study. The majority (78 percent) of research reports describe studies conducted in the United States. A breakdown in numbers of effect sizes from studies from the various countries is listed in Table 5.

Several of the studies conducted in the United States involved the analysis of data from samples drawn in each U.S. state (e.g., NAEP studies, a study involving scores from the Scholastic Aptitude Test, or SAT). The studies conducted in the United States that examined data from more specific locations included 23 different states, plus the District of Columbia. Several studies were conducted in multiple states.[20]

For many of the reports (42 percent) found in literature search, the type of setting from which the samples were drawn was not specified. Twenty-five percent of the reports specify samples living in urban areas. Slightly fewer reports indicate samples from "mixed" types of settings (either a mix of urban, rural, suburban schools or schools located in areas that cannot be clearly defined as

[19] See the beginning of Section IV and Appendix A for more information on these correction procedures.

[20] A breakdown of samples coming from these states has not been performed. To do so, the codes used for states (U.S. mail state codes) would have to be assigned numeric codes, which could then be aggregated by sample.

urban, rural, and suburban). Five reports specify samples drawn from suburban settings, and four other reports state that their samples were drawn from rural settings.

Sample Sizes and Characteristics of Samples

For the reports that were found, assuming the information was available in the report, coders recorded the total number of "units" within the sample (usually number of children), along with the numbers of boys in sample, number of girls in sample, number within the sample who were from lower-income families. Race and ethnicity information also were recorded when available. Numbers of children of African, Asian, European, and Native American/Eskimo/Pacific Island descent were recorded, as well as number of children of Hispanic ethnicity. Coders extracted from reports the numbers of children within the sample whose primary language was different from the dominant language. Numbers of children who had disabilities—either physical or learning disabilities—were noted. Finally, the lower-bound age of the sample and upper-bound age of the sample were used to classify the sample as representing a preschool population (ages 0–4), kindergarten (ages 5–6), elementary school (ages 6-11), middle school (ages 11–14), high school (ages 14–18), or mixed (samples that contain children from several of these categories or that use a longitudinal approach that track children across levels).

Table 5. Nations Represented in Research on Children's Access to Print and Outcomes

Country	Number of Effect Sizes	% of Effect Sizes
Australia	23	3.7%
Bulgaria	3	0.5%
Canada	68	10.8%
England	33	5.3%
Fiji	15	2.4%
Finland	1	0.1%
France	3	0.5%
Hong Kong	3	0.5%
Hungary	3	0.5%
Israel	11	1.7%
Italy	3	0.5%
Multiple countries	7	1.1%
New Zealand	20	3.2%
Norway	3	0.5%
Singapore	15	2.4%
Sweden	5	0.8%
United States	412	65.5%

Most of these numbers were converted to the following percentages:

- Percent of sample who are male
- Percent of sample from low-income families
- Percent of sample who are racial/ethnic minority (for U.S. samples only)
- Percent of sample whose primary language is not the language of instruction
- Percent of sample who are disabled

The conversion of these numbers into percentages allows meta-analyses on these potential moderators as continuous variables, rather than categorical. However, as can be seen in Table 6, not all studies provided information on sample characteristics. This lack of information from these studies makes moderator analysis on these variables questionable, at best.

The numbers of samples found in reports at each level of school are presented in Table 7. This table shows that most frequently, samples that were examined were in elementary schools. At least this is true for the "within all samples" and "samples within rigorous studies" columns. However, according to the reports accumulated for this review, investigators who study interventions that include distribution of print material to children to keep are more likely to use preschool children as their samples.

Table 6. Sample Sizes and Sample Characteristics in Obtained Reports

Sample Characteristic	Within All Samples (160 samples)			Samples Within Rigorous Studies (45 samples)			Samples Within Studies of Interventions That Distribute Print Material (33 samples)		
	k	**Range**	**Median**	***k***	**Range**	**Median**	***k***	**Range**	**Median**
Sample size	160	8–94,591	129	45	8–1,330	103	33	10–94,591	108
Percent male	71	0–1	0.506	16	.47–.61	0.527	15	.47–.57	0.525
Percent from low-income families	49	0–1	0.935	15	.01–1	0.877	19	.01–1	0.951
Percent minority	20	0–1	0.753	7	0–1	1	6	0–1	0.960
Percent not speaking dominant language	29	0–1	0.648	13	0–1	0.648	10	0–1	0.710
Percent disabled	11	0–1	0	8	0–1	0	3	0–1	0.000

Note: *k*, number of samples for which sufficient information is provided to calculate the percentages.

Table 7. Numbers of Samples at Each School Level

Level of School	Within All Samples (160 samples)		Samples Within Rigorous Studies (45 samples)		Samples Within Studies of Interventions That Distribute Print Material (33 samples)	
	Number of Samples	Percentage of Samples	Number of Samples	Percentage of Samples	Number of Samples	Percentage of Samples
Preschool (PK)	26	16.3%	9	20.0%	13	39.4%
Kindergarten	15	9.4%	7	15.6%	7	21.2%
Elementary school (Grade 1–5)	63	39.4%	20	44.4%	5	15.2%
Middle school (Grade 6–8)	12	7.5%	5	11.1%	2	6.1%
High school (Grade 9–12)	16	10.0%	1	2.22%	2	6.1%
Mixed levels	17	10.6%	3	6.7%	7	21.2%

Intervention-Related Information From Reports of Studies That Distribute Print Material

For reports of interventions that included the distribution of print material to children, coders examined features of those programs and marked the appropriate category for each feature. Numbers of samples having each category are listed in Table 8.

Table 8. Characteristics of Reports of Interventions That Include Distribution of Reading Materials

Program Feature and Categories	Samples Within Studies of Interventions That Distribute Print Material (33 samples)	
	Number of Samples	Percent of Samples
Children get choice in print materials?		
No	25	75.50%
Yes	6	18.20%
Not sure	2	6.10%
Print material screened for content?		
No	1	3.10%
Yes	26	78.80%
Not sure	6	18.20%

Table Continues…

Program Feature and Categories	Samples Within Studies of Interventions That Distribute Print Material (33 samples)	
	Number of Samples	Percent of Samples
All children at site have opportunity to receive material?		
All children receive material	14	42.40%
Just low SES children	0	0.00%
Subset of children based on other parameter	17	51.50%
Not sure	2	6.10%
Timing of distributions		
School year only	21	63.60%
Year round	10	30.30%
Summer only	3	3.00%
Not sure	1	3.00%
Guidance to guardians on reading?		
No	7	21.20%
Yes	24	72.70%
Not sure	2	6.10%
Is guardian-child coreading a component of program?		
No	7	21.20%
Yes	11	33.30%
Yes, assumed because of children's age	13	39.40%
Not sure	2	6.10%
Program includes formal questions for guardians to ask children while reading?		
No	32	97%
Yes	1	3.00%
Not sure	0	0.00%

Table Continues….

Program Features and Categories	Samples Within Studies of Interventions That Distribute Print Material (33 samples)	
	Number of Samples	Number of Samples
Program aligned with school assignments/quizzes/book reports?		
No	31	93.90%
Yes	0	0.00%
Not sure	2	6.10%
Sponsor of intervention		
School	19	57.60%
Hospital/Clinic	7	21.20%
Multiple sponsors	1	3.03%
Preschool	1	3.03%
Day care center	3	9.10%
Multiple sponsors	1	3.03%
Unknown	1	3.03%
Intervention requires community matching funds?		
No	31	93.90%
Yes, population-based scale	0	0.00%
Yes, uniform scale	0	0.00%
Not sure	1	3.03%
Program includes bilingual reading materials?		
No	27	81.80%
Yes, bilingual	1	3.03%
Materials in child's native language	2	6.06%
Not sure	3	9.09%
Intervention includes motivational/community events		
No	31	93.90%
Yes	1	3.03%
Not sure	1	3.03%

Table Continues…

Program Features and Categories	Samples Within Studies of Interventions That Distribute Print Material (33 samples)	
	Number of Samples	Number of Samples
Does intervention encourage volunteer involvement?		
No	31	93.90%
Yes	2	6.06%
Not sure	0	0.00%
Does distribution of print materials accompany broader literacy initiative?		
No	14	42.40%
Yes, guardian-oriented program	4	12.10%
Yes, teacher-oriented program	9	27.30%
Yes, guardian- and teacher-oriented program	5	15.20%
Not sure	1	3.03%

The interventions studied in these reports share several similar features with RIF's "Books for Ownership" program: the organizations that sponsor the interventions screen the print materials for appropriateness and reading level, print materials are provided to all children at the research sites (rather that providing print materials only to some students within a site or classroom), and provision of print materials is not aligned with evaluative tasks (assignments, quizzes, or tests). However, most of the interventions revealed through the literature search do differ on the core features of RIF's book distribution programs. Seventy-five percent of these interventions do not offer children choices in print materials to own, 72 percent provide specific guidance to parents on reading with their child, 93 percent do not require a community "match" to purchase print materials, 81 percent do not provide bilingual materials to children, and 93 percent do not encourage volunteer participation and motivational events surrounding distribution of print materials.

Interventions in these reports distributed between 1 and 75 print materials to children, with the average of 14.92 materials (mostly books). Materials were distributed between 0 weeks apart (if only one item was given to children) to 52 weeks apart (once a year). On average, materials were distributed 5.75 weeks apart.

Effect Size Information

Effect size calculations were based on various summary statistics provided in the reports. In some cases, coders were required to translate findings from the form in the report to another form from which effect sizes could be calculated. A summary of types of summary statistics from which effect sizes were calculated is presented in Table 9. As noted in Section II, these data reflect the research team's efforts to base effect size calculations on information that is "closest" to the actual data. Approximately 36 percent of the effect sizes are based on means and standard deviations.

The types of children's outcomes being examined were in part defined during the initial meeting between representatives of Learning Point Associates and Reading Is Fundamental. At that meeting, representatives from RIF stated that they were interested in not only educational outcomes (e.g., emergent literacy skills, reading achievement from standardized and informal tests, achievement in other disciplines) but also behavioral outcomes (e.g., amount of shared reading between caregivers and children, and amount of reading among families) and psychological outcomes (e.g., children's attitudes toward reading, children's interest in reading or motivation to read). After reviewing the reports that emerged from the screening process, the team identified 58 distinct outcomes. Some of these outcomes were examined only once (e.g., "attitude toward homework," "active participation in storybook reading"), while other outcomes frequently appeared in these studies (e.g., scores on a reading assessment, attitudes toward reading, and expressive language abilities). Rather than report separate meta-analytic findings for each of the 58 outcomes, outcomes were grouped into eight broader categories. Meta-analytic findings are presented according to these categories.

Table 9. Statistics From Which Effect Sizes Were Calculated

Statistic	Number of Samples	Percent of Samples
Means and standard deviations in text	56	35.9%
Calculation of means and standard deviations from frequency tables	3	1.9%
Correlation coefficient	32	20.5%
Beta from regression analysis[21]	14	9.0%
Path coefficients[22]	7	4.5%
Chi square (1 degree of freedom)	13	8.3%
T-score	7	4.5%
F-statistic from ANOVA (1 degree of freedom in numerator)	6	3.8%

Table Continues…

[21] Standardized regression coefficients (betas) differ from correlation coefficients in that betas reflect the *unique* relationship between the variables of interest (excludes variance shared with other variables in the model). Experts in the field of meta-analysis recommend against using betas as the basis of calculating effect sizes for meta-analysis since these may differ from effect sizes calculated using other statistics (Cooper, 2010). The experts contend that only in instances where regression models are exactly the same (same measures used, same number of predictors) can comparisons be made across effect sizes. The rationale for including effect sizes from betas and path coefficients within this meta-analysis was based on an empirical approach. If meta-analytic findings and moderator analyses reveal systematic differences between effect sizes from regression-based statistics and effect sizes from other types of statistics, then those that were regression-based would be removed from data sets. Because such differences were not apparent, those effect sizes were meta-analyzed along with the rest.

Statistic	Number of Samples	Percent of Samples
Effect sizes listed in report	3	1.9%
Inferred from text	3	1.9%
Multiple types (different statistics for different outcomes)	12	7.7%

Categorization of Outcomes

The project manager examined all outcomes included in the relevant and empirical reports and grouped them into eight broader categories. These categories were (1) attitudes, (2) reading interest or motivation, (3) reading behavior, (4) basic language abilities, (5) emergent literacy skills, (6) reading performance, (7) writing performance, and (8) general academic achievement. The specific outcomes contained within each broader category are listed in Table 10.

Attitudes

For this review, "attitude" was defined as a child's relative preference for or enjoyment of different objects and activities. Studying the attitudes of children toward reading is challenging when children are just developing actual reading skills. One method for doing this that was used frequently within the uncovered studies involves administering the Elementary Reading Attitude Survey (ERAS; McKenna & Kear, 1990). This measure uses pictures of "Garfield" expressing four emotion-laden poses to reflect the "strong like," "like," "dislike," and "strongly dislike" response categories. Teachers or researchers read the items aloud to children, and they are asked to circle that picture of Garfield that best indicates their liking or disliking for that item. Similar versions of this type of measure include drawing of faces that include smiles, neutral expressions, and frowns. Reports that were uncovered during the literature search examined several types of attitudes: attitudes toward reading, attitudes toward homework, and attitudes toward particular academic subjects.

Motivation to Read/Interest in Reading

Other reports examined children's desire to read, desire to be read to by their caregiver, or their desire to look at books. All of these types of outcomes were grouped together into one category. Outcomes in this category included caregivers' impressions of their child's interest/motivation as well as the interests/motivations expressed by children themselves.

Reading Behavior

Some reports examined children's reading-related behavior. This outcome category was defined as the frequency and amount of time that children interact with print materials or print-related toys. Home literacy orientation or family literacy activities also were included in this category, since these measures tend to be dominated by items related to actual reading within the home or among family members.

Table 10. Grouping Scheme for Children's Outcomes Into Eight Categories

Outcome Category	Measures From Studies in Category
Attitudes	Attitude toward reading, attitude toward school/academics, attitude toward homework, attitude toward particular academic subject
Reading interest or motivation	Interest in reading, reading motivation, child's request to be read to, child's request to go to library, library visits.
Reading behavior	Reading frequency, books read, reading amount of time, parent reading to child, books/print-related play, home literacy orientation/family literacy
Basic language abilities	Reading readiness, receptive language, expressive language, following oral directions, general language
Emergent literacy skills	Oral story retelling, emergent literacy skills, phonemic awareness, concepts about print, letter identification, sign/label/picture identification, sign/label/picture reading (environmental print), word recognition, word reading, word attack, tracking print, active participation in storybook reading, asking questions during storybook reading, inferring character states, inferring author states, printing/handwriting, sentence completion/cloze procedure
Reading performance	Fluency, comprehension/retelling, vocabulary, text level, formal/informal reading test
Writing performance	Writing (general), writing story, narrative versus expository, words attempted, words correct, vocabulary (in writing), spelling, sentence structure, writing structure, content, length
General academic achievement	Grades/GPA, grades in particular subjects, credits accumulated, SAT/ACT mathematics, other tests in mathematics, grade promotion + (or retention –), graduation + (or dropout –), achievement gap closing (+)

Basic Language Abilities

Children within their first few years of formal schooling are often assessed to determine if they possess the general understanding of their native language necessary to begin reading instruction. These assessments often include receptive language (child's understanding of words that are spoken to her/him) and expressive language (child's ability to verbally express the names of objects and actions). Scores on these assessments are often combined to reflect "reading readiness" or "general language."

Emergent Literacy Skills

During reading instruction, different aspects of children's abilities to extract meaning from print are assessed. These basic abilities are referred to here as "emergent literacy skills." This category includes the development of basic skills of equating letters and groups of letters with sounds, stringing letters together to form words, associating groupings of letters as distinct words, and tracking of print from left to write (in English). Assessment scores of children's ability to know what they have learned from print and what information is not included in print (i.e., meta-cognitive abilities) is included in this category as well. As children further develop reading skills, they are able to draw inferences of character states and author states. Developing readers learn to identify rhymes and alliterative words as well.

Reading Performance

Whereas emergent literacy skills refer to basic subskills necessary to extract meaning from print, more global assessments of reading performance—usually administered to older children—were grouped within a separate category. Outcomes in this category include fluency (children's reading spread), passage comprehension, vocabulary, and children's scores on formal or informal reading tests. Teachers' assignments of children to texts of different levels of difficulty were included in this category too.

Writing Performance

Assessments of various aspects of children's writing performance were grouped into a separate category. Elements of children's written performance included the following: general writing scores, words attempted in writing sample, vocabulary level within writing sample, spelling, grammar, structure of the sample, content of the sample, length of the sample, and child's ability to write in narrative and expository styles.

General Academic Achievement

The last category of outcomes involves academic outcomes that are unrelated to reading or writing. These include children's grades, achievement scores in other subjects, grade promotion, closing of achievement gaps within schools, caregivers' impressions of child's knowledge, classification of "giftedness," and general academic achievement.

The next section presents meta-analytic findings. The relationships between children's access to print material and these categories of outcomes will be examined.

Section IV. Results

The findings that follow are organized into three sections. The first section describes the procedures used to weight the effect sizes for each sample. This section also briefly describes two sets of statistical adjustments made to these weights: (1) adjustments to correct for nested data, and (2) the adjustment that accommodates for random effects variance.

The second section addresses research questions 1–3 at a broad level (i.e., across all samples and outcome categories). Average effect sizes and confidence intervals are provided. However, data from this broad level were not subjected to moderator analyses.

The third section provides summaries of findings for each outcome category. These findings include average weighted effect sizes, confidence intervals, and tests of homogeneity. If the test for homogeneity is found to be significant, results for moderator analyses are provided.

Within each of these sections, several groupings of findings will be provided to better address the overall research questions. They are as follows: (1) the estimates of the overall relationship, (2) the estimates among that subset of studies that use rigorous designs (i.e., that allow causal inference), and (3) the estimates among the subset of studies that examine interventions that distribute books or other types of print material to children.

Weighting the Effect Sizes

Before the meta-analytic procedures could be conducted on the effect sizes, a weight was calculated using conventional equations (e.g., Cooper, 2009) to represent the size of the sample in each study. The specific formula is provided among the technical details found in Appendix A. It should also be noted that the weight for each effect size represents the inverse of the standard error for that effect.

An adjustment was made to these weights when data presented in the research reports were *nested,* but researchers did not account for that nesting.[22] The adjustment is based on equations for two- and three-level nested data provided by Hedges (2009). This adjustment ultimately reduces the weights for studies that assigned schools and/or classrooms to conditions yet analyzed child-level data as though the children were the primary unit of investigation. No such corrections were made for weights for reports that had used Hierarchical Linear Modeling (HLM) to adjust for the nested data (e.g., Wilkinson, 1998). The equation for the two-level nested adjustment and the three-level nested adjustments are presented in Appendix A.

Second, weights were adjusted again to create random effects models. The procedures outlined in Lipsey and Wilson (2001) were followed, and the formulae for these adjustments also are

[22] "Nesting" refers to the hierarchical nature of educational research: children obtain their educational experiences within classrooms, which are situated within schools, administered by districts, found in states and countries. Two-level "nested" data are those collected on students when classrooms or teachers or schools were assigned to conditions. Three-level nested data are apparent when data from children in intervention schools or treatment districts are compared with children in nonintervention sites (i.e., children nested in classroom nested in school).

provided in Appendix A. Random effects models are recommended in meta-analytic reviews like this one, where the domain of inquiry is relatively broad and when the meta-analyst wishes to extrapolate findings to the overall population, rather than focusing on just the collected reports. In general, the adjustment for random effects produces an additional variance component for the standard error of each effect size. The additional variance component tends to reduce the magnitude of weights and results in wider confidence intervals. All results presented in text are based on meta-analysis using the random effects models (i.e., weights adjusted for random effects). However, some summary tables presented in text list both fixed effects models (adjusted for nested data) and random effects models.

Relationship Between Children's Access to Print Material and Outcomes

The first set of meta-analyses addressed the research questions 1–3 at a broad level, by ignoring the distinct outcome categories. Samples could only contribute a single effect size for these analyses. Average effect sizes across samples and corresponding confidence intervals were calculated.

As summarized in Table 11, findings indicate that across all independent samples, there is a positive relationship between children's access to print material and various outcomes. The raw effect sizes calculated for the samples ranged from $d = -.25$ to $d = +2.34$. The weighted effect size was $d = +.492$ (95% CI = +.456/+.528).[23] These effect sizes fall within the "medium" range specified by Cohen (1988).

More focused analyses looking at just the 44 reports of studies that employ rigorous research designs suggests a smaller effect size, but that effect size still falls within Cohen's "medium" range ($d_w = +.284$, 95% CI = +0.209/+0.359). A similar aggregated effect size was found when just those reports of studies involving distribution of books or other reading material were analyzed ($d_w = +0.288$, 95% CI = +0.209/+0.366).

Thus, at this most broad level, the findings suggest that the answers to research questions 1–3 are all "yes." Across all reports, there appears to be a positive relationship between children's access to print material and outcomes, and the magnitude of that relationship is approximately .49 standard deviations. At least part of that relationship appears to be causal, in that children's access to print materials produces positive impacts on children's outcomes. Positive impacts were seen for both interventions that lent print material to children and interventions that *gave* print material to children to keep.

To simplify the reporting of results, tests for moderating effects (test for homogeneity) were not conducted at this broader level but were reserved for the sections that follow that focus on findings for specific outcome categories.

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[23] The meta-analysis conducted on these data yielded random effects results that were larger than those from the corrected fixed effects model. Such findings may occur when average weighted effect sizes remain correlated with sample sizes. The results of the fixed effects model also yielded positive estimates, albeit slightly lower in magnitude. Regardless of the model used, average weighted effect size was calculated to be positive and within range identified by Cohen as "medium effect size" for social science interventions.

Table 11. Average Effect Sizes and Confidence Intervals Across Independent Samples

Analysis	*N*	*k*	Fixed Effects			Random Effects		
				95% CI			95% CI	
			d_w	Lower	Upper	d_w	Lower	Upper
All Effects	**269,745**	**190**	**+0.450**	**+0.442**	**+0.459**	**+0.492**	**+0.456**	**+0.528**
Nonrigorous studies	262,702	145	+0.452	+0.444	+0.461	+0.507	+0.470	+0.545
Rigorous studies	6,845	44	+0.284	+0.209	+0.359	(see "Fixed Effects")		
Correlational	239,945	122	+0.452	+0.444	+0.461	+0.509	+0.469	+0.548
Interventions-lending	5,909	35	+0.410	+0.327	+0.492	+0.460	+0.326	+0.594
Interventions-"giving"	28,788	33	+0.288	+0.209	+0.366	(see "Fixed Effects")		

Note: *N*, number of children studied within reports; *k*, number of independent samples within reports.

Findings for Different Categories of Outcomes

Separate meta-analyses were done for each of the eight categories of outcomes, with each sample contributing a separate effect size for each category. Analysis at this level provides a more detailed view of relationships. As with the broad findings just presented, the meta-analysis findings presented here will include estimates of average weighted effect size and 95 percent confidence interval. Tests for homogeneity also will be reported, and should those tests suggest variability in effects that exceeds what would be expected from sampling alone, findings from a search for moderators will be examined.

Attitudes Toward Reading and Learning

Among the studies reviewed as part of this meta-analysis, "attitudes" are defined as children's liking or disliking of objects or activities. The attitude construct was developed in other domains as a way of easily measuring people's likely behavior towards an object, activity, or person. Attitudes have been used to predict health-related behavior, likelihood of purchasing particular products, and likelihood of voting for particular candidates. The same is true in the domain of early literacy research: attitudes toward reading and learning are used to predict children's likely reading behavior and their desire to learn more about their world through print material.

The search for relevant reports uncovered 17 reports that examined the relationship between children's access to print material and their attitudes. These reports contain 27 samples of children and 37 effect sizes. For the meta-analysis, effect sizes were averaged within sample so that 27 independent estimates of the effect could be examined.

Estimates of Average Effect Size. The raw effect sizes for children's attitudes in these reports range from $d = -.56$ to $d = +1.48$. Once the effect sizes were weighted by sample size and adjusted for nested data and random effects, the average weighted effect size was calculated to

be d_w = +.333 or one third of a standard deviation (95% CI was +0.249 to +0.418). This effect size falls within the "medium" range specified by Cohen. See Table 12.

Average weighted effect sizes for the subset of studies that used rigorous designs show a similar relationship (d_w = +0.336; 95% CI = +0.103/+0.568). The reports that contain studies of interventions that included distribution of books or other print material to children to own also show a medium effect (d_w = +0.384, 95% CI = +0.159/+0.456).

Table 12. Meta-Analytic Results on Relationship Between Children's Access to Print Material and Attitudes

			Fixed Effects				Random Effects		
				95% CI				95% CI	
Analysis	***N***	***k***	***d_w***	**Lower**	**Upper**	***Q***	***d_w***	**Lower**	**Upper**
Attitudes	**8,034**	**27**	**+0.329**	**+0.268**	**+0.390**	**30**	**+0.333**	**+0.249**	**+0.418**
Nonrigorous studies	6,414	15	+0.327	+0.262	+0.392	13	(see "Fixed Effects")		
Rigorous studies	1,620	12	+0.347	+0.166	+0.528	17.5	+0.336	+0.103	+0.568
Correlational	3,530	4	+0.323	+0.254	+0.393	1.80	(see "Fixed Effects")		
Interventions-lending	2,990	19	+0.331	+0.177	+0.485	24	+0.293	+0.115	+0.476
Interventions-ownership	1,514	4	+0.384	+0.159	+0.609	4.62	(see "Fixed Effects")		

Note: *N*, number of children studied within reports; *k*, number of independent samples within reports.

Potential Moderating Characteristics. For all these analyses on the print access-attitude relationship, tests for homogeneity of effects were not statistically significant. These findings suggest that there is not enough variability in effect sizes related to attitudes to warrant an examination for potential moderating factors.

Summary. The findings related to print-access and children's attitudes indicate a positive medium-sized relationship. The studies that used rigorous designs suggest a causal link between print materials for children and their attitudes toward reading. When children have more access to books and other print material, they develop more positive attitudes toward reading and learning. This finding appears to hold for interventions that allow children to *borrow* books to read and interventions that *give* books to children to own.

Motivation to Read/Interest in Reading

Whereas children's "attitudes" toward reading reflect the degree to which the "like" or "dislike" the activity, another psychological construct reflects their *desire* to read. For some studies reviewed in this project, they refer to this desire as "motivation" to read, and for other studies, investigators refer to this construct as "interest" in reading. Throughout the remainder of this report, this category of outcomes will be referred to as "motivation to read."
Twelve reports examined the relationship between children's access to print material and their motivation to read. Within these reports are 21 effect sizes gathered from 15 independent

samples.[24] Effect sizes were aggregated within sample so that meta-analytic findings could be based on independent estimates of effect.

Estimates of Average Effect Size. Unlike the findings for attitudes, the findings for children's motivation to read are less clear. The meta-analytic findings using random effects model suggests a medium-sized positive average effect size (d_w = +0.617; 95% CI = +0.311/+0.924). [25] Findings are presented in Table 13. However, the limited number of studies that used rigorous research designs suggest a near zero impact (d_w = +0.160; 95% CI = −0.137/+0.456). Findings from intervention studies that facilitate children's ownership of books or other types of reading materials actually fall within Cohen's "large effect size" range (d_w = +0.967, 95% CI = +0.141/+1.79).

Table 13. Meta-Analytic Results on Relationship Between Children's Access to Print Material and Motivation to Read

			Fixed Effects				Random Effects		
				95% CI				95% CI	
Analysis	***N***	***k***	d_w	**Lower**	**Upper**	***Q***	d_w	**Lower**	**Upper**
Motivations	**9,307**	**15**	**+0.118**	**+0.075**	**+0.160**	**103[c]**	**+0.617**	**+0.311**	**+0.924**
Nonrigorous studies	9,001	12	+0.116	+0.074	+0.159	100.5[c]	+0.691	+0.323	+1.069
Rigorous studies	306	3	+0.160	−0.137	+0.456	2.72	(see "Fixed Effects")		
Correlational	8,476	5	+0.098	+0.055	+0.141	44.36[c]	+0.665	+0.161	+1.171
Interventions-lending	447	5	+0.530	+0.260	+0.799	14.62[c]	+0.310	−0.221	+0.841
Interventions-owning	384	5	+0.475	+0.205	+0.744	27.8[b]	+0.967	+0.141	+1.79

Note: *N*, number of children studied within reports; *k*, number of independent samples within reports.
[a] $p < .05$; [b] $p < .001$; [c] $p < .0001$.

Potential Moderating Characteristics. Tests for homogeneity of effects for all samples suggest that sampling alone cannot account for the variability in effect sizes [$Q_b(14) = 103$, $p < .0001$].

[24] The number of effect sizes is actually larger than this. However, the effect sizes from the various subscales of the "Motivation for Reading Questionnaire" in Loera's (2007) dissertation were all aggregated during the coding process, producing an overall composite effect size for that report.

[25] The reason for the inconsistency between findings from fixed effect model and those from random effects model involves the relative influence of effect size and weight in the two types of models. Fixed effect models allow weights to have a greater influence on overall results than do random effects models, where effect size has greater influence. For the fixed effects analysis, one study in particular, Hall and Cole's 1997 survey of 7,976 English school children far outweighed all the other studies in the analysis (weight for Hall and Cole's study was 1992.63, average weight for the other 14 studies was 12.694). Relationships listed in Hall and Cole's study were translated to an effect size of near zero (d = .074). Thus, the influence of the weight for Hall and Cole's study produced a fixed effects average weighted effect size much closer to 0. If Hall and Cole (1997) is removed from the analysis, the fixed effects average weighted effect size for the remaining 14 samples is much larger (d_w = .525; 95% CI: +.469/+.763). For the random effects analysis, the weight for Hall and Cole (1997) remains larger than the others, but not nearly as extreme (weight for Hall and Cole = 3.64, average weight for other 14 studies = 2.536). The result of the relative influence of these weights is a larger average weighted effect size.

Significant tests for homogeneity were found for the effects from the subset of studies of interventions that gave books/print material to children [$Q_b(4) = 27.8$, $p < .0001$]. The potential influences of report-level characteristics, features of research designs, samples on effect size magnitude were examined via moderator analysis (see Table 14).

Table 14. Results of Moderator Analyses for Print Access—Reading Motivation Relationship

Statistic	Q_b	Difference Among Moderator Categories
Characteristics of the Reports		
Author	99.09[c]	Twelve different authors. Only one author contributed multiple effect size estimates. Insufficient data to draw conclusions
Author team	28.35[c]	Only two author teams represented, each contributing a single effect size. Insufficient data to draw conclusions
Year of publication	1.18	
Publication type	66.58[c]	Nine different categories, see "Publication type 2" for explanation
Publication type 2	36.8[c]	Books, book chapters and conference presentations ($k = 10$) $d_w = +0.631$ All other types of reports (combined) ($k = 5$) $d_w = +0.84$.
Peer reviewed?	64.56[c]	Not peer reviewed ($k = 5$) $d_w = +0.716$ Peer reviewed ($k = 3$) $d_w = +0.966$ Unknown ($k = 7$) $d_w = +0.078$.
Characteristics of Research Design		
Study type	16.46[c]	Correlational/Comparison of "Natural Groups" ($k = 5$) $d_w = +0.098$ Studies of Interventions ($k = 10$) $d_w = +0.502$
Research design	51.7[c]	Correlational ($k = 5$) $d_w = +0.098$ Comparison across two sites ($k = 4$) $d_w = +0.072$ Nonequivalent design with similar units ($k = 2$) $d_w = +.96$ Randomlike assignment to conditions ($k = 3$) $d_w = +0.16$ Other comparison ($k = 1$) $d_w = +0.96$
"Rigorous design"	0.80	
Random selection	59.04[c]	Sample of convenience ($k = 10$), $d_w = +0.639$ Units sampled based on eligibility requirements ($k = 4$), $d_w = +0.08$ Selection method unknown ($k = 1$), $d_w = 1.15$

Table Continues…

Statistic	Q_b	Difference Among Moderator Categories
Characteristics of Sample and Setting		
Nationality of sample	51.8[c]	U.S. sample (k = 9), d_w = +0.697 Non-U.S. sample (k = 6), d_w = +0.076
Type of setting	25.3[c]	Urban areas (k = 10), d_w = +0.516 Mixed Settings (k = 4) d_w = +0.089 Setting unknown (k = 1) d_w = +0.885
Percent male	0.06	
Percent low SES[26]	0.18	
Percent minority	6.4[b]	β = −.843 (samples with higher percent minority show smaller effects)
Percent non-native speakers	0.31	
School level of children	62.9[c]	Preschool (0–5 years) (k = 6) d_w = +0.692 Kindergarten (k = 2) d_w = +1.18 Elementary (k = 2) d_w = +0.410 Middle school (k = 5) d_w = +0.074
Statistic type	18.16[c]	Chi square (k = 4) d_w = +0.994 Means and standard deviations (k = 5) d_w = +0.455 Other types of statistics (k = 5) d_w = +0.105
Characteristics of the Intervention (For intervention studies only)		
Choice of books/ Materials	6.25[a]	Children have no choice (k = 6) d_w = +0.64 Children can choose book (k = 4) d_w = +0.072
All children qualify?	3.86[a]	Print material provided to all children at site (k = 4) d_w = +0.072 Print material provided to only children who meet other criteria (k = 5) d_w = +0.522
Number of books/ materials provided to children	13.92[c]	β = +0.557 (samples receiving more materials show greater effects)
Number of weeks between distributions	12.7[c]	β = −0.673 (less time between distributions, the greater the student's motivation)

Table Continues…

[26] Most of the studies examined for this review examined samples of children who lived in families with limited financial resources. Thus, there is a restricted range for this SES variable, which might explain lack of results for this variable.

Statistic	Q_b	Difference Among Moderator Categories
Guidance given to caregivers?	4.52[a]	No guidance given (k = 5) d_w = +0.165 Guidance given to caregivers (k = 5) d_w = +0.629
Caregivers encouraged to coread with child?	7.389[a]	No (k = 5) d_w = +0.259 Yes (k = 2) d_w = +1.15 Assumed given age of child (k = 3) d_w = +0.475
Sponsor of intervention	18.51[c]	School (k = 5) d_w = 0.165 Clinic (k = 4) d_w = 0.505 Multiple sponsors (k = 1) d_w = 2.10
Distribution of print combined with other type of activity?	16.91[c]	No other literacy-related activity (k = 8) d_w = +0.391 Teacher-led activity or teacher and parent led activity (k = 2) d_w = 1.49

Note: N, number of children studied within reports; k, number of independent samples within reports;
[a] $p < .05$; [b] $p < .001$; [c] $p < .0001$.

As can be seen in Table 14, many of the features of reports, designs, samples/settings, and interventions show potentially moderating effects. The overlap among these characteristics within the reports impedes the interpretation of these findings. In addition, although many of those features may be associated with some of the variability in effect sizes, features related to reports and study design reflect more of the aspects of the scientific enterprise than aspects of the actual programs. That information inform the scientific community about the influences of children's motivation to read, but provide little guidance to those who seek to design programs that foster children's motivation to read.

The findings related to characteristics of the intervention may provide more insight into possible ways to refine book lending and distribution programs to better motivate children to read. Within the 10 studies that implemented either a lending program or a book ownership intervention, interventions that provided *less* choice of books to children, provided access to books just to those children who met certain criteria (typically those whose caregivers consent to participate in the study), provided more print materials to children with shorter time lags between distributions and encouraged caregivers to "coread" with the child, showed stronger print-access-reading motivation relationships. Stronger motivation to read was also found among children participating in clinic-based interventions (such as "Reach Out and Read"), interventions that combine distribution of print material with guidance to caregivers on how to read with one's child, and interventions that combine distribution with another type of literacy activity.

Summary. The findings from these meta-analyses indicate a medium-sized relationship between access to print material and children's motivation to read. The more focused analysis of studies that examined interventions that facilitate children's ownership of print material showed a "large" effect. However the rigorous studies conducted on this relationship (k = 3) suggest that no *causal* relationship exists between print access and motivation to read. To date, however, none of those rigorous studies involves true randomization of children to conditions. Further primary research studies using highly rigorous research designs may help to clarify whether print access alone can enhance children's motivation to read.

Another possibility exists regarding the flow of direction between motivation to read and access to books. It is possible—even likely—that children who are more motivated to read are more likely to collect books and seek out ways to obtain other types of print material. Future research should attempt to control for children's baseline motivation to read.

Reading Behavior

The "reading behavior" category included children's self-reported reading frequency and amount of time reading as well as caregivers' estimates of these outcomes for their children. For studies of younger children, this category also included shared reading between caregiver and child, the child's book/print-related play (e.g., looking at pictures in books, playing with letter blocks). The "reading behavior" category also included "home literacy orientation" and "family literacy orientation," which are composite measures dominated by items related to reading by children and other family members within the home.

The literature search revealed 34 studies that reported effect sizes on reading behavior from 41 independent samples. Effect sizes were averaged within independent sample prior to meta-analysis.

Estimates of Average Effect Size. The meta-analytic findings (Table 14) suggest a "medium"-sized relationship between children's access to print material and reading behavior (d_w = +0.704; 95% CI: +0.526/+0.907). Average weighted effect sizes for both the subset of samples examined in rigorous studies and the subset of samples from studies of interventions that facilitated children's ownership of print material also suggest "medium" positive effects (d_w = +0.589, 95% CI = +0.326/+0.852; d_w = +0.568, 95% CI = +0.308/+0.829 for rigorous studies and interventions involving distribution of print materials, respectively).

Table 15. Meta-Analytic Results on Relationship Between Children's Access to Print Material and Reading Behavior

			Fixed Effects				Random Effects		
				95% CI				95% CI	
Analysis	*N*	*k*	d_w	Lower	Upper	Q_b	d_w	Lower	Upper
Reading Behavior	**42,077**	**41**	**+0.802**	**+0.781**	**+0.823**	**1919[c]**	**+0.704**	**+0.526**	**+0.882**
Nonrigorous studies	38,507	29	+0.827	+0.806	+0.845	1777[c]	+0.744	+0.536	+0.952
Rigorous studies	3,475	11	+0.245	+0.198	+0.392	29.5[c]	+0.589	+0.326	+0.852
Correlational	37,218	17	+0.830	+0.808	+0.851	1736[c]	+0.780	+0.520	+1.04
Interventions-lending	2,268	10	+0.665	+0.485	+0.844	25.7[a]	+0.695	+0.380	+1.01
Interventions-owning	2,591	14	+0.283	+0.187	+0.380	37.9[b]	+0.568	+0.308	+0.829

Note: *N*, number of children studied within reports; *k*, number of independent samples within reports;
[a] $p < .05$; [b] $p < .001$; [c] $p < .0001$.

Potential Moderating Characteristics. Hedges's test for homogeneity of effects was done to determine whether factors besides sampling error may be contributing to the variability in effect

sizes. For the entire pool of effect sizes that reflect the print-access—reading relationship and for both of the key subsets of studies, these tests of homogeneity indicate that features of reports, research designs, samples, and interventions may influence the magnitude of effect sizes. The results of the moderator analysis are reported in Table 16.

Table 16. Results of Moderator Analysis for Print Access-Reading Behavior Relationship

Statistic	Q_b	Difference Among Moderator Categories
Characteristics of the Reports		
Author	1,748[c]	Thirty-one different authors. Only four authors contributed multiple effect size estimates. Insufficient data to draw conclusions
Author team	130[c]	Five author teams represented. Only two teams contributed more than a single effect size. Insufficient data to draw conclusions
Year of publication	1,181[c]	β = +.785 (more recent studies have larger effect sizes)
Publication type	1,598[c]	7 different categories, see "Publication type 2" for explanation
Publication type 2	1,588[c]	Books, book chapters, & conference presentations (k = 34) d_w = +1.058 All other types of reports (combined) (k = 7) d_w = +0.093.
Peer reviewed?	1,149[c]	Not peer reviewed (k =7) d_w = +0.238 Peer reviewed (k = 20) d_w = +1.073 Unknown (k = 14) d_w = +0.139.
Characteristics of Research Design		
Study type	106[c]	Correlational/Comparison of "Natural Groups" (k = 17) d_w = +0.830 Studies of interventions (k = 24) d_w = +0.369
Research design	134[c]	Correlational (k = 16) d_w = +0.098 Comparison across two sites (k = 7) d_w = +0.072 Nonequivalent design with similar units (k = 4) d_w = +.96 Nonequivalent design with matched groups of units (k = 4) d_w = +0.29 Randomlike assignment to conditions (k = 4) d_w = +0.718 Random assignment to conditions (k = 4), d_w = +0.220 Other comparison (k = 1) d_w = +0.509
"Rigorous design"	113[c]	Nonrigorous (k = 29) d_w = .829 Rigorous (k = 11) d_w = +.295
Random selection	1,680[c]	Sample of convenience (k =10), d_w = +0.639 Units sampled based on eligibility requirements (k = 11), d_w = +0.101 Selection method unknown (k = 9), d_w = 1.09

Table Continues…

Statistic	Q_b	Difference Among Moderator Categories
Characteristics of Sample and Setting		
Nationality of sample	51.8[c]	U.S. sample (k = 31), d_w = +0.432 Non-U.S. sample (k = 10), d_w = +0.836
Type of setting	25.3[c]	Urban areas (k = 13), d_w = +0.407 Suburban (k = 3) d_w = .454 Mixed settings (k = 10) d_w = +0.836 Setting unknown (k = 13) d_w = +0.443.
Percent male	0.115	
Percent low SES	0.443	
Percent minority	1494[b]	β = −.600 (samples with higher percent minority show smaller effects)
Percent non-native speakers	0.63	
School level of children	1,436[c]	Preschool (0-5 years) (k = 14) d_w = +0.647 Kindergarten (k = 2) d_w = +1.02 Elementary (k = 16) d_w = +1.04 Middle School (k = 2) d_w = +0.074 High School (k = 4) d_w = +0.520 Mixed (k = 3) d_w = .226
Characteristics of the Intervention (For intervention studies only)		
Choice of books/ Materials	7.42[a]	Children have no choice (k = 13) d_w = +0.556 Children can choose book (k = 10) d_w = +0.294
All children qualify?	16.94[c]	Print material provided to all children at site (k = 14) d_w = +0.668 Print material provided to only children who meet other criteria (k = 9) d_w = +0.249
Number of materials provided to children	2.83	
Number of weeks between distributions	31.41[c]	β = +0.662 (more time between distributions, the more the children read)
Guidance given to caregivers?	1,024[a]	No guidance given (k = 8) d_w = +0.270 Guidance given to caregivers (k = 12) d_w = +0.551 Unknown (k = 2) d_w = = +0.489
Caregivers encouraged to coread with child?	20.08[b]	No (k = 7) d_w = +0.262 Yes (k = 4) d_w = +0.965 Assumed given age of child (k = 9) d_w = +0.508 Unknown (k = 2) d_w = +0.442

Table Continues…

Statistic	Q_b	Difference Among Moderator Categories
Characteristics of the Intervention (For intervention studies only) (Continued)		
Sponsor of intervention	20.89[c]	School (k = 13) d_w = +0.301 Clinic (k = 7) d_w = +0.436 Multiple sponsors (k = 1) d_w = +1.73
Distribution of print combined with other type of activity?	42.63[c]	No other instruction (k = 13) d_w = +0.259 Teacher led activity (k = 4), d_w = +0.642 Joint teacher- and parent-led activity (k = 4) d_w = +0.837 Unknown (k = 1) d_w = +2.07

Note: k, number of independent samples within reports; d_w, average weighted effect size.
[a] $p < .05$; [b] $p < .001$; [c] $p < .0001$.

As with the results for reading motivation, many of the potential moderators uncovered during this analysis involve characteristics of the method of scientific inquiry and reporting (e.g., research design and methods of disseminating reports). These moderators are reported in Table 16, but description is not provided here because of the overlapping moderator issue and because of the lack of relevance of these moderators to educators, policymakers, and administrators of interventions that distribute print materials.

According to the information contained in the reports on interventions, the access to print–reading relationship is strongest when children have *less* choice in the which books they will read, when all children within a site qualify for the intervention, when a *longer* time period separates the distribution/selection of reading materials, when caregivers are provided guidance on how to read to their child, when they are encouraged to coread with their child, when the intervention is sponsored by a preschool or clinic, and when the distribution of print materials accompanies another literacy related activity.

Summary. Reading behavior represents a category of outcomes that has been linked in previous research with academic outcomes (Bus, van Ijzendoorn, & Pellegrini, 1985). Given this link, the curriculum model promoted by many education researchers as a means of increasing children's general academic performance involves providing children with ample time to read during school ("silent sustained reading"; Krashen, 2004), to encourage children to read at home, and to provide children with plenty of reading materials in their areas of interest.

The general finding from the meta-analysis of effects of children's access to books/print material and reading behavior indicates a positive *causal* relationship. Giving children print material to read causes them to read more frequently and for greater amounts of time. However, several of the intervention-related factors appear to contradict conventional wisdom on administration of these interventions. For instance, children appear to read more when they have *less* choice in which books they read. Number of print materials provided to children does not appear to matter in terms of their reading behavior, but the interval separating the distribution does. They appear to read *more* when the distribution intervals are longer.

Engaging caregivers appears to be an important factor in encouraging children to read. Children of caregivers who are given guidance on how to read to the child and encouraged to coread with

him/her appear to read more. Reading behavior is bolstered even more when distribution of print materials is combined with other teacher and/or caregiver-led activities.

Development of Basic Language Abilities

"Basic language abilities" refer to the types of outcomes that are typically assessed in children before they receive instruction in reading. Specific outcomes within this category include the following: expressive language, receptive language, ability to follow oral instructions, "general language ability," and "reading readiness." This latter outcome typically involves children's scores on a school readiness assessment, which includes components on expressive and receptive language.

The literature search identified 30 research reports that examined basic language-related outcomes, and those 30 reports included 84 effect sizes from 34 independent samples. For each sample, all effect sizes within this category were averaged, allowing each sample to contribute just one effect size to the analysis.

Estimates of Average Effect Size. The average weighted effect size for this category of outcomes also fell in the "medium" effect size range, $d_w = +0.400$ (95% CI: +.247/+.553). When more "focused" meta-analyses were conducted on the subset of reports of rigorous studies and on the subset of studies conducted on interventions that distributed print material to children, both analyses indicated effect sizes near 0 ($d_w = +0.128$, 95% CI = −0.028/+0.283; $d_w = +0.140$, 95% CI = −0.010/+0.291 for rigorous studies and interventions involving distribution of print materials, respectively).

Table 17. Meta-Analytic Results on Relationship Between Children's Access to Print Material and Language Development

			Fixed Effects				Random Effects		
				95% CI				95% CI	
Analysis	***N***	***k***	d_w	**Lower**	**Upper**	Q_b	d_w	**Lower**	**Upper**
Language Development	**5,613**	**34**	**+0.385**	**+0.316**	**+0.454**	**104[c]**	**+0.400**	**+0.247**	**+0.553**
Nonrigorous studies	3,234	17	+0.447	+0.371	+0.524	86.2[c]	+0.558	+0.344	+0.773
Rigorous studies	2,379	15	+0.128	−0.028	+0.283	5.2	(see "Fixed Effects")		
Correlational	2,315	14	+0.517	+0.407	+0.628	69.7[c]	+0.65	+0.338	+0.961
Interventions-lending	1,490	5	+0.384	+0.275	+0.492	14.2[a]	+0.347	+0.048	+0.646
Interventions-ownership	1,807	15	+0.140	−0.01	+0.291	4.82	(see "Fixed Effects")		

Note: *N*, number of children studied within reports; *k*, number of independent samples within reports; Q_b, Hedges's *Q* statistic for test of homogeneity of effects; [a] $p < .05$; [b] $p < .001$; [c] $p < .0001$.

Potential Moderator Characteristics. Hedges's *Q* statistic suggests that sampling alone cannot explain the variability in effect sizes. A search for possible moderating factors was conducted. The results of these moderator analyses are presented in Table 18.

Characteristics related to reports and research designs are provided in the table, even though these features provide little information to policymakers and those who oversee interventions that distribute print materials to children. No explanation of those moderators is provided here.

Only several of the intervention-related features appear to be related to the magnitude of effects. Samples of children whose caregivers are provided guidance on coreading with their child show weaker print access-language development relationships (d_w = +0.154) than do samples of children whose parents receive no such guidance (d_w = +0.512).

Table 18. Results of Moderator Analysis for Relationship Between Children's Access to Print Materials and Language Development

Statistic	Q_b	Difference Among Moderator Categories
Characteristics of the Reports		
Author	102[c]	Thirty-one different authors. Only four authors contributed multiple effect size estimates. Insufficient data to draw conclusions
Author team	37.28[c]	Five author teams represented. Only two teams contributed more than a single effect size. Insufficient data to draw conclusions
Year of publication	4.79[c]	β = +.785 (more recent studies have larger effect sizes)
Publication type	32.4[c]	Journal (k = 24) d_w = +0.341
		Book chapter (k = 2) d_w = +1.037
		Complete book (k = 1) d_w = +0.447
		Report from government sponsored group (k = 4) d_w = +1.06
		Report from independent researcher (k = 1) d_w = +0.44
		Conference presentation (k = 2) d_w = 1.455
Publication type 2	1.23	
Peer reviewed?	9.71[a]	Not peer reviewed (k =7) d_w = +0.260 Peer reviewed (k = 16) d_w = +0.342 Unknown (k = 11) d_w = +0.617

Table Continues…

Statistic	Q_b	Difference Among Moderator Categories
Characteristics of Research Design		
Study type	9.08[b]	Correlational/Comparison of "Natural Groups" (k = 14) d_w = +0.518 Studies of Interventions (k = 20) d_w = +0.300
Research design	28.67[c]	Correlational (k = 12) d_w = +0.522 Comparison across 2 sites (k = 3) d_w = +0.374 Nonequivalent design with larger number of units (k = 1) d_w = +0.533 Nonequivalent design with similar units (k = 3) d_w = +0.135 Nonequivalent design with matched groups of units (k = 2) d_w = +0.382 Randomlike assignment to conditions (k = 2) d_w = +0.055 Random assignment to conditions (k = 11), d_w = +0.140
"Rigorous design"	13.03[c]	Non rigorous (k = 19) d_w = +0.447 Rigorous (k = 15) d_w = +0.128
Random selection	59.04 [c]	Sample of convenience (k =14, d_w = +0.65 Units sampled based on eligibility requirements (k = 10) d_w = +0.431 Other (k = 8), Selection method unknown (k = 9), d_w = +0.181
Characteristics of Sample and Setting		
Nationality of sample	0.33	
Type of setting	25.4[c]	Urban areas (k = 13), d_w = +0.237 Rural (k = 2) d_w = +0.206 Mixed Settings (k = 4) d_w = +0.078 Setting unknown (k = 15) d_w = +0.507.

Table Continues…

Statistic	Q_b	Difference Among Moderator Categories
Characteristics of Sample and Setting (continued)		
Percent male	0.438	
Percent low SES	0.205	
Percent minority	0.561	
Percent non-native speakers	0.018	
School level of children	33.83[c]	Preschool (0–5 years) (k = 15) d_w = +0.243 Kindergarten (k = 5) d_w = +0.135 Elementary (k = 6) d_w = +0.680 Middle school (k = 2) d_w = +1.55 Mixed (k = 7) d_w = +0.433
Characteristics of the Intervention (For intervention studies only)		
Choice of books/ Materials	.470	
All children qualify?	1.38	
Number of materials provided to children	0.01	
Number of weeks between distributions	0.221	
Guidance given to caregivers?	12.14[b]	No guidance given (k = 4) d_w = +0.512 Guidance given to caregivers (k = 15) d_w = +0.154 Unknown (k = 1) d_w = +1.395
Caregivers encouraged to coread with child?	15[b]	No (k = 3) d_w = +0.393 Yes (k = 7) d_w = +0.203 Assumed given age of child (k = 8) d_w = +0.074 Unknown (k = 2) d_w = +0.530
Sponsor of intervention	19.79[c]	School (k = 7) d_w = +0.059 Clinic (k = 5) d_w = +0.105 Multiple sponsors (k = 1) d_w = +0.330 Preschool (k = 4) d_w = +0.519 Day care center (k = 4) d_w = +0.150
Distribution of print combined with other type of activity?	3.60	

Summary. The findings from these meta-analyses reveal a medium-sized relationship between children's access to print and language development (e.g., expressive language, receptive language, reading readiness). However, the results of focused analyses of effects from rigorous studies show no *causal* link between children's access to print and outcomes.

Although the search for potential moderators related to interventions did reveal some factors that may facilitate an effect that books may have on children's language development, none of the moderating relationships appear to explain why language development does not improve with access to books (and shared reading with caregiver). This is a topic that future studies can explore in more depth.

Emergent Literacy Skills

The category of outcomes labeled "emergent literacy skills" includes many of the basic reading-related skills that children must acquire in order to derive meaning from printed material. Most of these involve the skills for which children in the United States typically receive instruction during preschool, Kindergarten, and Grade 1. Included in this category are letter identification, word identification, phonological awareness, phonemic awareness, word attack, tracking of print, sentence completion, identification of rhyming words, and identifying alliterative words.

General Findings. Thirty-five research reports were located that present outcomes within this category, and these reports contained 50 independent samples. In total, 141 independent emergent literacy-related effect sizes were extracted from these reports. To ensure the independence of effect size estimates, the effect sizes were averaged within sample.

Findings are presented in Table 19. Average weighted effect sizes suggest a medium-sized relationship between children's access to print material and the development of emergent literacy skills (d_w = .330, 95% CI = +.210/+.450).[27] The reports of rigorous investigations of this relationship suggest that providing children with access to print material plays a causal role in the development of emergent literacy skills (d_w = .499, 95% CI = +.304/+.694). Likewise, focused meta-analyses on reports on interventions that distribute print material to children to own also show a medium sized effect (d_w = .442, 95% CI = +.265/+.620).

[27] As was the case with the analysis of reading motivation/interest, the meta-analytic findings reveal a large discrepancy between the average weighted average effect sizes produced by fixed effects model and the random effects model, and the direction of this difference runs counter to what is typically expected when meta-analyses are run on these two types of models. This discrepancy is attributable to the large influence of weights for the seven large nationwide samples in Myrberg and Rosén's (2008) study. In that study, the PIRLs questionnaires sent to caregivers of 9-year-olds asked them whether their child began "learning to read" at an early age. Effect sizes representing this relationship for some of the countries were positive, and some were negative. On balance, given the large weights and near 0 overall effect across the samples from that study helped reduce the average weighted effect size estimates for fixed effect models. Removing the effects from this study for this outcome category (which might be justified given that caregivers' responses were based on retrospection) yields average weighted effect sizes (d_w = .465, 95% CI = +.398/+.532) that are more aligned with random effects estimates from all samples.

Table 19. Meta-Analytic Results on Relationship Between Children's Access to Print Material and Emergent Literacy Skills

Analysis	*N*	*k*	Fixed Effects				Random Effects		
				95% CI				95% CI	
			d_w	Lower	Upper	Q_b	d_w	Lower	Upper
Emergent Literacy	**57,196**	**50**	**+0.02**	**−0.005**	**+0.040**	**654[c]**	**+0.330**	**+0.210**	**+0.450**
Nonrigorous studies	54,648	31	+0.011	−0.011	+0.034	613[c]	+0.272	+0.138	+0.407
Rigorous studies	2,548	19	+0.499	+0.304	+0.694	16	(see "Fixed Effects")		
Correlational	30,125	22	−0.001	−0.024	+0.022	550[c]	+0.248	+0.099	+0.397
Interventions-lending	2,114	12	+0.308	+0.190	+0.426	42.5[b]	+0.391	-0.034	+0.815
Interventions-ownership	24,957	16	+0.442	+0.265	+0.620	13.6	(see "Fixed Effects")		

Note: *N*, number of children studied within reports; *k*, number of independent samples within reports; Q_b, Hedges's *Q* statistic for test of homogeneity of effects; [a] $p < .05$; [b] $p < .001$; [c] $p < .0001$.

Potential Moderators. The significant test for homogeneity of effect sizes indicates that characteristics of reports, designs, samples, or effect sizes may facilitate or impede the relationship between children's access to print material and emergent literacy skills.

Moderator analyses revealed that many of the report-related, design-related, and sample-related features appear to be related with the magnitude of effect sizes. The inter-relations between these features in the reports make these findings challenging to interpret. If nothing else, these moderator findings can provide some possibilities to consider in planning future studies on children's access to print and emergent literacy.

Of more interest to educators, policymakers, and administrators of interventions that facilitate children's access to print material are the features of the interventions that may be related to the strength of the effect sizes. Children given choices of reading material showed higher effect sizes than did children who had no such choice (d_w = +0.766 versus +0.402 for choice and no choice, respectively). Interventions that provided guidance to caregivers on reading with their children, that encouraged children and caregivers to read together, and that combined other literacy activity with the distribution of print material yielded stronger effect sizes than did interventions that incorporated none of these additional features.

Table 20. Results of Moderator Analyses for Print Access and Emergent Literacy Skills

Statistic	Q_b	Difference Among Moderator Categories
Characteristics of the Reports		
Author	194.5[c]	Thirty-one different authors. Only four authors contributed multiple effect size estimates. Insufficient data to draw conclusions
Author team	114[c]	Five author teams represented. Only two teams contributed more than a single effect size. Insufficient data to draw conclusions
Year of publication	60[c]	β = −.303 (more recent studies have smaller effect sizes)
Publication type	39[c]	Journal (k = 31) d_w = +0.007 Book chapter (k = 1) d_w = +0.403 Complete book (k = 7) d_w = -0.210 Report from government sponsored group (k = 9) d_w = +0.361 Report from independent researcher (k = 1) d_w = +0.375 Doctoral dissertation/thesis (k = 1) d_w = 1.03
Publication type 2	30.7[c]	Books, book chapters, and conference presentations (k = 39) d_w = +0.007 All other types of reports (combined) (k = 11) d_w = +0.410
Peer reviewed?	49[c]	Not peer reviewed (k =9) d_w = +0.526 Peer reviewed (k = 24) d_w = +0.001 Unknown (k = 17) d_w = +0.349
Characteristics of Research Design		
Study type	46[c]	Correlational/Comparison of "Natural Groups" (k = 22) d_w = −0.001 Studies of Interventions (k = 28) d_w = +0.349
Research design	80[c]	Correlational (k = 22) d_w = +0.522 Comparison across two sites (k = 5) d_w = +0.374 Nonequivalent design with larger number of units (k = 1) d_w = +0.533 Nonequivalent design with similar units (k = 3) d_w = +0.135 Nonequivalent design with matched groups of units (k = 4) d_w = +0.685 Randomlike assignment to conditions (k = 4) d_w = +0.099 Random assignment to conditions (k = 10), d_w = +0.652 Other type of comparison (k = 1), d_w = +0.50
"Rigorous design"	23.7[c]	Nonrigorous (k = 31) d_w = +0.011 Rigorous (k = 19) d_w = +0.499
Random selection	101 [c]	Sample of convenience (k =21), d_w = +0.407 Units sampled based on eligibility requirements (k = 10) d_w = +0.251 Selection method unknown (k = 1), d_w = +1.15

Table Continues…

Statistic	Q_b	Difference Among Moderator Categories
Characteristics of Sample and Setting		
Nationality of sample	0.33	U.S. sample (k = 24), d_w = +0.483
		Non-U.S. sample (k = 26), d_w = -0.001
Type of setting	57.41[c]	Urban areas (k = 13), d_w = +0.418 Suburban (k = 2), d_w = +0.536 Rural (k = 5) d_w = +0.284 Mixed settings (k = 14) d_w = -0.007 Setting unknown (k = 10) d_w = +0.293
Percent male	1.53	
Percent low SES	0.509	
Percent minority	6.4[b]	β = +.670 (samples with higher percent minority show more positive effects)
Percent non-native Speakers	0.146	
School level of children	97.2[c]	Preschool (0-5 years) (k = 9) d_w = +0.638 Kindergarten (k = 12) d_w = +0.526 Elementary (k = 19) d_w = -0.011 Middle school (k = 6) d_w = -0.088 Mixed (k = 3) d_w = +0.206
Characteristics of the Intervention (For intervention studies only)		
Choice of books/ Materials	5.38[a]	Children have no choice (k = 15), d_w = 0.402 Children have choice (k = 10), d_w = +0.766
All children qualify?	1.57	
Number of materials provided to children	1.45	
Number of weeks between distributions	0.068	
Guidance given to caregivers?	10.17[a]	No guidance given (k = 11) d_w = +0.184 Guidance given to caregivers (k = 15) d_w = +0.399 Unknown (k = 1) d_w = +1.11
Caregivers encouraged to coread with child?	10.21[a]	No (k = 10) d_w = +0.138 Yes (k = 6) d_w = +0.359 Assumed given age of child (k = 9) d_w = +0.457 Unknown (k = 2) d_w = +0.185

Tables Continues…

Statistic	Q_b	Difference Among Moderator Categories
Characteristics of the Intervention (For intervention studies only) (continued)		
Sponsor of intervention	28.106[c]	School (k = 20) d_w = +0.378 Juvenile detention center (k = 1) d_w = +0.980 Clinic (k = 1) d_w = +0.375 Multiple sponsors (k = 1) d_w = +0.403 Preschool (k = 4) d_w = +0.189 Day care center (k = 1) d_w = +1.09
Distribution of print combined with other type of literacy activity?	12.55[a]	No other literacy activity (k = 8), d_w = -0.054 Caregiver-led activity (k = 2), d_w = +0.36 Teacher-led activity (k = 11), d_w = +0.388 Teacher- and caregiver-led activities (k = 4), d_w = 0.461

Summary. Meta-analytic findings from the studies found in the literature search suggest an overall positive relationship between children's access to print material and development of the basic skills needed to extract information from print material. Moreover, the findings from the subset of rigorous studies suggest a *causal link* between access to print material and development of emergent literacy skills.

Moderator analyses suggest that engaging caregivers in the process of reading may be important. Providing caregivers with guidelines for reading with children (e.g., Whitehurst's dialogic reading strategies) and combining teacher-led literacy activities with caregiver-led literacy activities may enhance the relationship between access to print material and emergent literacy skills.

Reading Performance

Outcomes within the "reading performance" category include aspects of reading that are typically assessed on standardized achievement tests (e.g., reading comprehension, vocabulary, formal/informal reading test). Reading fluency (reading speed) and teacher-assigned level of text difficulty are key reading-related outcomes studied among children who are just beginning to read (or children just learning to read in a second language), and these outcomes were grouped in this category as well. Effect sizes for children's self-reported reading ability also were categorized as reading performance.

Sixty reports were found that included effect sizes reflecting the relationship between children's access to print material and reading performance. These 60 reports contained 106 independent samples for which 196 effect sizes were extracted. Effect sizes representing reading performance were averaged within sample, yielding independent effect size estimates for each of the 106 samples.

Estimates of Average Effect Size. Meta-analytic findings suggest a medium effect size for this category as well (Table 21). Average weighted effect size was d_w = .441 with 95% CI = +.389/+.494. Findings for the subset of studies that employ rigorous designs show a slightly

smaller average effect size (d_w = +0.267, 95% CI = +0.175/+0.359), but one still within the "medium" range indicated by Cohen. The effect size for interventions that distribute print material also was positive (d_w = +0.435, 95% CI = +0.238/+0.632).

Table 21. Meta-Analytic Results on Relationship Between Children's Access to Print Material and Reading Performance

			Fixed Effects				Random Effects		
				95% CI				95% CI	
Analysis	***N***	***k***	d_w	**Lower**	**Upper**	Q_b	d_w	**Lower**	**Upper**
Reading Performance	**157,429**	**106**	**+0.360**	**+0.349**	**+0.371**	**1248[c]**	**+0.441**	**+0.389**	**+0.494**
Nonrigorous studies	155,355	77	+0.361	+0.351	+0.372	1220[c]	+0.450	+0.394	+0.507
Rigorous studies	4,074	29	+0.267	+0.175	+0.359	24.3	(see "Fixed Effects")		
Correlational	153,315	69	+0.362	+0.352	+0.373	1213[c]	+0.456	+0.399	+0.513
Interventions-lending	3,996	25	+0.257	+0.154	+0.360	10	(see "Fixed Effects")		
Interventions-ownership	2,118	12	+0.263	+0.155	+0.370	18	+0.435	+0.238	+0.632

Note: *N*, number of children studied within reports; *k*, number of independent samples within reports; Q_b, Hedges's *Q* statistic for test of homogeneity of effects; [a] $p < .05$; [b] $p < .001$; [c] $p < .0001$.

Potential Moderating Characteristics. The test for homogeneity conducted on all independent effect sizes within this outcome category indicated more variability among effect sizes than would be expected based on sampling alone [Q(105) = 1248, $p < .0001$]. Moderator analyses were conducted to determine which report, design, sample, and setting features appear related to the magnitude of effects.

The results of characteristics that appear to moderate the access to print- reading performance relationship are listed in Table 22. As with the moderator analyses conducted for other outcome categories, these findings also show numerous report-related and design-related features that are associated with the magnitude of effects. These findings will not be summarized here, since they are probably irrelevant to educators, policymakers, and program administrators. Some of the variability in effect sizes appears to be associated with characteristics of the scientific enterprise and publication process.

Table 22. Results of Moderator Analyses for Print Access–Reading Performance Relationship

Statistic	Q_b	Difference Among Moderator Categories
Characteristics of the Reports		
Author	854.6[c]	Fifty-one different authors. Twenty-one authors contributed multiple effect size estimates. Insufficient data to draw conclusions
Author team	34.7[c]	Center for Study of Reading (k = 6) d_w = +0.383
		Elley and colleagues' *Book Flood Studies* (k = 5) d_w = +0.906
		Krashen, McQuillan, Constantino, & Pilgreen (k = 7) d_w = +0.507
		Allington & McGill-Franzen (k = 1) d_w = +0.140
		Morrow & Gambrell (k = 2) d_w = +1.13
		Cooper, Jacobson, Speece (k = 1) d_w = +1.84
		Whitehurst and colleagues (k = 1) d_w = 0.00
		All other samples (k = 83) d_w = +0.361
Year of publication	195[c]	β = −0.396 (more recent studies have smaller effect sizes)
Publication type	124[c]	Journal (k = 53) d_w = +0.253 Book chapter (k = 2) d_w = +0.880 Complete book (k = 18) d_w = +0.393 Report from government agency (k = 17) d_w = +0.444 Report from government sponsored research group (k = 7), d_w = +0.236 Report from independent researchers (k = 2) d_w = +0.77 Conference presentation (k = 4) d_w = +1.037 Doctoral dissertation/thesis (k = 3) d_w = +0.522
Publication type 2	169[c]	Books, book chapters & conference presentations (k = 73) d_w = +0.263 All other types of reports (combined) (k = 33) d_w = +0.410
Peer reviewed?	192[c]	Not peer reviewed (k = 12) d_w = +0.290 Peer reviewed (k = 51) d_w = +0.253 Unknown (k = 43) d_w = +0.412
Characteristics of Research Design		
Study type	7.15[c]	Correlational/Comparison of "Natural Groups" (k = 69) d_w = +0.362 Studies of Interventions (k = 37) d_w = +0.260

Table Continues…

Statistic	Q_b	Difference Among Moderator Categories
Characteristics of Research Design		
Research design	18.16[b]	Correlational (k = 70) d_w = +0.362 Comparison across 2 sites (k = 6) d_w = +0.152 Nonequivalent design with larger number of units (k = 1) d_w = +0.223 Nonequivalent design with matched units (k = 2) d_w = +0.96 Randomlike assignment to conditions (k = 4) d_w = +0.789 Random assignment to conditions (k = 18), d_w = +0.216 Other type of comparison (k = 1), d_w = -0.270
"Rigorous design"	3.96[a]	Nonrigorous (k = 77) d_w = +0.361 Rigorous (k = 29) d_w = +0.267
Random selection	198[c]	Sample of convenience (k = 35), d_w = +0.271 Units sampled based on eligibility requirements (k = 26) d_w = +0.141 Sample drawn randomly (k = 29), d_w = +0.390 Other selection criteria (k = 11), +0.235 Selection method unknown (k = 5), d_w = +0.803
Characteristics of Sample and Setting		
Nationality of sample	446[c]	U.S. sample (k = 76), d_w = +0.443
		Non-U.S. sample (k = 30), d_w = +0.206
Type of setting	10[a]	Urban areas (k = 22), d_w = +0.316 Suburban (k = 3), d_w = +0.293 Rural (k = 5) d_w = +0.494 Mixed settings (k = 47) d_w = +0.363 Setting unknown (k = 29) d_w = +0.360
Percent male	0.114	
Percent low SES	0.471	
Percent minority	7.65[b]	β = −.330 (samples with higher percent minority show smaller effects)
Percent non-native speakers	2.52	
School level of children	74.06[c]	Preschool (0–5 years) (k = 2) d_w = 0.00 Kindergarten (k = 4) d_w = +0.786 Elementary (k = 55) d_w = +0.339 Middle school (k = 21) d_w = +0.321 High school (k = 14), d_w = +0.403 Mixed (k = 9) d_w = +0.518

Table Continues…

Statistic	Q_b	Difference Among Moderator Categories
Characteristics of the Intervention (For intervention studies only)		
Choice of books/ Materials	2.54	
All children qualify?	0.017	
Number of materials provided to children	1.01	
Number of weeks between distributions	8.0[c]	β = −0.662 (less time between distributions, the greater the students' reading performance)
Guidance given to caregivers?	6.2[a]	No guidance given (k = 25) d_w = +0.231 Guidance given to caregivers (k = 12) d_w = +0.478
Caregivers encouraged to coread with child?	11.19[a]	No (k = 25) d_w = +0.222 Yes (k = 7) d_w = +0.480 Assumed given age of child (k = 4) d_w = +0.456 Unknown (k = 1) d_w = +0.223
Sponsor of intervention	0.499	
Distribution of print combined with other type of literacy activity?	5.19	

Note: k, number of independent samples within reports; Q_b, Hedges's Q statistic (between) for test of homogeneity of effects; [a] $p < .05$; [b] $p < .001$; [c] $p < .0001$.

However, there are intervention-related features that were identified in the moderator analysis that may play a role in the strength of the relation between children's access to print material and their reading performance. First, shorter intervals between distribution of materials appears to be related to effect sizes. Second, getting caregivers involved in reading with their children, by providing guidance to them on how to read to/with their children and encouraging coreading with children appears to be related to stronger impacts.

Summary. The collective findings on children's access to print material and reading performance suggest a consistent positive relationship. Findings from rigorous studies suggest that providing children with access to print material actually plays a *causal role* in helping children read better. Although moderator analyses cannot detect other design features that play causal roles, they can identify potential features that could be target variables in future studies. Among the potential intervention-related moderators are the following: (1) shortening the intervals between distributions of print material, (2) encouraging caregivers to coread with their children, and (3) guidance to caregivers regarding how to read with children. Although positive relationships were found for children at all school levels, the biggest impact appears to be with kindergarteners.

Writing Performance

Twelve distinct types of outcomes were grouped together in the "writing performance" category. These include children's performance on a dictation task, ability to write a story, words attempted on a writing task, vocabulary used in writing, spelling, structure of written work, content in the writing sample, length of writing sample, number of words in the writing sample that are correctly used, use of appropriate grammar, and ability to adopt a narrative versus expository style.

The literature search revealed 15 different research reports that examined children's writing performance in relation to their access to print material, and within those 15 reports, there were 42 effect sizes produced by 17 independent samples of children. Writing performance-related effect sizes were averaged within sample.

Overall Average Effect Size. Meta-analysis results reveal a "medium-sized" relationship for children's access to print and writing performance, with average weighted effect size, d_w = .393 and 95% confidence interval ranging from +0.099 to +0.687 (Table 23). Despite this positive overall relationship, focused meta-analyses conducted on the two subsets of studies of most interest—rigorous studies and studies of interventions involving distribution of print material to children—both indicate a near-0 effect (d_w = +.099, 95% CI = −0.327/+0.526 for rigorous studies and = +.257, 95% CI = −0.068/ +0.582).

Table 23. Meta-Analytic Results on Relationship Between Children's Access to Print Material and Writing Performance

			Fixed Effects				Random Effects		
				95% CI				95% CI	
Analysis	***N***	***k***	d_w	**Lower**	**Upper**	Q_b	d_w	**Lower**	**Upper**
Writing Performance	**3,217**	**17**	**+0.299**	**+0.189**	**+0.409**	**42**[c]	**+0.393**	**+0.099**	**+0.687**
Nonrigorous studies	1,391	7	+0.342	+0.226	+0.461	20[a]	+0.665	+0.259	+1.07
Rigorous studies	1,825	10	+0.046	−0.241	+0.334	17.9[a]	+0.099	-0.327	+0.526
Correlational	778	4	+0.913	+0.381	+1.44	1.3	(see "Fixed Effects")		
Interventions-lending	1,536	6	+0.273	+0.154	+0.393	27.6[b]	+0.174	−0.340	+0.687
Interventions-ownership	902	7	+0.257	−.068	+0.582	7.8	(see "Fixed Effects")		

Note: *N*, number of children studied within reports; *k*, number of independent samples within reports; Q_b, Hedges's *Q* statistic for test of homogeneity of effects; [a] $p < .05$; [b] $p < .001$; [c] $p < .0001$.

Potential Moderating Characteristics. The test for homogeneity of variance in effect sizes indicates more variability than would be expected by sampling error alone [Q(16) = 42, $p <$ .001]. Based on this finding, we examined whether features of reports, research designs, samples, or interventions might moderate some of that variability.

For reasons already mentioned with other summaries of moderator findings with other outcome categories, the report-related and design-related moderators will not be described in text. Readers interested in these potential moderators can see them in Table 24. The types of moderators of most interest to educators, program administrators, and policymakers involve features of actual interventions that may enhance the relationship between children's access to print material and performance on writing assessments. Several of these findings run counter to expectations.

Analysis of moderators suggest that interventions that allow children to choose the books/print materials that they wish to read may strengthen the relationship between access to books/print material and writing performance.

Table 24. Results of Moderator Analyses for Print Access–Writing Performance Relationship

Statistic	Q_b	Difference Among Moderator Categories
Characteristics of the Reports		
Author	37.5[b]	Thirteen different authors. Four authors contributed multiple effect size estimates
Author team	24.2[b]	Only three author teams provide more than effect size to these analyses. Insufficient data to draw conclusions
Year of publication	0.751	
Publication type	2.47	
Publication type 2	.005	
Peer reviewed?	.102	
Characteristics of Research Design		
Study type	5.25[a]	Correlational/Comparison of "Natural Groups" (k = 4) d_w = +0.913 Studies of Interventions (k = 13) d_w = +0.272
Research design	33[c]	Correlational (k = 4) d_w = +0.985 Nonequivalent design with larger number of units (k = 1) d_w = +0.197 Nonequivalent design with similar units (k = 2) d_w = +0.804 Nonequivalent design with matched units (k = 2) d_w = −0.455 Randomlike assignment to conditions (k = 3) d_w = +0.185 Random assignment to conditions (k = 4), d_w = +0.282 Other type of comparison (k = 1), d_w = −1.06
"Rigorous design"	3.49	
Random selection	14.26[b]	Sample of convenience (k = 10), d_w = +0.253 Units sampled based on eligibility requirements (k = 4) d_w = +0.200 Other selection criteria (k = 1), +0.805 Selection method unknown (k = 2), d_w = +0.455

Table Continues…

Statistic	Q_b	Difference Among Moderator Categories
Characteristics of Sample and Setting		
Nationality of sample	4.91[a]	U.S. sample (k = 11), d_w = +0.482
		Non-U.S. sample (k = 6), d_w = +0.215
Type of setting	27.2[c]	Urban areas (k = 6), d_w = +0.420 Suburban (k = 1), d_w = −1.06 Rural (k = 2) d_w = −0.107 Mixed settings (k = 1) d_w = +0.805 Setting unknown (k = 7) d_w = +0.255
Percent male	1.54	
Percent low SES	0.472	
Percent minority	0.47	
Percent non-native Speakers	9.35	β = −.768 (samples with higher percent of non-native speakers show smaller effects)
School level of children	12.13[a]	Preschool (0–5 years) (k = 4) d_w = +0.728 Kindergarten (k = 2) d_w = +0.162 Elementary (k = 6) d_w = +0.325 Middle school (k = 1) d_w = +0.855 Mixed (k = 4) d_w = +0.207
Characteristics of the Intervention (For intervention studies only)		
Choice of books/ Materials	14.69 [c]	Children have no choice in materials (k = 7) d_w = −0.054 Children have choice of materials +0.752
All children qualify?	0.432	
Number of materials provided to children	18.47[c]	β = −0.765 (more materials provided to children, the worse their performance on writing assessment)
Number of weeks between distributions	5.229[a]	β = +0.559 (more time between distributions, the greater the students' reading performance)
Guidance given to caregivers?	6.10[a]	No guidance given (k = 5) d_w = +0.202 Guidance given to caregivers (k = 7) d_w = −0.054
Caregivers encouraged to coread with child?	7.37	
Sponsor of intervention	16.4[c]	School (k = 9), d_w = +0.087 Clinic (k = 1), d_w = +0.740 Preschools (k = 3), d_w = +0.190 Day care centers (k = 1), d_w = 0.805
Distribution of print combined with other type of literacy activity?	3.88	

The number of distributions of print materials to children and the timing of those distributions may play a counterintuitive role. Findings suggest that children perform better on writing assessments when they receive *fewer* reading materials and when the timing of the distribution of reading materials is made longer. Findings also suggest that the relationship between access to print and writing is bolstered when educators *refrain* from providing guidance to parents on reading with one's children. Interventions taking place within day care centers and medical clinics also appear to show stronger access-writing relationships than interventions conducted in other settings.

Summary. Despite the overall positive relationship found between children's access to print and writing performance, the more focused meta-analyses suggests no direct causal role for access to print and children's performance on writing tasks. The results also suggest that interventions that provide books or other print material to children may be unrelated in children's development of writing skills. The meta-analysis procedures and procedures for moderator analysis revealed several intriguing findings regarding the relationship between access to print materials and writing performance. Additional primary studies need to be conducted to provide a clearer picture of the true nature of the overall relationship and potential factors that influence that relationship.

General Achievement

A catch-all category was created to accommodate other indicators of academic achievement besides those most related to understanding written communication (reading performance) and written expression of ideas (writing performance). This category included measures of children's academic performance in other subjects (i.e., mathematics, science), their grades, grade promotion, the changes in achievement gaps within a school, and general "giftedness" of students.

Ten reports were identified and obtained that contained studies of the relationship between children's access to print material and general academic achievement. Each of these studies provided data on a single independent sample, and altogether, there were 32 effect size estimates provided within these reports. Effect sizes were averaged for each sample prior to beginning meta-analysis.

Overall Average Effect Size. The average weighted effect size from this analysis was d_w = +0.534 (95% CI = +0.211/+0.857). This average effect size also falls within Cohen's "medium" range (Table 25). Only one report was uncovered that used a rigorous design to examine children's access to print and some other type of achievement (in this case, guardians' impressions of child's knowledge). That same report is the only one that examines an intervention that distributes books to children as well (McCormick & Mason, 1986). Too few research findings are available to make conclusions regarding magnitude of effects of these types of studies.

Table 25. Meta-Analytic Results on Relationship Between Children's Access to Print Material and General Academic Achievement

Analysis	*N*	*k*	Fixed Effects				Random Effects		
				95% CI				95% CI	
			d_w	Lower	Upper	Q_b	d_w	Lower	Upper
General Academic Achievement	**78,503**	**40**	**+0.548**	**+0.534**	**+0.563**	**29.8**[a]	**+0.543**	**+0.483**	**+0.604**
Nonrigorous studies	78,377	39	+0.548	+0.533	+0.563	29.1[c]	+0.542	+0.481	+0.603
Rigorous studies	24	1	+1.07	—	—	—	—		
Correlational	77,938	37	+0.548	+0.534	+0.563	29[b]	+0.542	+0.481	+0.603
Interventions-lending	256	2	+0.474	-0.173	+1.12	0.1	(see "Fixed Effects")		
Interventions-ownership	24	1	+1.07	—	—	—	—		

Note: *N*, number of children studied within reports; *k*, number of independent samples within reports; Q_b, Hedges's *Q* statistic for test of homogeneity of effects; [a] $p < .05$; [b] $p < .001$; [c] $p < .0001$.

Potential Moderating Characteristics. For the general relationship between children's access to print and other types of academic achievement, the test for homogeneity suggests that other factors besides sampling error are influencing the effect sizes [Q_b (9) = 29.8, $p < .05$]. Tests for potential moderators were conducted to determine if characteristics of reports, research designs, samples, settings, or interventions may be associated with magnitude of effect sizes from these 10 reports.

Table 26. Results of Moderator Analysis for Print Access–General Achievement Relationship

Statistic	Q_b	Difference Among Moderator Categories
Characteristics of the Reports		
Author	29[c]	Nine different authors. Only one author contributed multiple effect size estimates
Author team	1.94	
Year of publication	2.64	
Publication type	26.42 [a]	Journal article (k = 2), d_w = +0.064
		Chapter in a book (k = 2), d_w = +1.03
		Complete book (k = 1), d_w = +0.616.
		Report from a government-sponsored research group (k = 3), d_w = +0.346.
		Conference presentation (k = 2), d_w = +1.098.
Publication type 2	1.243	
Peer reviewed?	12.9[b]	Not peer reviewed (k = 3), d_w = +1.087

Table Continues…

Statistic	Q_b	Difference Among Moderator Categories
Characteristics of the Reports (continued)		
		Peer reviewed (k = 1), d_w = −0.028
		Unknown (k = 6), d_w = +0.526
Characteristics of Research Design		
Study type	0.23	
Research design	0.903	
"Rigorous design	0.74	
Random selection	24.98[c]	Sample of convenience (k = 7), d_w = +0.895 Units sampled based on eligibility requirements (k = 1) d_w = +0.616 Random selection (k = 1), −0.028 Selection method unknown (k = 1), d_w = +0.330
Characteristics of Sample and Setting		
Nationality of sample	7.46[b]	U.S. sample (k = 6), d_w = +0.536
		Non-U.S. sample (k = 4), d_w = +0.119
Type of setting	20.78[c]	Urban areas (k = 2), d_w = +1.98 Mixed settings (k = 3) d_w = +0.235 Setting unknown (k = 7) d_w = +0.885
Percent male	0.826	
Percent low SES	NA	
Percent minority	NA	
Percent non-native Speakers	NA	
School level of children	1.78	
Characteristics of the Intervention (For intervention studies only)		
Choice of books/ Materials	0.538	
All children qualify?	0.538	
Number of materials provided to children	0.564	
Number of weeks between distributions	0.245	

Table Continues…

Statistic	Q_b	Difference Among Moderator Categories
Characteristics of the Intervention (For intervention studies only) (continued)		
Guidance given to caregivers?	0	
Caregivers encouraged to coread with child?	0.538	
Sponsor of intervention	0	
Distribution of print combined with other type of literacy activity?	0.003	

Note: NA, not available.

Although the test for homogeneity of variance did indicate sufficient variation among effect sizes to warrant an exploration of moderators, very few of the features that have been examined in these analyses were found to be associated with effect size magnitude. Moderators identified through these analyses were as follows: (1) author of the study, (2) publication type, (3) whether report was peer reviewed, (4) nationality of the sample, and (5) type of setting. Most of these features are reflective of the scientific enterprise and the way that research findings are disseminated to the public and other researchers. None of the intervention-related features appeared to moderate the relationship between children's access to print and general academic achievement.

Summary. General academic achievement represents a wide variety of types of academic achievement and intellectual abilities that do not directly involve reading and writing. This category covers outcomes involving test scores in other subjects (e.g., science, mathematics), grades in other subjects, and school-wide indicators (e.g., achievement gaps between groups of students). Of the eight outcome categories examined for this project, the outcomes for "general academic achievement" appear in the fewest number of reports, are tested with the fewest samples of children, and fewest numbers of children. Although a general positive relationship is evident among the 10 reports and samples, too few rigorous studies have been conducted to determine whether children's access to print material may be influencing these types of outcomes directly or whether actual distribution of print materials may be associated with these types of academic outcomes.

Little insight into features that may strengthen or weaken the print access-achievement relationship can be found in moderator analyses either. Those features that were identified as associated with effect size magnitude tended to reflect the characteristics of the scientific process and dissemination outlets, rather than target populations or components of interventions. More research needs to be done to determine whether there exist causal relationships between children's access to print and general achievement and whether particular types of interventions that facilitate children's access to print material produce the greatest effects.

Summary

The results just presented were produced by 27 separate meta-analyses. Three meta-analyses were conducted at a broad level (sample as unit, disregarding particular outcome categories). One of these meta-analyses examined the overarching relationship between access to print material and outcomes, one examined the subset of reports that used rigorous research designs capable of detecting "causal" relationships, and one examined the subset of reports focusing on interventions that facilitate children's ownership of books and other types of print material. Collectively, these findings show that providing books and other types of print material to children *causes* improvements in education-related outcomes.

The remaining 24 meta-analyses were conducted on the various outcome categories. Three meta-analyses were done for each category: (1) one that estimated general relationship between access to print material and the outcome type, (2) one on the subset of studies using rigorous research designs, and (3) one on the subset of reports that examined interventions that facilitate children's ownership of books. Findings from these 24 meta-analyses show that the general relationships found at the broadest level are not necessarily manifested in all outcome categories. Meta-analytic findings show the following:

- Access to books and print material *produces* (i.e., causes) improved attitudes toward reading and learning among children.
- Although access to books and print material is related to children's motivation to read, the direction of causality for this relationship is uncertain. Findings do not show that providing children with print material *causes* increased motivation to read.
- Providing children with books and print material *causes* increased reading.
- Access to print material is related to children's language development, but meta-analytic findings do not show a direct *causal* link.
- Books and other types of print material appear to be instrumental in helping children learn to the "basics" of reading (i.e., emergent literacy or extraction of meaning from print).
- Providing books and print materials to children helps to improve their reading performance.
- The findings for reading achievement do *not* extend to children's performance on writing tasks. Despite a relationship between access to print and writing, it is not clear that the former *causes* the latter.
- Although there is a relationship between children's access to print materials and other types of academic outcomes, too few reports exist to examine any possible *causal* links.

Focus on Interventions That Facilitate Children's Ownership of Print Material

The studies reviewed here fall into three types: (1) studies of general relationships, (2) studies of interventions that involved *lending* books or print material to children (i.e., lending libraries, book-bag programs, book floods), and (3) interventions that facilitate children's *ownership* of

print material. The following discussion addresses the last type of study: investigations of impacts of interventions that distribute print material to children. Such investigations were found among 27 reports, and findings are available on 33 samples of children.

Although the interventions in reports examined here have one similarity to RIF's book ownership program (i.e., providing print material to children to own), it must be noted at the onset that none of the reports examined in this section has findings on any of Reading Is Fundamental's programs. Learning Point Associates' near-exhaustive literature search has not uncovered any reports of impact studies of RIF programs.[28] The evaluations of RIF that have been uncovered have focused on RIF's processes of distributing books to children, their administrative processes, and management (Boldovici, Rosenfeld, & Wilkes, 1971; General Research Corporation, 1980). Previous attempts to examine impacts of RIF's book ownership program were discontinued prior to completion because of funding cuts (General Research Corporation, 1980).

Nor are the interventions examined here directly analogous to RIF's book ownership program. Rather, these interventions share "the critical" feature with RIF's book distribution program—they give print material to children to own—but there are several other features of RIF's program that these interventions may or may not share.[29] The specific interventions found in this literature review that provide print materials to children are summarized in Table 27.

We examined the collective impact of these interventions by focusing on just those that employ a rigorous design. Individual samples within reports contributed a single effect size estimate to the analysis. The results of this meta-analysis indicates that these interventions do produce positive outcomes among children, and the magnitude of this effect falls within Cohen's "medium" range [d_w = +0.263, 95% CI = +0.176/+0.350].

[28] Learning Point Associates literature search did identify one study of RIF's "Running Start" program—a program funded by Chrysler Corporation that challenges children to read 21 books in three weeks. Gambrell and Morrow (1993) and Gambrell, Almasi, Xie, and Heland (1995) both suggest that the report showed positive impacts for this program. However, these book chapters provide too few details on the evaluation to include in this meta-analytic review. Learning Point Associates' project manager has requested a copy of the original research report from Linda Gambrell (the primary investigator) and from the primary contact at Reading Is Fundamental, but both Dr. Gambrell and the RIF contact state that they no longer possess copies of that report.

[29] From our understanding of RIF's book ownership program, core components appear to be as follows: (1) distribution of several books to elementary-school-aged children, spread out across the year, (2) children are able to choose from a variety of age-appropriate, prescreened books, (3) sites are required to match the funds provided by RIF for these books, and (4) the distribution of books is usually accompanied by other types of events designed to get children excited about reading.

Table 27. Types of Book Distribution Programs Included in This Meta-Analysis

Type of Intervention	Number of Samples	Report Authors
Books and reading guidance provided to caregivers by physicians in conjunction with clinic-based, well-child exams (Reach Out And Read [ROAR], Beginning with Books)	8	Bean et al. (1990)
		Billings (2009)
		Golova et al. (1999)
		High et al. (2000)
		Jones et al.
		Mendelsohn et al. (2001)
		Needlman et al. (1991)
		Sharif et al. (2002)
Interventions by Center for the Study of Reading on "Little Books"	8	Mason (1990)
		McCormick & Mason (1984)
		McCormick & Mason (1986)
		Phillips et al (1990)
		Phillips et al. (1996)
Books provided in conjunction with dialogic reading	3	Whitehurst (1994, 1998)
		Lonigan et al. (1998)
Books provided in conjunction with home visits	2	Levenstein et al. (2002)
		Mann et al.(2009)
Summer-loss prevention book distribution program	2	Allington et al. (2010)
		Kim & White (2008)
Native language reading material	2	Goldenberg et al. (1992)
		Hancock (2002)
Magazine subscriptions to children	2	Rucker (1982) (two samples)
Book lending + gift certificate for book	2	McGill-Franzen & Allington (1999)
		Kelly-Vance & Schreck (2002)
Books provided in conjunction with larger schoolwide literacy initiative	2	Inglis et al. (1981) (two samples)
Parental guidance on reading + book	1	Saint-Laurent & Gaisson (2005)
Literature-based literacy program + magazine subscription	1	Morrow (1999)

Section V: Summary of Findings and Conclusions

This research synthesis involved a near-exhaustive search for published and unpublished reports of studies on the relationship between children's access to print material and education-related outcomes. Of the 1,107 research reports that were identified as "potentially relevant" and "empirical" on the basis of their abstracts, the team was able to obtain 955 (86 percent) of these reports. After screening these reports further based on relevance to this investigation, adequacy of research design to investigate relationships between variables, and inclusion of sufficient data to calculate effect sizes, 108 reports remained. The features of these remaining research reports were coded, and their findings were translated into a common effect size metric (the *d* index, or difference between groups in standard deviation units). The findings from the meta-analyses are summarized in order of the research questions listed in the introductory section (see Table 28 and Figure 5).

Overall Magnitude of Relationship

According to the reports found through this literature search and screening process, meta-analysis of effect sizes indicate that a positive relationship exists between children's access to print material and the outcomes. The magnitude of the relationship falls within Cohen's "medium" range of effects (d_w = .463). The average weighted effect sizes for each of the categories of outcomes also fall within the "medium" range.

A relationship between variables is a necessary component for determining causation, but a simple relationship fails to show the direction of influence between variables (i.e., whether variable A influences—or plays a causal role for—variable B or vice versa). Only studies using "rigorous" research designs are capable of examining the causal roles between variables.

Magnitude of Relationship From Reports Containing Rigorous Studies

Reports of studies that do use rigorous research designs do show that increasing children's access to print material generally does improve children's outcomes. However, that causal role was not evident for all outcomes. Increasing children's access to print material appears to produce more positive attitudes toward reading, increases the amount of reading that children do, increases children's emergent literacy skills, and improves children's reading achievement. For reading motivation, basic language skills, and writing achievement, the collective findings suggest no causal relationship. The causal role of access to print on other academic outcomes could not be determined because of a lack of effect sizes.

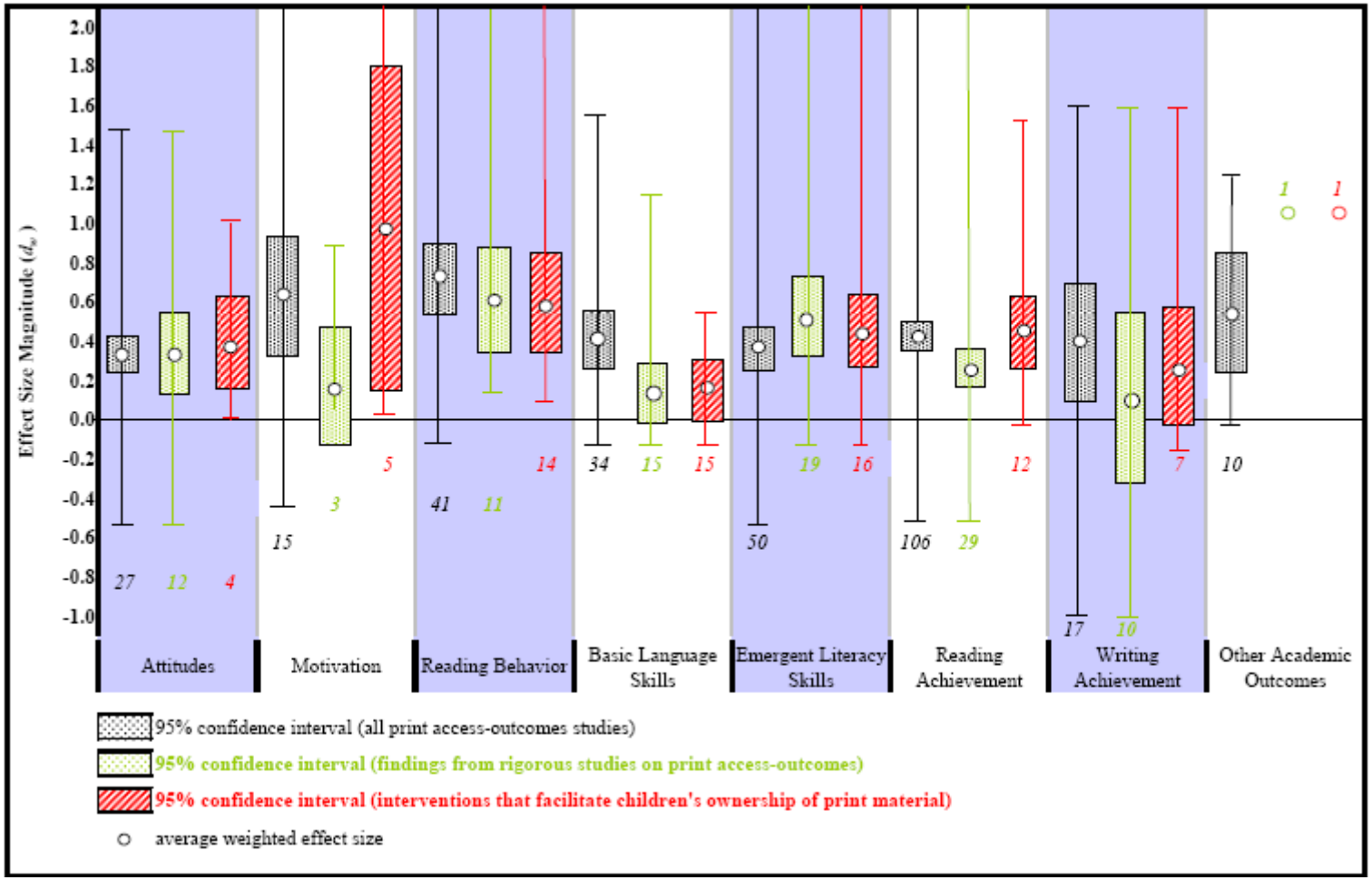
Impacts of Interventions That Include Distribution of Print Material

Similarly, providing children with print material also appears to be associated with positive outcomes. This positive finding was evident for all categories of outcomes except language development and writing achievement. Too few effects sizes were uncovered for the category of "other academic outcomes" to make any conclusions. It should also be noted that many of the interventions included here provided books or other types of reading material as just one part of a broader literacy intervention.

Table 28. Answers to Research Questions Underlying Research Synthesis Project

Research Question	Answer Based on This Meta Analytic Review
1. What is magnitude of the relationship between children's access to print material and outcomes?	d_w = +.463 [+.422/+.502]. A medium effect
Attitudes	d_w = +.333 [+.249/+.418]. A medium effect
Motivation to read	d_w = +.617 [+.311/+.924]. A medium effect
Reading behavior	d_w = +.704 [+.526/+.882]. A medium effect
Basic language abilities	d_w = +.400 [+.245/+.553]. A medium effect
Emergent literacy skills	d_w = +.330 [+.210/+.450]. A medium effect
Reading performance	d_w = +.441 [+.389/+.494]. A medium effect
Writing performance	d_w = +.393 [+.099/+.687]. A medium effect
General academic achievement	d_w = +.534 [+.211/+.857]. A medium effect
2. Do studies that use the most rigorous designs indicate positive effects?	Yes
Attitudes	Yes
Motivation to read	No
Reading behavior	Yes
Basic language abilities	No
Emergent literacy skills	Yes
Reading performance	Yes
Writing performance	No
General academic achievement	Too few reports for this outcome category
3. Are there impacts among programs that facilitate children's ownership of print materials?	Yes
Attitudes	Yes
Motivation to read	Yes
Reading behavior	Yes
Basic language abilities	Yes
Emergent literacy skills	Yes
Reading performance	Yes
Writing performance	No effect
General academic achievement	Too few reports for this outcome category
4. Characteristics of reports or studies *moderate* relationship between access to print and outcomes?	Yes

Figure 5. Box and Whisker Plot of Average Effect Sizes



Potential Moderators of Print Access-Outcome Relationship

Moderator effects were examined for each category of outcome. With the findings of moderator analyses came the cautionary note: many of the features of reports, research designs, samples, research settings and interventions appear intermixed within the research reports. Thus, report features that are found to be related with effect sizes may actually duplicate findings from another moderator analysis. Care must be taken in drawing inferences from results of moderator analyses. These moderator analyses are also "exploratory" in nature, readers should consider findings to be "hints" of relationships, rather than strong confirmation that actual relationships exist. Additional primary studies should be performed to confirm the existence of these moderating relationships.

Across outcomes, findings suggest that characteristics of the scientific enterprise or research design issues play a role in the magnitude of effects that are reported. Effect sizes are larger for certain investigators than for others, and effect sizes were larger for certain types of publication vehicles (book chapters and conference presentations, both of which are scrutinized less by peers) than others. Effects from studies using "nonrigorous" designs tend to be larger than those from studies using more rigorous designs. Studies conducted in the United States also had larger effect sizes than did studies conducted in other countries.

When examining features of interventions that may moderate print access-outcome relationships, it appears that moderators may operate in different ways depending on the outcome being examined (see Table 29). For instance, guidance provided to caregivers on reading to their children appear to show contradictory influences for reading behavior and language development. For reading behavior, interventions that provided guidance showed stronger print access-reading relationships. For language development, interventions that provided guidance to caregivers showed smaller effect sizes than those that did not provide such guidance.

It is therefore recommended that those wishing to know whether a particular feature should be included in an intervention that distributes books or other print material look first at the particular outcome that the intervention is attempting to influence. Once a desired outcome is identified, then examine the features that are linked with stronger effects.

Magnitude of Effect Size in Context

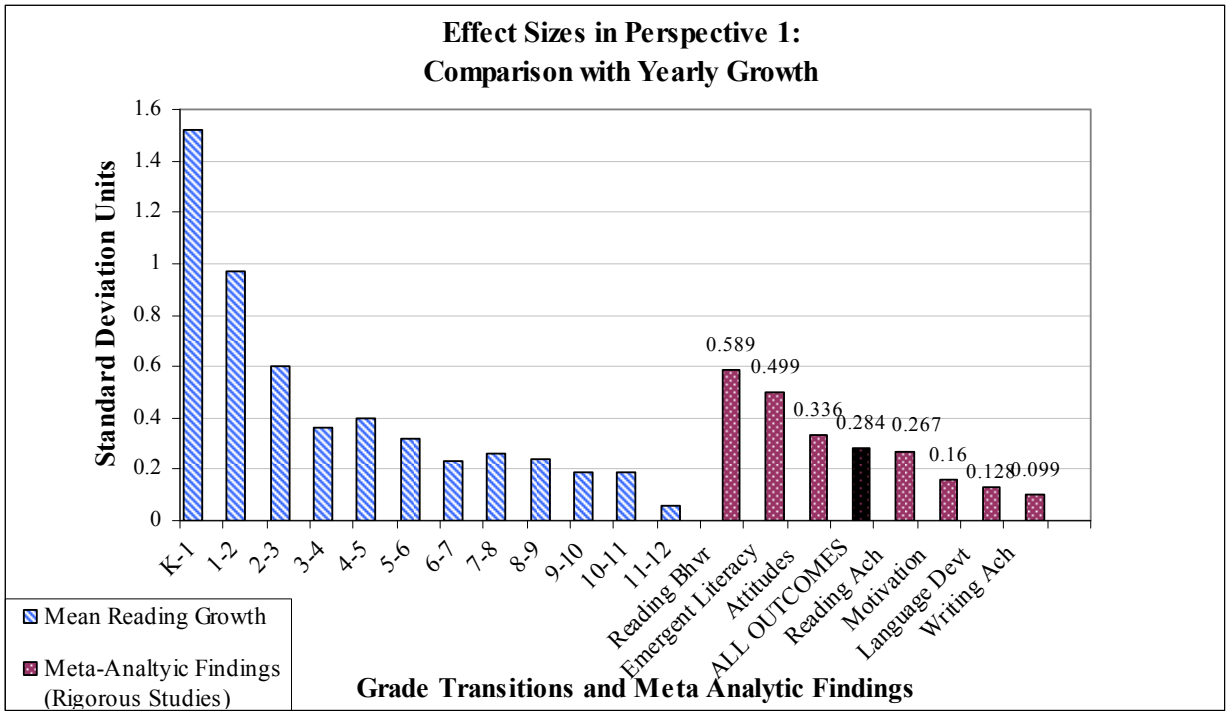
Throughout this review, we have drawn on Cohen's classification of effect sizes as "small" ($d < .10$), "medium" ($.20 < d < .80$), and "large" ($d > .80$) to provide context of magnitude of effect. Most effects uncovered through this project would be classified as "medium." Cohen and other researchers have stated that the small/medium/large classification reflects social science in general, and that these ranges of effects actually vary by social science discipline.

Table 29. Summary of Moderator Analysis Findings for Sample-Related, Setting-Related, and Intervention-Related Features

Moderator Type and Moderator	Attitudes	Motivation	Reading Behavior	Basic Language Skills	Emergent Literacy Skills	Reading Performance	Writing Performance	General Academic Achievement
Sample and Setting								
% male	—	—	—	—	—	—	—	—
% in poverty	—	—	—	—	—	—	—	—
% minority	—	negative	negative	—	positive	negative	—	—
% non-native speakers	—	—	—	—	—	—	negative	—
School level	—	best at younger ages	best at younger ages	best in elementary grades	best in PK & K	best in K, positive in all but PK	no interpretation	—
Intervention								
Choice of materials	—	choice < no choice	choice < no choice	—	choice > no choice	—	choice > no choice	—
Children's eligibility	—	all children < "eligible children"	all children > "eligible" children	—	—	—	—	—
Number of materials	—	best with more materials	—	—	—	—	best with fewer materials	—
Distribution intervals	—-	best with shorter intervals	best with longer intervals	—	—	best with shorter intervals	best with longer intervals	—
Caregiver guidance	—	guidance > no guidance	guidance > no guidance	guidance < no guidance	guidance > no guidance	guidance > no guidance	guidance < no guidance	—
Encouragement to coread	—	encouraged > unencouraged	encouraged > unencouraged	encouraged < unencouraged	encouraged > unencouraged	encouraged > unencouraged	—	—
Sponsor	—	Multiple & clinic > schools	multiple & clinic > schools	preschool > others	no interpretation	—	other > school	—
Combined with other literacy activities	—	Other activities > no activities	Other activities > no activities	—	Other activities > no activities	—	—	—

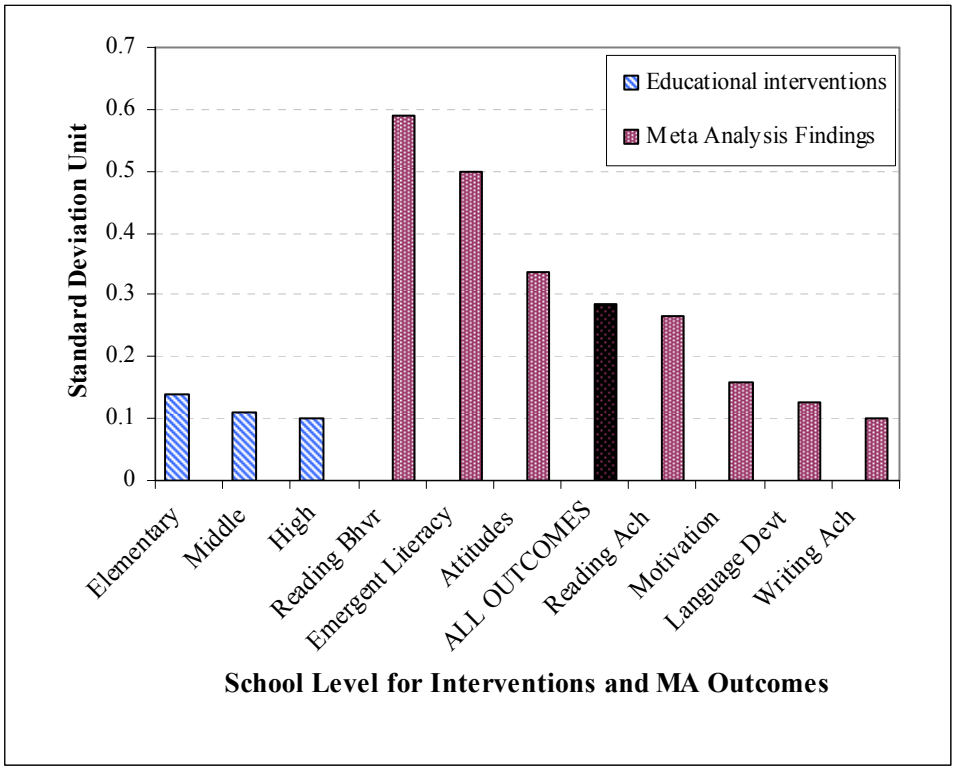
Another way to gauge the magnitude of average effect size is to compare them with the academic growth that children display during a single year of school. Bloom, Hill, Black, and Lipsey (2008) examined annual rates of growth for children in various grades on reading, based on seven nationally normed tests. They found that rates of growth for reading ranged from d = 1.52 (Kindergarten and Grade 1) to d = .06 (Grade 12). Rates of growth were relatively large during the first few years of schooling (Grades K–2) but decreased over time (see Figure 6). Across all outcome types, meta-analytic findings are about 19 percent as large as average reading growth for children between Kindergarten and the end of Grade 1. Average change in reading achievement attributable to increased access to books is approximately 18 percent as large as the amount of reading growth between Kindergarten and Grade 1. The degree of reading improvement evidenced in the rigorous studies examining children's access to print material is most similar to the rate of reading growth demonstrated by children in the middle school grades (Grades 6, 7, and 8).

Figure 6. Comparison of Meta-Analytic Findings With Average Reading Growth



Another benchmark against which to compare these findings is the average impact of educational interventions. Lipsey (2010) has examined the average effect sizes of educational interventions that have been implemented in elementary schools, middle schools, and high schools. Average effect sizes for interventions range from d = .10 for interventions in high school to d = .14 for interventions conducted on children in elementary school levels (see Figure 7). In comparison to other types of educational interventions, the average weighted effect size for rigorous studies that test interventions that increase children's access to print (across all outcomes) is twice as large as the average finding from other types of educational interventions (d = .284 versus d = .14 for elementary schools).

Figure 7. Comparison of Meta-Analytic Findings With Findings From Other Educational Interventions



Other Questions Requiring Consideration

Two general questions were revealed in the literature review that may need to be considered to understand the relationship between children's access to print material and outcomes. First, throughout this report, readers have been cautioned to avoid inferring direction of causation from the existence of a simple relationship. The effects from rigorous studies do show that increasing children's access to print produces improvements in four of eight outcome categories (attitudes, reading behavior, emergent literacy skills, and reading achievement). However, it may be that a *reciprocal* relationship exists between access and outcomes, such that providing interesting written materials to children increases their reading behavior and achievement, *which then in turn further increases their desire to read and acquire more books*. If such is the case, then quadratic patterns would be apparent in longitudinal studies that explored these relationships. The second question arose from work done by McGill-Franzen, Allington, Yokoi, & Brooks (1999) and the work on dialogic reading by Whitehurst and his associates (e.g., Lonigan & Whitehurst, 1998; Whitehurst et al., 1994a, 1994b) suggesting that print materials were necessary but not sufficient for increasing children's performance in reading. The findings in this review do not address this speculation directly. Findings from these investigators are included in this review, but in general, findings from programs in which access to print materials accompanies other types of literacy activity (teacher or caregiver-facilitated reading assistance) do not show an improvement (Q_b for "book add-on" in Table 12 is not significant).

Conclusion

This meta-analytic research synthesis was designed to uncover as many research findings on the relationship between children's access to print material and outcomes as possible. Systematic procedures searching for research reports and screening those reports were carried out.

The results of this meta-analytic review provide firm support for consistent and reliable relationships between children's access to print material and outcomes. Separate meta-analytic procedures performed on just those effects produced by "rigorous" studies suggest that children's access to print materials plays a *causal* role in facilitating behavioral, educational, and psychological outcomes in children—especially attitudes toward reading, reading behavior, emergent literacy skills, and reading performance. Finally, although reports from interventions that share all of the features of RIF's book ownership program were not found in the literature search, the research on interventions that put print materials in the hands of youth also suggests consistently positive relationships.

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*Denotes report included in meta-analytic research synthesis.

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Appendix A
Technical Methods

This appendix provides detailed information on how effect sizes were calculated, methods used to weight effect sizes and adjust those weights to accommodate for nested data, and adjustments made to create random effects models. Five equations are provided for converting research findings presented in text to Cohen's *d*-index. The process of weighting effect sizes is provided in one equation, and nine additional equations are provided to show how alternative weights were created for nested data. One additional equation is provided to show how random effects models were created.

Methods for Calculating Cohen's *d*-Index

The equations that follow demonstrate how effect sizes were calculated given the findings presented in reports. One equation applies to situations where means and standard deviations of study groups are presented. One equation corresponds to situations when only *t*-statistics (comparisons between two groups) are presented, and another equation is presented for the case when *F*-statistics (with 1 degree of freedom in numerator) are provided. For situations when investigators report the Pearson product-moment correlation coefficient, another conversion-to-*d*-equation is presented. Finally, the process of converting χ^2 tests of independence ("chi square") to *d*-index is presented.

Also included are the research synthesis team's preferences for methods of conversion to *d*-index. The inferences the team members made regarding "null effects" versus "unreported effects" also explained in this section as well.

Cohen's "*d*-index" From Group Averages and Standard Deviations

The method of conversion that is closest to the underlying definition of *d*-index involves calculating the difference between an intervention group's average and the comparison group's average and dividing by the common standard deviation of each of the groups. See Equation 1 below.

$$d = \frac{x_1 - x_2}{\frac{SD_1 + SD_2}{2}} \qquad \textbf{[Equation 1]}$$

In this equation, x_1 represents that average of the intervention group, x_2 represents that average of the comparison group, and the denominator represents the common standard deviation among the two groups.

Cohen's "*d*-index" From *t*-statistic (or *F*-statistic With 1 df)

When only *t*-statistics are presented to indicate the difference between two independent groups, a *d*-index is calculated using Equation 2.

$$d = \frac{2t}{\sqrt{df_{error}}} \qquad \textbf{[Equation 2]}$$

In this equation, "*t*" represents the *t*-statistic provided in the report, and the denominator reflects the total number of units (i.e., children or schools) being examined in the analysis (specifically, sum of number of units in both groups minus 2).

F-tests with 1 degree of freedom in the numerator are often presented (comparison between two groups), especially when the independent effects of numerous variables are being examined together. Because $t = \sqrt{F}$, Equation 2 can be altered slightly to convert these *F*-statistics to *d*-index (see Equation 3).

$$d = \frac{2\sqrt{F}}{\sqrt{df_{error}}} \qquad \textbf{[Equation 3]}$$

Cohen's "*d*-index" From Pearson's Product-Moment Correlation (*r*) and χ^2 Test (1 df)

Many of the reports involved in this meta-analytic literature review involved examinations of the magnitude of relationship between two continuous variables. Such was the case when children's survey responses on number of books they have access to in the home are correlated to their score on a reading test. For such cases, the correlation coefficient (*r*) was converted to a *d*-index using Equation 4.

$$d = \frac{2r}{\sqrt{1 - r^2}} \qquad \textbf{[Equation 4]}$$

When findings from a multiple regression were reported as well as the zero-order correlation coefficient, the latter statistic was used as the basis for the *d*-index. In instances where only standardized regression coefficients (βs) were reported, these coefficients were treated as correlation coefficients using Equation 4. The research team then coded the β–based effect sizes differently from those computed directly from zero-order correlation coefficients.

When dichotomous frequency data are presented for two different groups, Learning Point Associates' research team either used the frequency data to calculate the corresponding χ^2 statistic or used the χ^2 statistic (with 1 df) reported in text as the basis for *d*-index. For example, if caregivers report that their child's reading improved or did not improve following participation in either a book-bag lending program or no book-lending program, then the frequency of response from caregivers of children in each group can be used to calculate χ^2.

These χ^2 statistics (with 1 df) were converted to a Pearson product moment correlation coefficient (r) using Equation 5 and then to *d*-index using Equation 4.

$$r = \sqrt{\frac{\chi^2}{n}} \qquad \textbf{[Equation 5]}$$

Inferences Regarding Null Effects Versus "Unexamined" Effects

For many studies, Learning Point Associates' research synthesis team had to make inferences regarding whether the lack of findings for children's access to print and the outcome variable reflected a "null finding" (i.e., no significant differences between access and no access groups or no significant relationship between the two variables) or reflected a lack of interest among the investigators in that particular relationship (i.e., relationship did not address any of investigators' research questions). These inferences could be made with some confidence when the research questions within a report explicitly mention children's access to print material or when researchers explicitly mention that the relationships were "not statistically significant."

For null effects, the research analysis team took a relatively conservative approach by setting the *d*-index to 0.[30] Lack of reporting of print access-outcome relationships when such a finding was considered peripheral to the central purpose of the investigation was handled differently. In such cases, no effect size for that relationship were extracted or imputed from the research report.

Preferences for Effect Size Conversions

Given that many studies provided research findings that allowed multiple methods of conversion to *d*-index, the Learning Point Associates research team adopted the method that was "closest to the raw data" (Cooper, 1998). That is, in reports with studies that provide group averages and standard deviations as well as inferential test statistics (*r*, *t*, *F*, or χ^2), the averages and standard deviations were used to calculate the *d*-index. Zero-order correlation coefficients were next preferred, followed by *t*-statistics, *F*-statistics (1 degree of freedom in numerator), and chi-square statistics.

In addition, there were rare occasions when studies reported just the *p* values associated with a *t*-test, correlation, or a χ^2 statistic. In such cases, the test-statistic associated with the exact *p* value (and corresponding number of units or degrees of freedom) was determined and entered into the appropriate equation.

Finally, for test statistics provided in reports that involved comparisons of gain scores across conditions or analysis of covariance (where pretest scores are used as covariate), all efforts were

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[30] This standard approach used by meta-analysts is considered relatively conservative. Alternative methods would include inserting the *d*-index associated with a *p* value associated with 0.10 level of significance favoring the hypothesized relationship (considered a *liberal* estimate) or inserting the *d*-index associated with a *p* value associated with 0.10 level of significance in the direction *opposite* of that hypothesized (considered an exceedingly *conservative* estimate).

made to make the corresponding adjustments to the standard deviation or variance estimates based on recommendations made by Glass, McGraw, and Smith (1981).

The Weighting of Effect Sizes

Per standard practice within meta-analytic research syntheses, this research review applied weights to effect sizes to reflect the sizes of samples within the studies (or, put another way, the standard error of each estimate). The logic underlying the use of weights is that studies with larger sample sizes *should* produce effect sizes that are better reflections of the "true relationship" within the population (i.e., standard error of estimate is smaller). Thus, the effect sizes from studies with larger samples should be given "more weight" in the calculation of the collective effect sizes estimates than studies with smaller samples.

The weighting of samples where data are not based on hierarchical structure of "units" involves the calculation based on a single equation (see Equation 6, from Cooper, 2009). Hedges (2009) provides additional equations that accommodate for the hierarchical nature of data often found in educational settings (e.g., when classrooms are assigned to conditions yet data analysis is conducted at the student level).[31] The methods used to calculate weights for two-level and three-level nested effects are presented in Equations 7–15.

Calculation of Weights for Non-Nested Research Findings

Several of the research reports contain data that are not hierarchical in nature. Some of these reports involve surveys in which numbers of books in children's homes were correlated with some student-level outcome. Other cases involve random assignment of students to conditions within a single classroom. For these types of "non-nested" studies, weights were calculated using Equation 6.

$$w_i = \frac{2(n_{i1} + n_{i2})n_{i1}n_{i2}}{2(n_{i1} + n_{i2})^2 + n_{i1}n_{i2}d_i^2}. \quad \textbf{[Equation 6]}$$

Where: w_i = the weight for each effect size,
n_{i1} = sample size for group 1,
n_{i2} = sample size for group 2, and
d_i = effect size.

For correlational designs, N/2 was used for n_1 and n_2. Conceptually, the weight represents the inverse of standard error of the estimate.

Calculation of Weights for Research Findings Based on Two Nested Levels of Data

[31] *Hierarchical Linear Modeling* (HLM) is a class of statistical procedures that is being used more frequently to obtain effect size estimates that control for nested levels of data. For reports uncovered in this literature review that used HLM analyses to estimate the effect of an intervention, effect sizes were based on HLM estimates, and the weighting scheme from Equation 6 was used.

A key ingredient for equations in which data are nested is the intraclass correlation, or the variance between units divided by total variance (symbolized "ρ"). Because these variances were not reported in nearly all studies examined during this review, approximations for ρ were taken from data reported by Hedges and Hedberg (2007). Equation 7 provides method of calculating the variance of d_w for situations when two nested levels are apparent and sizes of clusters (either classrooms or schools) are equal.

$$v_W = \left(\frac{N^T + N^C}{N^T N^C}\right)\left(\frac{1+(n-1)\rho}{1-\rho}\right) + \frac{d_W^2}{2(N-M)} \quad \textbf{[Equation 7]}$$

Where:
N^T equals the sum of all children in the clusters (the "higher level," either classrooms or schools) exposed to the intervention,
N^C equals the sum of all children in the clusters (the "higher level," either classrooms or schools) *not* exposed to the intervention,
N equals the total number of children across all clusters,
n equals the number of children in a single cluster,
M equals the number of clusters, and
ρ equals the intraclass correlation for that outcomes.

The value of v_W is substituted for the standard error of the estimate in the calculation of the weights (the weight represents the *inverse* of the standard error of estimate).

For research findings based on unequal cluster sizes, an alternate value ($\tilde{n}$) is substituted for n in Equation 6. Calculation of $\tilde{n}$ is provided in Equation 8.

$$\tilde{n} = \frac{N^C \sum_{i=1}^{m^T} (n_i^T)^2}{N^T N} + \frac{N^T \sum_{i=1}^{mC} (n_i^C)^2}{N^C N} \quad \textbf{[Equation 8]}$$

Where:
N^C equals the total number of children who were in clusters *not* exposed to the intervention,
N^T equals the total number of children who were in clusters that were exposed to the intervention,
N equals total number of children in *all* clusters,
$n^T{}_i$ equals the number of children within a single cluster (clusters 1 through m^T) who were exposed to the intervention, and
$n^C{}_i$ equals the number of children within a single cluster (clusters 1 through m^C) who were *not* exposed to the intervention.

Calculation of Weights for Research Findings Based on Three Nested Levels of Data

Equal Cluster Sizes. For reports of studies in which children are nested in classrooms, nested in schools (or some other combination of three nested levels), additional adjustments were required to accommodate each of the nested levels. Equations 9 and 10 were used for instances when cluster sizes were equal.

$$v_{WC} = \frac{1+(pn-1)\rho_S+(n-1)\rho_C}{\tilde{m}pn(1-\rho_S-\rho_C)} + \frac{d_{WC}^2}{2(N-Mp)}, \quad \textbf{[Equation 9]}$$

where $\tilde{m} = \frac{m^T m^C}{m^T + m^C}$, **[Equation 10]**

and where: m^T equals the number of schools that implemented the intervention,
m^C equals the number of schools that did *not* implement the intervention,
p equals the number of classrooms within each school,
n equals the number of students within the classrooms (assumed to be equal),
ρ_S equals the intraclass correlation for schools,
ρ_C equals the intraclass correlation for classrooms,
N equals the total number of children across schools and classrooms, and
M equals the total number of schools.

To create the weight for the effect size, the value for v_{WC} is substituted for the standard error of the estimate. The weight becomes the *inverse* of the value for v_{WC}.

Unequal Cluster Sizes. For reports containing studies in which data collected from three nested levels of units and clusters sizes were unequal, an alternative set of equations are used to create weights (see Equations 11–14).

$$v_{WC} = \frac{1\_(p_U-1)\rho_S+(n_U-1)\rho_C}{\tilde{N}(1-\rho_S-\rho_C)} + \frac{d_{WC}^2}{2(N-P)}, \quad \textbf{[Equation 11]}$$

Where $p_U = \frac{N^C \sum_{i=1}^{m^T}\left(\sum_{j=1}^{p_i^T} n_{ij}^T\right)^2}{NN^T} + \frac{N^T \sum_{i=1}^{m^C}\left(\sum_{j=1}^{p_i^C} n_{ij}^C\right)^2}{NN^C}$, **[Equation 12]**

$n_U = \frac{N^C \sum_{i=1}^{m^T}\sum_{j=1}^{p_i^T}(n_{ij}^T)^2}{NN^T} + \frac{N^T \sum_{i=1}^{m^C}\sum_{j=1}^{p_i^C}(n_{ij}^C)^2}{NN^C}$, and **[Equation 13]**

$P = \sum_{i=1}^{m^T} p_i^T + \sum_{i=1}^{m^C} p_i^C$. **[Equation 14]**

The one term in Equations 11–14 that is not found within Equations 9 and 10 is $\tilde{N}$, which is defined as

$$\frac{N^T N^C}{N^T + N^C}. \qquad \textbf{[Equation 15]}$$

The value for v_{WC} represents the variance associated with a particular effect size. As was the case for the two-level design and the three-level design with equal size clusters, the value that emerges for v_{WC} is substituted for the standard error of estimate in the calculation of effect size weights. The weight for these effects becomes $1/ v_{WC}$.

Calculating Hedges's *Q* Statistic

The test for homogeneity of effects represents a test of the assumption that all effect sizes are estimating the same population value. Values derived from the test used in this review—Hedges's *Q* statistic—follows a χ^2 distribution with k-1 degrees of freedom when effect sizes are estimating the same population value. When the *Q* statistic is statistically significant (i.e., exceeds the critical value for χ^2 with the appropriate degrees of freedom), it suggests factors associated with the particular samples may be impacting the effects. Thus, a significant *Q* statistic provides justification to explore whether particular features of samples or research conditions may be related to magnitudes of effect sizes (Valentine, Piggott, & Rothstein, 2009).

The method used for calculating Hedges's *Q* for this research synthesis is provided in Equation 16 (Valentine, Piggott & Rothstein, 2009):

$$Q = \sum w_i (d - \bar{d}_w)^2, \qquad \textbf{[Equation 16]}$$

where: w_i equals the weight associated with a particular effect size,
d equals an effect size within a particular report, and
$\bar{d}_w$ represents the average weighted effect size for that outcome category.

Adjustments for Random Effects

To account for random effects, an extra component, $\hat{v}_\theta$, is added to the standard error associated with an effect size estimate. The inverse of the standard error estimate becomes the new weight for the effect. The formula for $\hat{v}_\theta$ is taken from Lipsey and Wilson (2001) and provided in Equation 17.

$$\hat{v}_\theta = \frac{Q_T - k - 1}{\sum w - \left(\frac{\sum w^2}{\sum w} \right)} \qquad \textbf{[Equation 17]}$$

Where Q_T = Hedges's Q statistic,
k = number of effects, and
w = weights.

Appendix B
Examination of Reports That Could Not Be Obtained

Table B1. Comparison of Publication Vehicles for Obtained (Effects in Data Set) and Unobtained Reports

Publication Vehicle	Unobtained Reports	Reports in Data Set
Dissertation/Thesis/ Practicum Report	27.30%	7.40%
Unpublished report (any sources)	22.00%	13.90%
Conference Presentations	18.67%	3.70%
Article in Journal or Periodical	15.30%	61.10%
Books	2.00%	7.10%
Book Chapters	0.00%	6.50%
Unknown	12.78%	0.00%

Table B2. Years of Publication for Obtained and Unobtained Reports

Year	Unobtained	All Obtained	Obtained in Data Set
1900–1955	1.0%	1.3%	0.9%
1956–1960	0.0%	0.0%	0.0%
1961–1965	1.3%	0.9%	1.9%
1966–1970	4.6%	0.9%	3.7%
1971–1975	6.0%	1.6%	0.9%
1976–1980	11.3%	4.3%	2.8%
1981–1985	25.3%	4.6%	10.3%
1986–1990	13.3%	6.8%	9.3%
1991–1995	10.6%	17.4%	18.7%
1996–2000	10.0%	24.3%	19.6%
2001–2005	6.7%	22.2%	17.8%
2006–present	10.0%	15.8%	14.0%
Median	1986	1998	1996

Appendix C

Tables Displaying Reports Included in This Meta-Analytic Review

Table C1. Reports of Findings on Children's Access to Print Material and Outcomes

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Anglum, Bell, & Roubinek (1990)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	357	+0.49
Anglum, Bell, & Roubinek (1990)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	389	+0.41
Anglum, Bell, & Roubinek (1990)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	236	+0.39
Applebee, Langer & Mullis (1988)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	21,700	+0.49
Applebee, Langer, & Mullis (1988)	correlational	.	correlational (nonrigorous)	middle	reading test	reading performance	10,850	+0.53
Applebee, Langer & Mullis (1988)	correlational	.	correlational (nonrigorous)	high	reading test	reading performance	16,819	+0.69
Aram & Levin (2002)	correlational	.	correlational (nonrigorous)	kindergarten	general language	basic language	81	+0.45
Aram & Levin (2002)	correlational	.	correlational (nonrigorous)	kindergarten	phonemic or phonological awareness	emergent lit skills	81	+0.82
Aram & Levin (2002)	correlational	.	correlational (nonrigorous)	kindergarten	word recognition	emergent lit skills	81	+1.28
Aram & Levin (2002)	correlational	.	correlational (nonrigorous)	kindergarten	word recognition	emergent lit skills	81	+1.06
Aram & Levin (2002)	correlational	.	correlational (nonrigorous)	kindergarten	grades in math	general ac. achieve	81	+0.47

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Arterberry et al. (2007)	correlational	.	correlational (nonrigorous)	preschool	receptive language	basic language	449	+0.30
Arterberry et al. (2007)	correlational	.	correlational (nonrigorous)	preschool	expressive language	basic language	449	+0.37
Barrett (1999)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	65	−0.34
Barrett (1999)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	65	0.00
Barrett (1999)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	65	+0.35
Barrett (1999)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	65	0.00
Barrett (1999)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	65	+0.07
Barrett (1999)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	65	+0.42
Bing (1963)	correlational	.	correlational (nonrigorous)	elementary	expressive language	basic language	64	+0.47
Bing (1963)	correlational	.	correlational (nonrigorous)	elementary	expressive language	basic language	60	+0.49
Bingham (2007)	correlational	.	correlational (nonrigorous)	preschool	receptive language	basic language	120	+0.07
Bingham (2007)	correlational	.	correlational (nonrigorous)	preschool	emergent literacy (general)	emergent lit skills	120	+0.07
Bingham (2007)	correlational	.	correlational (nonrigorous)	preschool	concepts about print	emergent lit skills	120	+0.38
Blakemore (1976)	correlational	.	correlational (nonrigorous)	elementary	attitudes toward reading	attitudes	136	+0.51

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Briggs (1977)	correlational	.	correlational (nonrigorous)	kindergarten	reading test	reading performance	152	+0.76
Cooper et al. (2002)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	general language	basic language	176	+0.70
Cooper et al. (2002)	correlational	.	correlational (nonrigorous)	elementary	phonemic or phonological awareness	emergent lit skills	104	+0.77
Cooper et al. (2002)	correlational	.	correlational (nonrigorous)	elementary	phonemic or phonological awareness	emergent lit skills	133	+0.77
Cooper et al. (2002)	correlational	.	correlational (nonrigorous)	elementary	phonemic or phonological awareness	emergent lit skills	133	+0.43
Durkin (1966)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	120	+0.17
Elley (1992)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	46	++1.00
Elley (1992)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	40	0.80
Elley (1992)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	40	+0.48
Elley (1992)	correlational	.	correlational (nonrigorous)	mixed-mid/high	reading test	reading performance	40	+0.95
Ezell, Gonzales, & Randolph (2000)	correlational	.	correlational (nonrigorous)	preschool	amount of time reading	reading behavior	96	+0.72

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Ezell, Gonzales, & Randolph (2000)	correlational	.	correlational (nonrigorous)	preschool	concepts about print	emergent lit skills	96	+0.65
Ezell, Gonzales, & Randolph (2000)	correlational	.	correlational (nonrigorous)	preschool	letter identification	emergent lit skills	96	0.00
Ezell, Gonzales, & Randolph (2000)	correlational	.	correlational (nonrigorous)	preschool	sign/label/picture reading	emergent lit skills	96	+0.94
Farris & Hancock (1991)	correlational	.	correlational (nonrigorous)	middle	reading test	reading performance	92	+0.19
Feitelson & Goldstein (1986)	correlational	.	quasi (nonrigorous)	kindergarten	general academic achievement	general ac. achieve	204	.
Foertsch (1992)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	9,068	+0.40
Foertsch (1992)	correlational	.	correlational (nonrigorous)	mixed-mid/high	reading test	reading performance	8,808	+0.44
Foertsch (1992)	correlational	.	correlational (nonrigorous)	high	reading test	reading performance	8,500	+0.40
Foertsch (1992)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	16,960	+0.36
Foertsch (1992)	correlational	.	correlational (nonrigorous)	mixed-mid/high	reading test	reading performance	17,451	+0.44
Foertsch (1992)	correlational	.	correlational (nonrigorous)	high	reading test	reading performance	16,701	+0.40

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Froese (1997)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	55	++1.06
Froese (1997)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	55	+0.36
Froese (1997)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	55	+0.34
Gaver (1963)	correlational	.	quasi (nonrigorous)	mixed-mult levels	amount of time reading	reading behavior	512	+0.37
Gaver (1963)	correlational	.	quasi (nonrigorous)	mixed-mult levels	amount of time reading	reading behavior	548	+0.53
Gaver (1963)	correlational	.	quasi (nonrigorous)	mixed-mult levels	amount of time reading	reading behavior	516	+0.18
Gaver (1963)	correlational	.	quasi (nonrigorous)	mixed-mult levels	general language	basic language	512	+0.38
Gaver (1963)	correlational	.	quasi (nonrigorous)	mixed-mult levels	general language	basic language	512	+0.26
Gaver (1963)	correlational	.	quasi (nonrigorous)	mixed-mult levels	general language	basic language	548	+0.70
Gaver (1963)	correlational	.	quasi (nonrigorous)	mixed-mult levels	general language	basic language	548	+0.68
Gaver (1963)	correlational	.	quasi (nonrigorous)	mixed-mult levels	general language	basic language	516	+0.39
Gaver (1963)	correlational	.	quasi (nonrigorous)	mixed-mult levels	general language	basic language	516	+0.28
Gaver (1963)	correlational	.	quasi (nonrigorous)	mixed-mult levels	math achievement	general ac. achieve	512	+0.69
Gaver (1963)	correlational	.	quasi (nonrigorous)	mixed-mult levels	math achievement	general ac. achieve	548	+0.97

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Gaver (1963)	correlational	.	quasi (nonrigorous)	mixed-mult levels	math achievement	general ac. achieve	516	+0.19
Goodson (1974)	correlational	.	correlational (nonrigorous)	high	reading test	reading performance	84	+0.63
Gustafson (2001)	correlational	.	correlational (nonrigorous)	mixed-mult levels	fluency	reading performance	216	+1.18
Hall (1997)	correlational	.	correlational (nonrigorous)	middle	child request library visit	reading motivation	15,952	+0.07
Hall (1997)	correlational	.	correlational (nonrigorous)	middle	reading frequency	reading behavior	15,952	+0.07
Hall (1997)	correlational	.	correlational (nonrigorous)	middle	amount of time reading	reading behavior	15,952	+0.07
Hall & Coles (1999)	correlational	.	correlational (nonrigorous)	middle	child's assessment of reading ability	reading performance	7,976	+0.37
Harris et al. (2007)	correlational	.	correlational (nonrigorous)	preschool	guardian/child shared reading	reading behavior	1,200	+0.75
Harris et al. (2007)	correlational	.	correlational (nonrigorous)	preschool	guardian/child shared reading	reading behavior	1,200	+0.72
Harris et al. (2007)	correlational	.	correlational (nonrigorous)	preschool	guardian/child shared reading	reading behavior	1,200	+0.72
Harris et al. (2007)	correlational	.	correlational (nonrigorous)	preschool	guardian/child shared reading	reading behavior	1,200	+0.65
Heyns (1978)	correlational	.	correlational (nonrigorous)	middle	reading test	reading performance	1,492	+0.04
Heyns (1978)	correlational	.	correlational (nonrigorous)	middle	reading test	reading performance	1,495	+0.01

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Hurd, Dixon, & Oldham (2006)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	1,080	+0.10
Jacobson (1994)	correlational	.	correlational (nonrigorous)	kindergarten	emergent literacy (general)	emergent lit skills	176	++1.03
Kim (2004)	correlational	.	correlational (nonrigorous)	middle	attitude toward homework	attitudes	3,373	+0.28
Korat, Klein, & Segal-Drori (2007)	correlational	.	correlational (nonrigorous)	kindergarten	emergent literacy (general)	emergent lit skills	188	+0.49
Korat, Klein, & Segal-Drori (2007)	correlational	.	correlational (nonrigorous)	kindergarten	emergent literacy (general)	emergent lit skills	188	+0.52
Krashen (1995)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	41 U.S. states	+1.13
Krashen & O'Brian (1996)	correlational	.	correlational (nonrigorous)	high	reading test	reading performance	33 high schools	+0.42
Krashen & O'Brian (1996)	correlational	.	correlational (nonrigorous)	middle	reading test	reading performance	53 middle schools	+0.28
Kubis (1994)	correlational	.	correlational (nonrigorous)	high	attitude toward reading	attitudes	316	+0.38
Lamme & Olmsted (1976)	correlational	.	correlational (nonrigorous)	elementary	guardian/child shared reading	reading behavior	38	+1.42
Lamme & Olmsted (1977)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	38	+1.42

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Lance, Welborn, & Hamilton-Pennell (1993)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	134	+1.31
Lance, Welborn, & Hamilton-Pennell (1993)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	134	+1.46
Lance, Welborn, & Hamilton-Pennell (1993)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	134	+0.77
Lance, Welborn, & Hamilton-Pennell (1993)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	134	+1.06
Lance, Welborn, & Hamilton-Pennell (1993)	correlational	.	correlational (nonrigorous)	middle	reading test	reading performance	134	+1.04
Lance, Welborn, & Hamilton-Pennell (1993)	correlational	.	correlational (nonrigorous)	high	reading test	reading performance	134	+2.34
Loera (2007)	correlational	.	correlational (nonrigorous)	elementary	reading motivation	reading motivation	128	+0.34
McCollough (1990)	correlational	.	correlational (nonrigorous)	middle	reading frequency	reading behavior	40	+0.10
McQuillan (1997)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	51 U.S. states	+0.69

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
McQuillan & Au (2001)	correlational	.	correlational (nonrigorous)	high	reading frequency	reading behavior	24	+0.55
McQuillan (2006)	correlational	.	correlational (nonrigorous)	high	amount of time reading	reading behavior	131	+0.20
McQuillan (2006)	correlational	.	correlational (nonrigorous)	high	amount of time reading	reading behavior	133	+0.02
McQuillan (2006)	correlational	.	correlational (nonrigorous)	high	comprehension	reading performance	24	+0.52
McQuillan (2006)	correlational	.	correlational (nonrigorous)	high	vocabulary	reading performance	133	+0.43
McQuillan (2006)	correlational	.	correlational (nonrigorous)	high	vocabulary	reading performance	133	+0.41
Meyer, Linn, & Hastings (1990)	correlational	.	correlational (nonrigorous)	elementary	emergent literacy (general)	emergent lit skills	460	+0.30
Meyer, Linn, & Hastings (1990)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	460	+0.31
Meyer, Linn, & Hastings (1990)	correlational	.	correlational (nonrigorous)	elementary	tests in science	general ac. achieve	460	+0.33
Morrison & Cooney (2001)	correlational	.	correlational (nonrigorous)	elementary	reading readiness	basic language	198	+1.35
Morrison & Cooney (2001)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	198	+0.80
Morrison & Cooney (2001)	correlational	.	correlational (nonrigorous)	elementary	guardian impression of child's knowledge	general ac. achieve	198	+1.06

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Morrison & Cooney (2001)	correlational	.	correlational (nonrigorous)	elementary		reading performance	198	+1.03
Morrow (1983)	correlational	.	correlational (nonrigorous)	kindergarten	interest in reading	reading motivation	116	+2.27
Morrow (1983)	correlational	.	correlational (nonrigorous)	kindergarten	interest in reading	reading motivation	116	+0.61
Morrow (1983)	correlational	.	correlational (nonrigorous)	kindergarten	interest in reading	reading motivation	116	+0.57
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	reading frequency	reading behavior	5,500	+0.95
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	reading frequency	reading behavior	3,147	+1.04
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	reading frequency	reading behavior	3,287	+1.32
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	reading frequency	reading behavior	3,148	+1.06
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	reading frequency	reading behavior	4,996	+0.93
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	reading frequency	reading behavior	4,432	+1.12
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	reading frequency	reading behavior	3,361	+1.42
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	emergent literacy (general)	emergent lit skills	5,500	+0.04
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	emergent literacy (general)	emergent lit skills	3,147	-0.04
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	emergent literacy (general)	emergent lit skills	3,287	+0.37

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	emergent literacy (general)	emergent lit skills	3,148	+0.26
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	emergent literacy (general)	emergent lit skills	4,996	+0.02
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	emergent literacy (general)	emergent lit skills	4,432	−0.26
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	emergent literacy (general)	emergent lit skills	3,361	−0.52
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	5,500	+0.26
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	3,147	+0.08
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	3,287	+0.58
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	3,148	+0.43
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	4,996	+0.20
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	4,432	+0.26
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	3,361	−0.18
Napoli (1968)	correlational	.	correlational (nonrigorous)	middle	reading test	reading performance	40	+0.82
Raines & Isbell (1992)	correlational	.	correlational (nonrigorous)	preschool	interest in reading	reading motivation	48	+1.68
Raines & Isbell (1992)	correlational	.	correlational (nonrigorous)	preschool	interest in reading	reading motivation	48	+0.97

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Roberts et al. (1984)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	127	−0.16
Roberts et al. (1984)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	134	+0.70
Roberts et al. (1984)	correlational	.	correlational (nonrigorous)	middle	reading test	reading performance	203	+0.39
Share et al. (1983)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	basic language	basic language	543	+0.28
Share et al. (1983)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	emergent literacy (general)	emergent lit skills	543	+0.23
Sheldon & Carrillo (1952)	correlational	.	correlational (nonrigorous)	.	reading test	reading performance	374	+0.36
Shoham (2000)	correlational	.	correlational (nonrigorous)	elementary	child request library visit	reading motivation	208	+0.69
Shoham (2000)	correlational	.	correlational (nonrigorous)	elementary	reading frequency	reading behavior	196	−0.16
Shoham (2000)	correlational	.	correlational (nonrigorous)	elementary	amount of time reading	reading behavior	196	+0.09
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	reading readiness	basic language	112	+1.76
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	reading readiness	basic language	112	+0.98
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	reading readiness	basic language	114	+1.58
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	reading readiness	basic language	114	+1.50
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	reading test	reading performance	112	+1.01

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	reading test	reading performance	112	+1.01
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	reading test	reading performance	114	+1.09
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	reading test	reading performance	114	+1.01
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	writing (general)	writing performance	112	+0.70
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	writing (general)	writing performance	112	+0.68
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	writing (general)	writing performance	114	+1.46
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	writing (general)	writing performance	114	+1.39
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	grade promotion	general ac. achieve	112	+1.62
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	grade promotion	general ac. achieve	114	+1.25
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	test in math	general ac. achieve	112	+1.01
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	test in math	general ac. achieve	112	+0.85
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	test in math	general ac. achieve	112	+0.80
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	test in math	general ac. achieve	114	+1.15
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	test in math	general ac. achieve	114	+1.09

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	test in math	general ac. achieve	114	+1.01
Snow et al. (1991)	correlational	.	correlational (nonrigorous)	elementary	word recognition	emergent lit skills	11	−0.28
Snow et al. (1991)	correlational	.	correlational (nonrigorous)	elementary	word recognition	emergent lit skills	12	−0.14
Snow et al. (1991)	correlational	.	correlational (nonrigorous)	middle	word recognition	emergent lit skills	9	+0.35
Snow et al. (1991)	correlational	.	correlational (nonrigorous)	elementary	comprehension	reading performance	11	+0.08
Snow et al. (1991)	correlational	.	correlational (nonrigorous)	elementary	comprehension	reading performance	12	+0.08
Snow et al. (1991)	correlational	.	correlational (nonrigorous)	middle	comprehension	reading performance	9	+0.75
Snow et al. (1991)	correlational	.	correlational (nonrigorous)	elementary	vocabulary	reading performance	11	−0.12
Snow et al. (1991)	correlational	.	correlational (nonrigorous)	elementary	vocabulary	reading performance	12	+0.18
Snow et al. (1991)	correlational	.	correlational (nonrigorous)	middle	vocabulary	reading performance	9	+0.72
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	reading readiness	basic language	40	+1.35
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	general language	basic language	40	+2.60
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	emergent literacy (general)	emergent lit skills	40	+1.31
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	phonemic or phonological awareness	emergent lit skills	40	+1.31

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	letter identification	emergent lit skills	40	+1.46
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	letter identification	emergent lit skills	40	+1.39
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	letter identification	emergent lit skills	40	+1.28
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	letter identification	emergent lit skills	40	+1.18
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	comprehension	reading performance	40	+2.27
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	comprehension	reading performance	40	+1.80
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	comprehension	reading performance	40	+1.46
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	spelling	writing performance	40	+0.98
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	letter or word identification	emergent lit skills	40	+1.09
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	letter or word identification	emergent lit skills	40	+1.01
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	letter or word identification	emergent lit skills	40	+0.87
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	letter or word identification	emergent lit skills	40	+0.56
Stephenson et al. (2008)	correlational	.	correlational (nonrigorous)	kindergarten	receptive language	basic language	61	−0.02
Stephenson et al. (2008)	correlational	.	correlational (nonrigorous)	kindergarten	phonemic or phonological awareness	emergent lit skills	61	+0.28

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Stephenson et al. (2008)	correlational	.	correlational (nonrigorous)	kindergarten	letter identification	emergent lit skills	61	+0.43
Stephenson et al. (2008)	correlational	.	correlational (nonrigorous)	kindergarten	word reading	emergent lit skills	61	−0.04
Stephenson et al. (2008)	correlational	.	correlational (nonrigorous)	kindergarten	word reading	emergent lit skills	61	+0.18
Teale (1986)	correlational	.	correlational (nonrigorous)	preschool	reading frequency	reading behavior	24	+0.56
Teale (1986)	correlational	.	correlational (nonrigorous)	preschool	amount of time reading	reading behavior	24	+0.25
Theriot et al. (2003)	correlational	.	correlational (nonrigorous)	preschool	receptive language	basic language	64	+2.30
Theriot et al. (2003)	correlational	.	correlational (nonrigorous)	preschool	expressive language	basic language	64	+0.51
Walberg & Tsai (1985)	correlational	.	correlational (nonrigorous)	elementary	attitude toward reading	attitudes	1,459	+0.37
Walberg & Tsai (1985)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	1,459	+0.63
White & Dewitz (1996)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	7,062	+0.41
White & Dewitz (1996)	correlational	.	correlational (nonrigorous)	middle	reading test	reading performance	5,551	+0.50
White & Dewitz (1996)	correlational	.	correlational (nonrigorous)	high	reading test	reading performance	5,569	+0.42
White & Dewitz (1996)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	5,335	+0.52
White & Dewitz (1996)	correlational	.	correlational (nonrigorous)	middle	reading test	reading performance	5,547	+0.56

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
White & Dewitz (1996)	correlational	.	correlational (nonrigorous)	high	reading test	reading performance	4,840	+0.47
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	word recognition	emergent lit skills	176	+1.16
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	word recognition	emergent lit skills	176	+0.95
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	word recognition	emergent lit skills	176	+0.50
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	word recognition	emergent lit skills	176	+0.44
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	comprehension	reading performance	176	+0.54
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	comprehension	reading performance	176	+0.42
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	comprehension	reading performance	176	+0.40
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	comprehension	reading performance	176	+0.37
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	comprehension	reading performance	176	+0.67
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	achievement gap	general ac. achieve	176	−0.31
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	achievement gap	general ac. achieve	176	0.00
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	achievement gap	general ac. achieve	176	0.00
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	achievement gap	general ac. achieve	176	0.00

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	achievement gap	general ac. achieve	176	0.00
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	achievement gap	general ac. achieve	176	0.00
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	achievement gap	general ac. achieve	176	0.00
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	achievement gap	general ac. achieve	176	0.00
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	achievement gap	general ac. achieve	176	0.00
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	achievement gap	general ac. achieve	176	0.00
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	achievement gap	general ac. achieve	176	0.00
Linnakylä, Malin, & Taube (2004)	correlational		correlational (nonrigorous)	high	reading test	reading performance	3,372	+0.22
Linnakylä, Malin, & Taube (2004)	correlational		correlational (nonrigorous)	high	reading test	reading performance	3,492	+0.43
Allington et al. (2010)	intervention	ownership	experimental (rigorous)	elementary	reading frequency	reading behavior	1,330 (852, 478)	+0.18
Allington et al. (2010)	intervention	ownership	experimental (rigorous)	elementary	reading test	reading performance	1,330 (852, 478)	+0.14
Allington et al. (2010)	intervention	ownership	experimental (rigorous)	elementary	reading test	reading performance	695 (444, 251)	+0.14
Bean et al. (1990)	intervention	ownership	quasi (nonrigorous)	preschool	child requests to be read to	reading motivation	41 (27, 14)	+3.32

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Bean et al. (1990)	intervention	ownership	quasi (nonrigorous)	preschool	child request library visit	reading motivation	41 (27, 14)	+0.80
Bean et al. (1990)	intervention	ownership	quasi (nonrigorous)	preschool	reading frequency	reading behavior	41 (27, 14)	−0.45
Bean et al. (1990)	intervention	ownership	quasi (nonrigorous)	preschool	guardian/child shared reading	reading behavior	41 (27, 14)	+0.69
Bean et al. (1990)	intervention	ownership	quasi (nonrigorous)	preschool	child play with print material	reading behavior	41 (27, 14)	−0.61
Bean et al. (1990)	intervention	ownership	quasi (nonrigorous)	preschool	general language	basic language	37 (24, 13)	+0.56
Bean et al. (1990)	intervention	ownership	quasi (nonrigorous)	preschool	active participation in storybook reading	emergent lit skills	37 (24, 13)	+0.74
Bean et al. (1990)	intervention	ownership	quasi (nonrigorous)	preschool	ask questions during reading time	emergent lit skills	37 (24, 13)	+0.02
Bean et al. (1990)	intervention	ownership	quasi (nonrigorous)	preschool	reading test	basic language	37 (24, 13)	+0.32
Bean et al. (1990)	intervention	ownership	quasi (nonrigorous)	preschool	writing (general)	writing performance	41 (27, 14)	+0.74
Billings (2009)	intervention	ownership	quasi (nonrigorous)	preschool	guardian/child shared reading	reading behavior	37 (22, 15)	−0.24
Billings (2009)	intervention	ownership	quasi (nonrigorous)	preschool	child play with print material	reading behavior	32 (17, 15)	0.61
Goldenberg, Reese, & Gallimore (1992)	intervention	ownership	quasi (rigorous)	kindergarten	child play with print material	reading behavior	10 (5, 5)	+1.00

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Goldenberg, Reese, & Gallimore (1992)	intervention	ownership	quasi (rigorous)	kindergarten	emergent literacy (general)	emergent lit skills	10 (5, 5)	+0.67
Goldenberg, Reese, & Gallimore (1992)	intervention	ownership	quasi (rigorous)	kindergarten	phonemic or phonological awareness	emergent lit skills	10 (5, 5)	+0.52
Goldenberg, Reese, & Gallimore (1992)	intervention	ownership	quasi (rigorous)	kindergarten	phonemic or phonological awareness	emergent lit skills	10 (5, 5)	+0.52
Golova et al. (1991)	intervention	ownership	quasi (rigorous)	preschool	interest in reading	reading motivation	130 (63, 67)	+0.03
Golova et al. (1991)	intervention	ownership	quasi (rigorous)	preschool	interest in reading	reading motivation	130 (63, 67)	+0.03
Golova et al. (1991)	intervention	ownership	quasi (rigorous)	preschool	reading frequency	reading behavior	130 (63, 67)	+0.68
Golova et al. (1991)	intervention	ownership	quasi (rigorous)	preschool	guardian/child shared reading	reading behavior	130 (63, 67)	+0.03
Golova et al. (1991)	intervention	ownership	quasi (rigorous)	preschool	general language	basic language	130 (63, 67)	+0.03
Hancock (2002)	intervention	ownership	experimental (rigorous)	kindergarten	emergent literacy (general)	emergent lit skills	52 (26, 26)	+0.66
High et al. (1999)	intervention	ownership	quasi (rigorous)	preschool	interest in reading	reading motivation	153 (76, 77)	+0.40
High et al. (1999)	intervention	ownership	quasi (rigorous)	preschool	guardian/child shared reading	reading behavior	153 (76, 77)	+0.67
High et al. (1999)	intervention	ownership	quasi (rigorous)	preschool	guardian/child shared reading	reading behavior	153 (76, 77)	+0.57

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
High et al. (1999)	intervention	ownership	quasi (rigorous)	preschool	home literacy orientation	reading behavior	153 (76, 77)	+2.20
High et al. (1999)	intervention	ownership	quasi (rigorous)	preschool	receptive language	basic language	151 (76, 75)	+0.47
High et al. (1999)	intervention	ownership	quasi (rigorous)	preschool	expressive language	basic language	151 (76, 75)	+0.26
Inglis et al. (1981)	intervention	ownership	quasi (nonrigorous)	elementary	attitude toward reading	attitudes	365 (156, 209)	−0.05
Inglis et al. (1981)	intervention	ownership	quasi (nonrigorous)	mixed-mult levels	attitude toward reading	attitudes	868 (446, 422)	+0.77
Jones et al. (2000)	intervention	ownership	quasi (rigorous)	preschool	attitude toward reading	attitudes	173 (88, 85)	+0.42
Kim & White (2008)	intervention	ownership	experimental (rigorous)	mixed-mult levels	reading frequency	reading behavior	207 (100, 107)	+0.25
Kim & White (2008)	intervention	ownership	experimental (rigorous)	mixed-mult levels	reading frequency	reading behavior	207 (100, 107)	+0.08
Kim & White (2008)	intervention	ownership	experimental (rigorous)	mixed-mult levels	reading frequency	reading behavior	200 (93, 107)	+0.09
Kim & White (2008)	intervention	ownership	experimental (rigorous)	mixed-mult levels	fluency	reading performance	207 (100, 107)	+0.03
Kim & White (2008)	intervention	ownership	experimental (rigorous)	mixed-mult levels	fluency	reading performance	207 (100, 107)	0.00
Kim & White (2008)	intervention	ownership	experimental (rigorous)	mixed-mult levels	fluency	reading performance	200 (93, 107)	−0.11
Kim & White (2008)	intervention	ownership	experimental (rigorous)	mixed-mult levels	reading test	reading performance	207 (100, 107)	+0.14
Kim & White (2008)	intervention	ownership	experimental (rigorous)	mixed-mult levels	reading test	reading performance	207 (100, 107)	+0.07

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Kim & White (2008)	intervention	ownership	experimental (rigorous)	mixed-mult levels	reading test	reading performance	200 (93, 107)	+0.02
Levenstein, Levenstein, & Oliver (2002)	intervention	ownership	quasi (nonrigorous)	preschool	emergent literacy (general)	emergent lit skills	24,335 (18, 24,317)	+0.71
Levenstein, Levenstein, & Oliver (2002)	intervention	ownership	quasi (nonrigorous)	preschool	emergent literacy (general)	emergent lit skills	24,337 (20, 24,317)	−0.40
Levenstein, Levenstein, & Oliver (2002)	intervention	ownership	quasi (nonrigorous)	preschool	emergent literacy (general)	emergent lit skills	23,187 (22, 23,165)	+0.18
Levenstein, Levenstein, & Oliver (2002)	intervention	ownership	quasi (nonrigorous)	preschool	emergent literacy (general)	emergent lit skills	22,356 (21, 22,335)	+0.60
Lonigan & Whitehurst (1998)	intervention	ownership	experimental (rigorous)	preschool	receptive language	basic language	46 (19, 27)	+0.19
Lonigan & Whitehurst (1998)	intervention	ownership	experimental (rigorous)	preschool	receptive language	basic language	45 (14, 31)	+0.05
Lonigan & Whitehurst (1998)	intervention	ownership	experimental (rigorous)	preschool	expressive language	basic language	45 (19, 26)	+0.47
Lonigan & Whitehurst (1998)	intervention	ownership	experimental (rigorous)	preschool	expressive language	basic language	45 (19, 26)	+0.36
Lonigan & Whitehurst (1998)	intervention	ownership	experimental (rigorous)	preschool	expressive language	basic language	45 (14, 31)	+0.79

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Lonigan & Whitehurst (1998)	intervention	ownership	experimental (rigorous)	preschool	expressive language	basic language	45 (14, 31)	+0.75
Mann et al. (2009)	intervention	ownership	quasi (nonrigorous)	preschool	child requests to be read to	reading motivation	37 (19, 18)	+2.10
Mann et al. (2009)	intervention	ownership	quasi (nonrigorous)	preschool	reading frequency	reading behavior	37 (19, 18)	+1.73
Mann et al. (2009)	intervention	ownership	quasi (nonrigorous)	preschool	receptive language	basic language	37 (19, 18)	+0.06
Mann et al. (2009)	intervention	ownership	quasi (nonrigorous)	preschool	receptive language	basic language	37 (19, 18)	+0.05
Mann et al. (2009)	intervention	ownership	quasi (nonrigorous)	preschool	expressive language	basic language	37 (19, 18)	+0.64
Mann et al. (2009)	intervention	ownership	quasi (nonrigorous)	preschool	expressive language	basic language	183 (92, 91)	+0.57
Mann et al. (2009)	intervention	ownership	quasi (nonrigorous)	preschool	phonemic or phonological awareness	emergent lit skills	37 (19, 18)	+0.56
Mann et al. (2009)	intervention	ownership	quasi (nonrigorous)	preschool	phonemic or phonological awareness	emergent lit skills	37 (19, 18)	+0.09
Mann et al. (2009)	intervention	ownership	quasi (nonrigorous)	preschool	rhyme awareness	emergent lit skills	37 (18, 19)	+0.50
Mann et al. (2009)	intervention	ownership	quasi (nonrigorous)	preschool	rhyme awareness	emergent lit skills	37 (18, 19)	+0.46
Mason et al. (1990)	intervention	ownership	experimental (rigorous)	preschool	general language	basic language	232 (116, 116)	+0.02
Mason et al. (1990)	intervention	ownership	experimental (rigorous)	preschool	concepts about print	emergent lit skills	232 (116, 116)	+0.07

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Mason et al. (1990)	intervention	ownership	experimental (rigorous)	preschool	letter identification	emergent lit skills	232 (116, 116)	+0.92
Mason et al. (1990)	intervention	ownership	experimental (rigorous)	preschool	reading test	reading performance	232 (116, 116)	0.00
Mason et al. (1990)	intervention	ownership	experimental (rigorous)	preschool	writing (general)	writing performance	232 (116, 116)	+0.02
McCormick & Mason (1986)	intervention	ownership	quasi (rigorous)	kindergarten	interest in reading	reading motivation	23 (13, 10)	+1.38
McCormick & Mason (1986)	intervention	ownership	quasi (rigorous)	kindergarten	child requests to be read to	reading motivation	23 (13, 10)	+0.39
McCormick & Mason (1986)	intervention	ownership	quasi (rigorous)	kindergarten	reading frequency	reading behavior	23 (13, 10)	+0.57
McCormick & Mason (1986)	intervention	ownership	quasi (rigorous)	kindergarten	child play with print material	reading behavior	23 (13, 10)	+1.50
McCormick & Mason (1986)	intervention	ownership	quasi (rigorous)	preschool	emergent literacy (general)	emergent lit skills	52 (26, 26)	+1.25
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	letter identification	emergent lit skills	45 (23, 22)	+0.51
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	letter identification	emergent lit skills	45 (23, 22)	+0.38
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	letter identification	emergent lit skills	45 (23, 22)	+0.16
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	letter identification	emergent lit skills	45 (23, 22)	+0.04
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	letter identification	emergent lit skills	53 (26, 27)	−0.28
McCormick & Mason (1986)	intervention	ownership	quasi (rigorous)	kindergarten	letter identification	emergent lit skills	24 (13, 11)	+1.15

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	sign/label/picture identification	emergent lit skills	45 (23, 22)	+0.51
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	sign/label/picture identification	emergent lit skills	45 (23, 22)	+0.12
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	expressive language	emergent lit skills	45 (23, 22)	+0.49
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	expressive language	emergent lit skills	45 (23, 22)	+0.32
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	word recognition	emergent lit skills	53 (26, 27)	−0.08
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	child requests to be read to	emergent lit skills	45 (23, 22)	+0.51
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	expressive language	emergent lit skills	45 (23, 22)	−0.07
McCormick & Mason (1986)	intervention	ownership	quasi (rigorous)	kindergarten	fluency	reading performance	24 (13, 11)	+1.93
McCormick & Mason (1986)	intervention	ownership	quasi (rigorous)	kindergarten	fluency	reading performance	24 (13, 11)	+1.83
McCormick & Mason (1986)	intervention	ownership	quasi (rigorous)	kindergarten	fluency	reading performance	24 (13, 11)	+1.76
McCormick & Mason (1986)	intervention	ownership	quasi (rigorous)	kindergarten	fluency	reading performance	24 (13, 11)	+1.60
McCormick & Mason (1986)	intervention	ownership	quasi (rigorous)	kindergarten	fluency	reading performance	24 (13, 11)	+1.36
McCormick & Mason (1986)	intervention	ownership	quasi (rigorous)	kindergarten	fluency	reading performance	24 (13, 11)	+1.01
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	comprehension	reading performance	45 (23, 22)	+1.95

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	comprehension	reading performance	45 (23, 22)	+1.51
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	comprehension	reading performance	45 (23, 22)	+1.02
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	comprehension	reading performance	45 (23, 22)	+0.83
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	comprehension	reading performance	45 (23, 22)	−0.21
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	comprehension	reading performance	45 (23, 22)	+0.13
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	comprehension	reading performance	45 (23, 22)	+0.09
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	comprehension	reading performance	53 (26, 27)	+1.17
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	comprehension	reading performance	53 (26, 27)	+0.75
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	comprehension	reading performance	53 (26, 27)	+0.38
McCormick & Mason (1986)	intervention	ownership	quasi (rigorous)	kindergarten	reading test	reading performance	23 (13, 10)	+1.10
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	spelling	writing performance	45 (23, 22)	+0.72
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	spelling	writing performance	45 (23, 22)	+0.44
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	spelling	writing performance	53 (26, 27)	−0.18
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	word reading	emergent lit skills	45 (23, 22)	+0.34

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	word reading	emergent lit skills	45 (23, 22)	−0.17
McCormick & Mason (1986)	intervention	ownership	quasi (rigorous)	kindergarten	word reading	emergent lit skills	23 (13, 10)	+0.54
McCormick & Mason (1986)	intervention	ownership	quasi (rigorous)	kindergarten	guardian impression of child's knowledge	general ac. achieve	24 (13, 11)	+1.07
McGill-Franzen et al. (1999)	intervention	ownership	experimental (rigorous)	mixed-pre/elem	receptive language	basic language	292 (139, 153)	−0.61
McGill-Franzen et al. (1999)	intervention	ownership	experimental (rigorous)	mixed-pre/elem	receptive language	basic language	317 (164, 153)	+0.30
McGill-Franzen et al. (1999)	intervention	ownership	experimental (rigorous)	mixed-pre/elem	phonemic or phonological awareness	emergent lit skills	292 (139, 153)	−1.25
McGill-Franzen et al. (1999)	intervention	ownership	experimental (rigorous)	mixed-pre/elem	phonemic or phonological awareness	emergent lit skills	317 (164, 153)	+0.77
McGill-Franzen et al. (1999)	intervention	ownership	experimental (rigorous)	mixed-pre/elem	concepts about print	emergent lit skills	317 (164, 153)	+2.00
McGill-Franzen et al. (1999)	intervention	ownership	experimental (rigorous)	mixed-pre/elem	concepts about print	emergent lit skills	292 (139, 153)	−0.18
McGill-Franzen et al. (1999)	intervention	ownership	experimental (rigorous)	mixed-pre/elem	letter identification	emergent lit skills	317 (164, 153)	+1.76

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
McGill-Franzen et al. (1999)	intervention	ownership	experimental (rigorous)	mixed-pre/elem	letter identification	emergent lit skills	292 (139, 153)	−0.03
McGill-Franzen et al. (1999)	intervention	ownership	experimental (rigorous)	mixed-pre/elem	word reading	emergent lit skills	317 (164, 153)	+2.60
McGill-Franzen et al. (1999)	intervention	ownership	experimental (rigorous)	mixed-pre/elem	concepts about print	emergent lit skills	292 (139, 153)	−0.23
McGill-Franzen et al. (1999)	intervention	ownership	experimental (rigorous)	mixed-pre/elem	spelling	writing performance	317 (164, 153)	+1.96
McGill-Franzen et al. (1999)	intervention	ownership	experimental (rigorous)	mixed-pre/elem	spelling	writing performance	292 (139, 153)	-1.71
Mendelsohn et al. (2001)	intervention	ownership	quasi (nonrigorous)	preschool	guardian/child shared reading	reading behavior	122 (49, 73)	+0.38
Mendelsohn et al. (2001)	intervention	ownership	quasi (nonrigorous)	preschool	home literacy orientation	reading behavior	122 (49, 73)	+0.21
Mendelsohn et al. (2001)	intervention	ownership	quasi (nonrigorous)	preschool	receptive language	basic language	122 (49, 73)	+0.70
Mendelsohn et al. (2001)	intervention	ownership	quasi (nonrigorous)	preschool	expressive language	basic language	122 (49, 73)	+0.22
Needlman et al. (1991)	intervention	ownership	quasi (nonrigorous)	preschool	home literacy orientation	reading behavior	79 (39, 40)	+0.33
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	reading readiness	basic language	133 (65, 68)	+0.04

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	reading readiness	basic language	144 (65, 79)	−0.13
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	general language	basic language	144 (81, 63)	−0.11
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	general language	basic language	131 (68, 63)	+0.18
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	emergent literacy (general)	emergent lit skills	42 (24, 18)	+0.48
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	emergent literacy (general)	emergent lit skills	146 (81, 65)	+0.14
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	emergent literacy (general)	emergent lit skills	134 (69, 65)	+0.26
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	emergent literacy (general)	emergent lit skills	36 (18, 18)	+0.83
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	reading test	reading performance	100 (51, 49)	+0.10
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	reading test	reading performance	105 (58, 47)	+0.12
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	reading test	reading performance	99 (50, 49)	+0.29

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	reading test	reading performance	129 (73, 56)	+0.29
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	reading test	reading performance	95 (52, 43)	+0.38
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	reading test	reading performance	104 (55, 49)	+0.43
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	reading test	reading performance	104 (55, 49)	+0.50
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	reading test	reading performance	118 (62, 56)	+0.49
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	reading readiness	basic language	85 (42, 43)	+0.00
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	reading readiness	basic language	85 (42, 43)	+0.47
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	reading readiness	basic language	55 (27, 28)	+0.30
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	reading readiness	basic language	55 (27, 28)	+0.64
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	reading readiness	basic language	113 (57, 56)	+0.04
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	reading readiness	basic language	113 (57, 56)	+0.49
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	general language	basic language	85 (42, 43)	+0.08

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	general language	basic language	85 (42, 43)	-+0.10
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	general language	basic language	85 (42, 43)	-+0.15
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	general language	basic language	85 (42, 43)	-+0.60
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	general language	basic language	113 (57, 56)	-+0.09
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	general language	basic language	113 (57, 56)	+0.27
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	word reading	emergent lit skills	85 (42, 43)	+0.58
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	word reading	emergent lit skills	85 (42, 43)	+0.81
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	word reading	emergent lit skills	85 (42, 43)	+0.58
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	word reading	emergent lit skills	85 (42, 43)	+0.81
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	word reading	emergent lit skills	113 (57, 56)	+0.58
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	word reading	emergent lit skills	113 (57, 56)	+0.81
Rucker (1982)	intervention	ownership	experimental (rigorous)	middle	reading test	reading performance	53 (27, 26)	+0.55
Rucker (1982)	intervention	ownership	experimental (rigorous)	middle	reading test	reading performance	104 (47, 57)	+0.45
Saint-Laurent & Gaisson (2005)	intervention	ownership	quasi (rigorous)	elementary	attitude toward reading	attitudes	108 (53, 55)	+0.26

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Saint-Laurent & Gaisson (2005)	intervention	ownership	quasi (rigorous)	elementary	home literacy orientation	reading behavior	108 (53, 55)	+1.09
Saint-Laurent & Gaisson (2005)	intervention	ownership	quasi (rigorous)	elementary	comprehension	reading performance	108 (53, 55)	+0.47
Saint-Laurent & Gaisson (2005)	intervention	ownership	quasi (rigorous)	elementary	vocabulary (written)	writing performance	108 (53, 55)	+0.72
Saint-Laurent & Gaisson (2005)	intervention	ownership	quasi (rigorous)	elementary	spelling	writing performance	108 (53, 55)	+0.59
Saint-Laurent & Gaisson (2005)	intervention	ownership	quasi (rigorous)	elementary	writing structure	writing performance	108 (53, 55)	+0.59
Saint-Laurent & Gaisson (2005)	intervention	ownership	quasi (rigorous)	elementary	writing content	writing performance	108 (53, 55)	+0.66
Saint-Laurent & Gaisson (2005)	intervention	ownership	quasi (rigorous)	elementary	writing content	writing performance	108 (53, 55)	+0.24
Saint-Laurent & Gaisson (2005)	intervention	ownership	quasi (rigorous)	elementary	Printing/hand-writing	emergent lit skills	108 (53, 55)	+0.31
Sharif, Reiber, & Ozuah (2002)	intervention	ownership	quasi (nonrigorous)	mixed-pre/elem	home literacy orientation	reading behavior	200 (100, 100)	+0.41
Sharif, Reiber, & Ozuah (2002)	intervention	ownership	quasi (nonrigorous)	mixed-pre/elem	home literacy orientation	reading behavior	200 (100, 100)	+0.23

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Sharif, Reiber, & Ozuah (2002)	intervention	ownership	quasi (nonrigorous)	mixed-pre/elem	receptive language	basic language	200 (100, 100)	+0.37
Sharif, Reiber, & Ozuah (2002)	intervention	ownership	quasi (nonrigorous)	mixed-pre/elem	expressive language	basic language	200 (100, 100)	+0.09
Whitehurst et al. (1994)	intervention	ownership	experimental (rigorous)	preschool	receptive language	basic language	53 (16, 37)	+0.33
Whitehurst et al. (1994)	intervention	ownership	experimental (rigorous)	preschool	receptive language	basic language	67 (19, 48)	+0.38
Whitehurst et al. (1994)	intervention	ownership	experimental (rigorous)	preschool	expressive language	basic language	53 (16, 37)	-+0.04
Whitehurst et al. (1994)	intervention	ownership	experimental (rigorous)	preschool	expressive language	basic language	53 (16, 37)	-+0.03
Whitehurst et al. (1994)	intervention	ownership	experimental (rigorous)	preschool	expressive language	basic language	67 (19, 48)	+0.47
Whitehurst et al. (1994)	intervention	ownership	experimental (rigorous)	preschool	expressive language	basic language	67 (19, 48)	-+0.32
Whitehurst et al. (1994)	intervention	ownership	experimental (rigorous)	preschool	expressive language	basic language	67 (19, 48)	+0.25
Singleton (2002)	intervention	lending	quasi (nonrigorous)	high	reading frequency	reading behavior	170 (34, 136)	+2.07
Singleton (2002)	intervention	lending	quasi (nonrigorous)	high	vocabulary	reading performance	170 (34, 136)	.
Singleton (2002)	intervention	lending	quasi (nonrigorous)	high	grades	general ac. achieve	170 (34, 136)	+0.60
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	receptive language	basic language	227 (136, 91)	+1.92

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	expressive language	basic language	121 (72, 49)	+0.24
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	general language	basic language	227 (136, 91)	+1.83
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	general language	basic language	261 (155, 106)	+0.67
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	middle	oral story retelling	emergent lit skills	269 (178, 91)	+2.18
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	word recognition	emergent lit skills	134 (80, 54)	+0.09
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	comprehension	reading performance	227 (136, 91)	+3.88
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	comprehension	reading performance	265 (159, 106)	+1.09
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	middle	comprehension	reading performance	270 (179, 91)	+1.28
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	middle	comprehension	reading performance	232 (145, 87)	+1.63
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	middle	vocabulary	reading performance	232 (145, 87)	+1.99

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	middle	writing (general)	writing performance	269 (178, 91)	+0.06
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	middle	writing (general)	writing performance	232 (145, 87)	+1.65
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	middle	grammar	reading performance	269 (178, 91)	+0.05
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	middle	grammar	reading performance	232 (145, 87)	+1.63
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	receptive language	basic language	512 (256, 256)	+0.22
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	expressive language	basic language	512 (256, 256)	+0.09
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	oral story retelling	emergent lit skills	512 (256, 256)	+0.38
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	word recognition	emergent lit skills	512 (256, 256)	+0.15
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	fluency	reading performance	512 (256, 256)	+0.19
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	comprehension	reading performance	512 (256, 256)	+0.34

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	vocabulary	reading performance	512 (256, 256)	+0.33
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	reading test	reading performance	512 (256, 256)	+0.32
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	writing (general)	writing performance	512 (256, 256)	+0.24
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	spelling	writing performance	512 (256, 256)	+0.27
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	writing structure	writing performance	512 (256, 256)	+0.31
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	writing structure	writing performance	512 (256, 256)	+0.00
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	writing content	writing performance	512 (256, 256)	+0.21
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	grammar	reading performance	512 (256, 256)	+0.33
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	dictation	writing performance	512 (256, 256)	+0.04
Faires, Nichols, & Rickelman (2000)	intervention	lending	quasi (rigorous)	elementary	reading test	reading performance	8 (4, 4)	+0.73

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Fisher, Lapp, & Flood (2001)	intervention	lending	quasi (nonrigorous)	mixed-mult levels	attitude toward reading	attitudes	674 (337, 337)	+0.60
Fisher, Lapp, & Flood (2001)	intervention	lending	quasi (nonrigorous)	mixed-mult levels	reading test	reading performance	674 (319, 355)	.
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	attitude toward reading	attitudes	82 (41, 41)	+0.30
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	attitude toward reading	attitudes	82 (41, 41)	+0.15
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	attitude toward reading	attitudes	82 (41, 41)	+0.07
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	attitude toward reading	attitudes	69 (34, 35)	-+0.61
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	attitude toward reading	attitudes	69 (34, 35)	+0.54
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	attitude toward reading	attitudes	69 (34, 35)	+0.27
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	attitude toward reading	attitudes	85 (42, 43)	−0.33
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	attitude toward reading	attitudes	85 (42, 43)	+0.26
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	attitude toward reading	attitudes	85 (42, 43)	+0.07
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	attitude toward reading	attitudes	89 (45, 44)	−0.51
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	attitude toward reading	attitudes	89 (45, 44)	+0.46

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	attitude toward reading	attitudes	89 (45, 44)	-0.07
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	interest in reading	reading motivation	82 (38, 44)	+0.43
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	interest in reading	reading motivation	69 (35, 34)	+0.50
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	interest in reading	reading motivation	85 (50, 35)	−0.16
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	interest in reading	reading motivation	89 (40, 49)	−0.45
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	word recognition	emergent lit skills	82 (38, 44)	−0.53
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	word recognition	emergent lit skills	69 (35, 34)	−0.11
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	word recognition	emergent lit skills	85 (50, 35)	−0.39
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	word recognition	emergent lit skills	89 (40, 49)	−0.14
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	reading test	reading performance	82 (38, 44)	+0.24
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	reading test	reading performance	69 (35, 34)	+0.18
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	reading test	reading performance	85 (50, 35)	−0.16
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	reading test	reading performance	89 (40, 49)	+0.22
Koskinen et al. (2000)	intervention	lending	quasi (rigorous)	elementary	reading frequency	reading behavior	84 (43, 41)	+0.71

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Koskinen et al. (2000)	intervention	lending	quasi (rigorous)	elementary	reading frequency	reading behavior	72 (31, 41)	+0.21
Koskinen et al. (2000)	intervention	lending	quasi (rigorous)	elementary	child play with print material	reading behavior	73 (43, 30)	+1.12
Koskinen et al. (2000)	intervention	lending	quasi (rigorous)	elementary	child play with print material	reading behavior	87 (46, 41)	+0.72
Koskinen et al. (2000)	intervention	lending	quasi (rigorous)	elementary	child play with print material	reading behavior	72 (31, 41)	+0.34
Koskinen et al. (2000)	intervention	lending	quasi (rigorous)	elementary	child play with print material	reading behavior	61 (31, 30)	+0.56
Koskinen et al. (2000)	intervention	lending	quasi (rigorous)	elementary	oral story retelling	emergent lit skills	70 (29, 41)	+0.51
Koskinen et al. (2000)	intervention	lending	quasi (rigorous)	elementary	oral story retelling	emergent lit skills	86 (45, 41)	+0.49
Koskinen et al. (2000)	intervention	lending	quasi (rigorous)	elementary	text level	reading performance	72 (31, 41)	−0.51
Koskinen et al. (2000)	intervention	lending	quasi (rigorous)	elementary	text level	reading performance	87 (46, 41)	−0.03
Koskinen et al. (2000)	intervention	lending	quasi (rigorous)	elementary	vocabulary (written)	writing performance	85 (46, 39)	−1.74
Koskinen et al. (2000)	intervention	lending	quasi (rigorous)	elementary	vocabulary (written)	writing performance	70 (31, 39)	−0.42
Lowery & Grafft (1968)	intervention	lending	quasi (rigorous)	elementary	attitude toward reading	attitudes	501 (342, 159)	+1.48
Gambrell & Morrow (1996)	intervention	lending	quasi (rigorous)	elementary	home literacy orientation	reading behavior	559 (279, 280)	+0.14
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	oral story retelling	emergent lit skills	88 (43, 45)	+2.60

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	oral story retelling	emergent lit skills	85 (40, 45)	+1.63
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	comprehension	reading performance	88 (43, 45)	+2.60
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	comprehension	reading performance	85 (40, 45)	+1.38
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	reading test	reading performance	88 (43, 45)	+0.65
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	reading test	reading performance	88 (43, 45)	+0.17
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	reading test	reading performance	85 (40, 45)	+0.20
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	reading test	reading performance	85 (40, 45)	+0.13
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	writing (general)	writing performance	88 (43, 45)	+2.55
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	writing (general)	writing performance	85 (40, 45)	+1.52
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	writing story	writing performance	88 (43, 45)	+2.11

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	writing story	writing performance	85 (40, 45)	+0.51
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	narrative versus expository writing	writing performance	88 (43, 45)	−1.29
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	narrative versus expository writing	writing performance	85 (40, 45)	−0.33
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	tests in science	general ac. achieve	88 (43, 45)	+1.77
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	tests in science	general ac. achieve	88 (43, 45)	+0.12
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	tests in science	general ac. achieve	85 (40, 45)	−0.07
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	tests in science	general ac. achieve	85 (40, 45)	−0.15
Morrow & Weinstein (1983)	intervention	lending	quasi (nonrigorous)	elementary	attitude toward reading	attitudes	96 (48, 48)	+0.00
Morrow & Weinstein (1986)	intervention	lending	quasi (nonrigorous)	elementary	attitude toward reading	attitudes	94 (46, 48)	+0.00
Gambrell & Morrow (1996)	intervention	lending	quasi (rigorous)	elementary	attitude toward reading	attitudes	559 (279, 280)	+0.14

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	attitude toward academic subject	attitudes	88 (43, 45)	+0.98
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	attitude toward academic subject	attitudes	85 (40, 45)	+0.01
Morrow & Weinstein (1983)	intervention	lending	quasi (rigorous)	elementary	reading frequency	reading behavior	96 (48, 48)	+0.00
Morrow & Weinstein (1983)	intervention	lending	quasi (nonrigorous)	elementary	reading frequency	reading behavior	94 (46, 48)	+0.00
Morrow & Weinstein (1983)	intervention	lending	quasi (rigorous)	elementary	child play with print material	reading behavior	96 (48, 48)	+0.19
Morrow & Weinstein (1983)	intervention	lending	quasi (rigorous)	elementary	child play with print material	reading behavior	94 (46, 48)	+0.43
Neuman & Roskos (1993)	intervention	lending	experimental (rigorous)	preschool	child play with print material	reading behavior	177 (130, 47)	+0.62
Neuman & Roskos (1993)	intervention	lending	experimental (rigorous)	preschool	child play with print material	reading behavior	1350 (900, 450)	+0.78
Neuman & Roskos (1993)	intervention	lending	experimental (rigorous)	preschool	expressive language	basic language	138 (98, 40)	+0.55
Neuman & Roskos (1993)	intervention	lending	experimental (rigorous)	preschool	expressive language	basic language	138 (98, 40)	+0.24
Neuman & Roskos (1993)	intervention	lending	experimental (rigorous)	preschool	sign/label/picture reading	emergent lit skills	89 (49, 40)	+1.11
Neuman (1999)	intervention	lending	quasi (nonrigorous)	preschool	receptive language	basic language	128 (71, 57)	−0.03

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Neuman (1999)	intervention	lending	quasi (nonrigorous)	preschool	receptive language	basic language	66 (35, 31)	+0.23
Neuman (1999)	intervention	lending	quasi (nonrigorous)	preschool	concepts about print	emergent lit skills	128 (71, 57)	+0.48
Neuman (1999)	intervention	lending	quasi (nonrigorous)	preschool	concepts about print	emergent lit skills	66 (35, 31)	+0.55
Neuman (1999)	intervention	lending	quasi (nonrigorous)	preschool	letter identification	emergent lit skills	128 (71, 57)	+0.14
Neuman (1999)	intervention	lending	quasi (nonrigorous)	preschool	letter identification	emergent lit skills	66 (35, 31)	+2.60
Neuman (1999)	intervention	lending	quasi (nonrigorous)	preschool	letter identification	emergent lit skills	66 (35, 31)	+4.24
Neuman (1999)	intervention	lending	quasi (nonrigorous)	preschool	sign/label/picture reading	emergent lit skills	128 (71, 57)	+0.30
Neuman (1999)	intervention	lending	quasi (nonrigorous)	preschool	word recognition	emergent lit skills	66 (35, 31)	+0.64
Neuman (1999)	intervention	lending	quasi (nonrigorous)	preschool	writing (general)	writing performance	128 (71, 57)	+0.58
Neuman (1999)	intervention	lending	quasi (nonrigorous)	preschool	writing (general)	writing performance	66 (35, 31)	+1.03
Neuman (1999)	intervention	lending	quasi (nonrigorous)	preschool	story telling (local)	emergent lit skills	128 (71, 57)	−0.51
Neuman (1999)	intervention	lending	quasi (nonrigorous)	preschool	story telling (global)	emergent lit skills	128 (71, 57)	−0.01
Neuman (1999)	intervention	lending	quasi (nonrigorous)	preschool	child requests to be read to0	emergent lit skills	66 (35, 31)	5.32
Neuman (1999)	intervention	lending	quasi (nonrigorous)	preschool	child requests to be read to1	emergent lit skills	66 (35, 31)	5.03

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Pilgreen (2000)	intervention	lending	quasi (nonrigorous)	high	reading frequency	reading behavior	248 (131, 117)	+0.51
Pilgreen (2000)	intervention	lending	quasi (nonrigorous)	high	reading test	reading performance	248 (131, 117)	+0.20
Pilgreen (2000)	intervention	lending	quasi (nonrigorous)	high	attitude toward reading	attitudes	379 (190, 189)	+0.34
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	expressive language	basic language	901 (343, 558)	+0.55
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	expressive language	basic language	901 (343, 558)	+0.53
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	expressive language	basic language	901 (343, 558)	+0.52
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	concepts about print	emergent lit skills	901 (343, 558)	+0.39
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	concepts about print	emergent lit skills	901 (343, 558)	+0.28
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	concepts about print	emergent lit skills	901 (343, 558)	+0.09
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	letter identification	emergent lit skills	901 (343, 558)	+0.20
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	letter identification	emergent lit skills	901 (343, 558)	+0.09
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	letter identification	emergent lit skills	901 (343, 558)	+0.02
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	fluency	reading performance	901 (343, 558)	+0.39
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	fluency	reading performance	901 (343, 558)	+0.22

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	fluency	reading performance	901 (343, 558)	−0.01
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	vocabulary	reading performance	901 (343, 558)	+0.41
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	vocabulary	reading performance	901 (343, 558)	+0.26
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	vocabulary	reading performance	901 (343, 558)	−0.04
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	text level	reading performance	901 (343, 558)	+0.37
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	text level	reading performance	901 (343, 558)	+0.33
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	text level	reading performance	901 (343, 558)	+0.08
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	child requests to be read to/interest in reading	writing performance	901 (343, 558)	+0.32
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	child requests to be read to/interest in reading	writing performance	901 (343, 558)	+0.25
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	child requests to be read to/interest in reading	writing performance	901 (343, 558)	+0.02
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	attitude toward reading	attitudes	38 (19, 19)	+0.71
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	attitude toward reading	attitudes	25 (13, 12)	+0.15

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	attitude toward reading	attitudes	32 (16, 16)	+0.80
Reis et al. (2007)	intervention	lending	experimental (rigorous)	middle	attitude toward reading	attitudes	37 (18, 19)	−0.01
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	attitude toward reading	attitudes	34 (17, 17)	+0.29
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	attitude toward reading	attitudes	31 (15, 16)	−0.56
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	attitude toward reading	attitudes	29 (15, 14)	−0.08
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	fluency	reading performance	38 (19, 19)	+0.18
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	fluency	reading performance	25 (13, 12)	−0.01
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	fluency	reading performance	32 (16, 16)	+0.21
Reis et al. (2007)	intervention	lending	experimental (rigorous)	middle	fluency	reading performance	37 (18, 19)	+0.13
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	fluency	reading performance	34 (17, 17)	−0.34
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	fluency	reading performance	31 (15, 16)	+0.36
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	fluency	reading performance	29 (15, 14)	+0.28
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	comprehension	reading performance	38 (19, 19)	+0.40
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	comprehension	reading performance	25 (13, 12)	−0.19

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	comprehension	reading performance	32 (16, 16)	+0.34
Reis et al. (2007)	intervention	lending	experimental (rigorous)	middle	comprehension	reading performance	37 (18, 19)	+0.74
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	comprehension	reading performance	34 (17, 17)	−0.70
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	comprehension	reading performance	31 (15, 16)	−0.03
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	comprehension	reading performance	29 (15, 14)	+0.37
Robinson, Larsen, & Haupt (1995)	intervention	lending	quasi (nonrigorous)	preschool	reading frequency	reading behavior	81 (40, 41)	+1.81
Robinson, Larsen, & Haupt (1995)	intervention	lending	quasi (nonrigorous)	preschool	reading frequency	reading behavior	81 (40, 41)	+1.81
Robinson, Larsen, & Haupt (1995)	intervention	lending	quasi (nonrigorous)	preschool	amount of time reading	reading behavior	81 (40, 41)	+0.70
Robinson, Larsen, & Haupt (1995)	intervention	lending	quasi (nonrigorous)	preschool	amount of time reading	reading behavior	41 (20, 21)	−0.22
Sanders et al. (2000)	intervention	lending	quasi (nonrigorous)	preschool	child requests to be read to	reading motivation	122 (65, 57)	+0.96
Sanders et al. (2000)	intervention	lending	quasi (nonrigorous)	preschool	home literacy orientation	reading behavior	124 (66, 58)	+0.52
Sheveland (1996)	intervention	lending	experimental (rigorous)	middle	comprehension	reading performance	53 (28, 25)	+0.55
Sheveland (1996)	intervention	lending	experimental (rigorous)	middle	attitude toward reading	attitudes	53 (28, 25)	+0.60

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Tizard, Schofield, & Hewison (1982)	intervention	lending	experimental (rigorous)	elementary	reading test	reading performance	66 (22, 44)	+1.15
Tizard, Schofield, & Hewison (1982)	intervention	lending	experimental (rigorous)	elementary	reading test	reading performance	72 (23, 49)	+0.50
Tizard, Schofield, & Hewison (1982)	intervention	lending	experimental (rigorous)	elementary	reading test	reading performance	58 (24, 34)	+0.35
Tizard, Schofield, & Hewison (1982)	intervention	lending	experimental (rigorous)	elementary	reading test	reading performance	65 (28, 37)	+0.43
U.S. Department of Education (2009)	intervention	lending	quasi (rigorous)	elementary	reading test	reading performance	256 (128, 128)	+0.50
U.S. Department of Education (2009)	intervention	lending	quasi (rigorous)	elementary	reading test	reading performance	256 (128, 128)	+0.12
U.S. Department of Education (2009)	intervention	lending	quasi (rigorous)	high	reading test	reading performance	130 (65, 65)	+0.46

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
U.S. Department of Education (2009)	intervention	lending	quasi (rigorous)	high	reading test	reading performance	130 (65, 65)	+0.05
Whitehurst et al. (1994b)	intervention	lending	experimental (rigorous)	preschool	general language	basic language	167 (94, 73)	+0.09
Whitehurst et al. (1994b)	intervention	lending	experimental (rigorous)	preschool	phonemic or phonological awareness	emergent lit skills	167 (94, 73)	+0.03
Whitehurst et al. (1994b)	intervention	lending	experimental (rigorous)	preschool	concepts about print	emergent lit skills	167 (94, 73)	+0.62
Whitehurst et al. (1994b)	intervention	lending	experimental (rigorous)	preschool	interest in reading, reading frequency	emergent lit skills	167 (94, 73)	+0.52
Whitehead (2004)	intervention	lending	quasi (nonrigorous)	elementary	attitude toward reading	attitudes	92 (73, 19)	−0.19
Whitehead (2004)	intervention	lending	quasi (nonrigorous)	elementary	reading frequency	reading behavior	92 (73, 19)	+0.06
Whitehead (2004)	intervention	lending	quasi (nonrigorous)	elementary	child's assessment of reading ability	reading performance	92 (73, 19)	+0.51
Zevenbergen, Whitehurst, & Zevenbergen (2003)	intervention	lending	experimental (rigorous)	preschool	expressive language	basic language	124 (71, 53)	+0.47
Zevenbergen, Whitehurst, & Zevenbergen (2003)	intervention	lending	experimental (rigorous)	preschool	oral story retelling	emergent lit skills	124 (71, 53)	+0.24

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Zevenbergen, Whitehurst, & Zevenbergen (2003)	intervention	lending	experimental (rigorous)	preschool	oral story retelling	emergent lit skills	124 (71, 53)	+0.20
Zevenbergen, Whitehurst, & Zevenbergen (2003)	intervention	lending	experimental (rigorous)	preschool	oral story retelling	emergent lit skills	124 (71, 53)	+0.00
Zevenbergen, Whitehurst, & Zevenbergen (2003)	intervention	lending	experimental (rigorous)	preschool	ask questions during reading time	emergent lit skills	124 (71, 53)	+0.00
Zevenbergen, Whitehurst, & Zevenbergen (2003)	intervention	lending	experimental (rigorous)	preschool	ask questions during reading time	emergent lit skills	124 (71, 53)	+0.00
Zevenbergen, Whitehurst, & Zevenbergen (2003)	intervention	lending	experimental (rigorous)	preschool	inferring character states	emergent lit skills	124 (71, 53)	+0.58
Zevenbergen, Whitehurst, & Zevenbergen (2003)	intervention	lending	experimental (rigorous)	preschool	inferring author states	emergent lit skills	124 (71, 53)	+0.00
Zevenbergen, Whitehurst, & Zevenbergen (2003)	intervention	lending	experimental (rigorous)	preschool	comprehension	reading performance	124 (71, 53)	+0.00

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Zevenbergen, Whitehurst, & Zevenbergen (2003)	intervention	lending	experimental (rigorous)	preschool	child requests to be read to/interest in reading	writing performance	124 (71, 53)	−0.28
Kelly-Vance & Schreck (2002)	intervention	lending & ownership	experimental (rigorous)	mixed-mult levels	fluency	reading performance	56 (28, 28)	+0.68
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	reading frequency	reading behavior	128 (64, 64)	4.86
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	reading frequency	reading behavior	110 (46, 64)	+3.94
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	guardian/child shared reading	reading behavior	110 (46, 64)	-+0.28
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	guardian/child shared reading	reading behavior	128 (64, 64)	+0.14
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	oral story retelling	emergent lit skills	110 (46, 64)	+1.41
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	oral story retelling	emergent lit skills	128 (64, 64)	+1.18
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	comprehension	reading performance	110 (46, 64)	+2.26
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	comprehension	reading performance	128 (64, 64)	+1.84
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	vocabulary	reading performance	110 (46, 64)	+1.53
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	vocabulary	reading performance	128 (64, 64)	+1.30
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	reading test	reading performance	128 (64, 64)	+0.84

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	reading test	reading performance	110 (46, 64)	+0.13
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	writing story	writing performance	110 (46, 64)	+2.52
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	writing story	writing performance	110 (46, 64)	+1.60
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	writing story	writing performance	128 (64, 64)	+1.33
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	writing story	writing performance	128 (64, 64)	+0.94
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	story telling (global)	emergent lit skills	110 (46, 64)	4.06
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	story telling (global)	emergent lit skills	128 (64, 64)	+3.19

[a] Numbers in parentheses represent numbers of children in intervention and comparison groups, respectively.

Table C2. Reports of Findings on Children's Access to Print Material and Attitudes

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Blakemore (1970)	correlational	.	correlational (nonrigorous)	elementary	attitudes toward reading	attitudes	136	0.51
Kim (2004)	correlational	.	correlational (nonrigorous)	middle	attitude toward homework	attitudes	3,373	0.28
Kubis (1994)	correlational	.	correlational (nonrigorous)	high	attitude toward reading	attitudes	316	0.38
Walberg & Tsai (1985)	correlational	.	correlational (nonrigorous)	elementary	attitude toward reading	attitudes	1,459	0.37
Fisher, Lapp, & Flood (2001)	intervention	lending	quasi (nonrigorous)	mixed-mult levels	attitude toward reading	attitudes	674 (337, 337)	0.60
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	attitude toward reading	attitudes	82 (41, 41)	0.30
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	attitude toward reading	attitudes	82 (41, 41)	0.15
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	attitude toward reading	attitudes	82 (41, 41)	0.07
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	attitude toward reading	attitudes	69 (34, 35)	−0.61
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	attitude toward reading	attitudes	69 (34, 35)	0.54
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	attitude toward reading	attitudes	69 (34, 35)	0.27
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	attitude toward reading	attitudes	85 (42, 43)	−0.33
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	attitude toward reading	attitudes	85 (42, 43)	0.26
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	attitude toward reading	attitudes	85 (42, 43)	0.07

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	attitude toward reading	attitudes	89 (45, 44)	−0.51
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	attitude toward reading	attitudes	89 (45, 44)	0.46
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	attitude toward reading	attitudes	89 (45, 44)	−0.07
Lowery & Grafft (1968)	intervention	lending	quasi (rigorous)	elementary	attitude toward reading	attitudes	501 (342, 159)	1.48
Morrow & Weinstein (1983)	intervention	lending	quasi (nonrigorous)	elementary	attitude toward reading	attitudes	96 (48, 48)	0.00
Morrow & Weinstein (1983)	intervention	lending	quasi (nonrigorous)	elementary	attitude toward reading	attitudes	94 (46, 48)	0.00
Gambrell & Morrow (1996)	intervention	lending	quasi (rigorous)	elementary	attitude toward reading	attitudes	559 (279, 280)	0.14
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	attitude toward academic subject	attitudes	88 (43, 45)	0.98
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	attitude toward academic subject	attitudes	85 (40, 45)	0.01
Pilgreen (2000)	intervention	lending	quasi (nonrigorous)	high	attitude toward reading	attitudes	379 (190, 189)	0.34
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	attitude toward reading	attitudes	38 (19, 19)	0.71
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	attitude toward reading	attitudes	25 (13, 12)	0.15
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	attitude toward reading	attitudes	32 (16, 16)	0.80

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Reis et al. (2007)	intervention	lending	experimental (rigorous)	middle	attitude toward reading	attitudes	37 (18, 19)	−0.01
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	attitude toward reading	attitudes	34 (17, 17)	0.29
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	attitude toward reading	attitudes	31 (15, 16)	−0.56
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	attitude toward reading	attitudes	29 (15, 14)	−0.08
Sheveland (1996)	intervention	lending	experimental (rigorous)	middle	attitude toward reading	attitudes	53 (28, 25)	0.60
Whitehead (2004)	intervention	lending	quasi (nonrigorous)	elementary	attitude toward reading	attitudes	92 (73, 19)	−0.19
Inglis et al. (1981)	intervention	ownership	quasi (nonrigorous)	elementary	attitude toward reading	attitudes	365 (156, 209)	−0.05
Inglis et al. (1981)	intervention	ownership	quasi (nonrigorous)	mixed-mult levels	attitude toward reading	attitudes	868 (446, 422)	0.77
Jones et al. (2000)	intervention	ownership	quasi (rigorous)	preschool	attitude toward reading	attitudes	173 (88, 85)	0.42
Saint-Laurent & Gaisson (2005)	intervention	ownership	quasi (rigorous)	elementary	attitude toward reading	attitudes	108 (53, 55)	0.26

[a] Numbers in parentheses represent numbers of children in intervention and comparison groups, respectively.

Table C3. Reports of Findings on Children's Access to Print Material and Motivation to Read

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Hall (1997)	correlational	.	correlational (nonrigorous)	middle	child requests library visit	reading motivation	15,952	0.07
Loera (2007)	correlational	.	correlational (nonrigorous)	elementary	reading motivation	reading motivation	128	0.34
Morrow (1983)	correlational	.	correlational (nonrigorous)	kindergarten	interest in reading	reading motivation	116	2.27
Morrow (1983)	correlational	.	correlational (nonrigorous)	kindergarten	interest in reading	reading motivation	116	0.61
Morrow (1983)	correlational	.	correlational (nonrigorous)	kindergarten	interest in reading	reading motivation	116	0.57
Raines & Isbell (1992)	correlational	.	correlational (nonrigorous)	preschool	interest in reading	reading motivation	48	1.68
Raines & Isbell (1992)	correlational	.	correlational (nonrigorous)	preschool	interest in reading	reading motivation	48	0.97
Shoham (1997)	correlational	.	correlational (nonrigorous)	elementary	child requests library visit	reading motivation	208	0.69
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	interest in reading	reading motivation	82 (38, 44)	0.43
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	interest in reading	reading motivation	69 (35, 34)	0.50
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	interest in reading	reading motivation	85 (50, 35)	−0.16
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	interest in reading	reading motivation	89 (40, 49)	−0.45
Sanders et al. (2000)	intervention	lending	quasi (nonrigorous)	preschool	child requests to be read to	reading motivation	122 (65, 57)	0.96
Bean et al. (1990)	intervention	ownership	quasi (nonrigorous)	preschool	child requests to be read to	reading motivation	41 (27, 14)	3.32

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Bean et al. (1990)	intervention	ownership	quasi (nonrigorous)	preschool	child requests library visit	reading motivation	41 (27, 14)	0.80
Golova et al. (1991)	intervention	ownership	quasi (rigorous)	preschool	interest in reading	reading motivation	130 (63, 67)	0.03
Golova et al. (1991)	intervention	ownership	quasi (rigorous)	preschool	interest in reading	reading motivation	130 (63, 67)	0.03
High et al. (1999)	intervention	ownership	quasi (rigorous)	preschool	interest in reading	reading motivation	153 (76, 77)	0.40
Mann et al. (2009)	intervention	ownership	quasi (nonrigorous)	preschool	child requests to be read to	reading motivation	37 (19, 18)	2.10
McCormick & Mason (1986)	intervention	ownership	quasi (rigorous)	kindergarten	interest in reading	reading motivation	23 (13, 10)	1.38
McCormick & Mason (1986)	intervention	ownership	quasi (rigorous)	kindergarten	child requests to be read to	reading motivation	23 (13, 10)	0.39

[a] Numbers in parentheses represent numbers of children in intervention and comparison groups, respectively.

Table C4. Reports of Findings on Children's Access to Print Material and Reading Behavior

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Ezell, Gonzales, & Randolph (2000)	correlational	.	correlational (nonrigorous)	preschool	amount of time reading	reading behavior	96	0.72
Gaver (1963)	correlational	.	quasi (nonrigorous)	mixed-mult levels	amount of time reading	reading behavior	512	0.37
Gaver (1963)	correlational	.	quasi (nonrigorous)	mixed-mult levels	amount of time reading	reading behavior	548	0.53
Gaver (1963)	correlational	.	quasi (nonrigorous)	mixed-mult levels	amount of time reading	reading behavior	516	0.18
Hall (1997)	correlational	.	correlational (nonrigorous)	middle	reading frequency	reading behavior	15,952	0.07
Hall (1997)	correlational	.	correlational (nonrigorous)	middle	amount of time reading	reading behavior	15,952	0.07
Harris et al. (2007)	correlational	.	correlational (nonrigorous)	preschool	guardian/child shared reading	reading behavior	1,200	0.75
Harris et al. (2007)	correlational	.	correlational (nonrigorous)	preschool	guardian/child shared reading	reading behavior	1,200	0.72
Harris et al. (2007)	correlational	.	correlational (nonrigorous)	preschool	guardian/child shared reading	reading behavior	1,200	0.72
Harris et al. (2007)	correlational	.	correlational (nonrigorous)	preschool	guardian/child shared reading	reading behavior	1,200	0.65
Lamme & Olmsted (1976)	correlational	.	correlational (nonrigorous)	elementary	guardian/child shared reading	reading behavior	38	1.42
McCollough (1990)	correlational	.	correlational (nonrigorous)	middle	reading frequency	reading behavior	40	0.10
McQuillan & Au (2001)	correlational	.	correlational (nonrigorous)	high	reading frequency	reading behavior	24	0.55

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
McQuillan (2006)	correlational	.	correlational (nonrigorous)	high	amount of time reading	reading behavior	131	0.20
McQuillan (2006)	correlational	.	correlational (nonrigorous)	high	amount of time reading	reading behavior	133	0.02
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	reading frequency	reading behavior	5,500	0.95
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	reading frequency	reading behavior	3,147	1.04
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	reading frequency	reading behavior	3,287	1.32
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	reading frequency	reading behavior	3,148	1.06
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	reading frequency	reading behavior	4,996	0.93
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	reading frequency	reading behavior	4,432	1.12
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	reading frequency	reading behavior	3,361	1.42
Shoham (1997)	correlational	.	correlational (nonrigorous)	elementary	reading frequency	reading behavior	196	−0.16
Shoham (1997)	correlational	.	correlational (nonrigorous)	elementary	amount of time reading	reading behavior	196	0.09
Teale (1986)	correlational	.	correlational (nonrigorous)	preschool	reading frequency	reading behavior	24	0.56
Teale (1986)	correlational	.	correlational (nonrigorous)	preschool	amount of time reading	reading behavior	24	0.25
Singleton (2002)	intervention	lending	quasi (nonrigorous)	high	reading frequency	reading behavior	170 (34, 136)	2.07

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Koskinen et al. (2000)	intervention	lending	quasi (rigorous)	elementary	reading frequency	reading behavior	84 (43, 41)	0.71
Koskinen et al. (2000)	intervention	lending	quasi (rigorous)	elementary	reading frequency	reading behavior	72 (31, 41)	0.21
Koskinen et al. (2000)	intervention	lending	quasi (rigorous)	elementary	child play with print material	reading behavior	73 (43, 30)	1.12
Koskinen et al. (2000)	intervention	lending	quasi (rigorous)	elementary	child play with print material	reading behavior	87 (46, 41)	0.72
Koskinen et al. (2000)	intervention	lending	quasi (rigorous)	elementary	child play with print material	reading behavior	72 (31, 41)	0.34
Koskinen et al. (2000)	intervention	lending	quasi (rigorous)	elementary	child play with print material	reading behavior	61 (31, 30)	0.56
Gambrell & Morrow (1996)	intervention	lending	quasi (rigorous)	elementary	home literacy orientation	reading behavior	559 (279, 280)	0.14
Morrow & Weinstein (1983)	intervention	lending	quasi (rigorous)	elementary	reading frequency	reading behavior	96 (48, 48)	0.00
Morrow & Weinstein (1983)	intervention	lending	quasi (nonrigorous)	elementary	reading frequency	reading behavior	94 (46, 48)	0.00
Morrow & Weinstein (1983)	intervention	lending	quasi (rigorous)	elementary	child play with print material	reading behavior	96 (48, 48)	0.19
Morrow & Weinstein (1983)	intervention	lending	quasi (rigorous)	elementary	child play with print material	reading behavior	94 (46, 48)	0.43
Neuman & Roskos (1993)	intervention	lending	experimental (rigorous)	preschool	child play with print material	reading behavior	177 (130, 47)	0.62
Neuman & Roskos (1993)	intervention	lending	experimental (rigorous)	preschool	child play with print material	reading behavior	1,350 (900, 450)	0.78

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Pilgreen (2000)	intervention	lending	quasi (nonrigorous)	high	reading frequency	reading behavior	248 (131, 117)	0.51
Robinson, Larsen, & Haupt (1995)	intervention	lending	quasi (nonrigorous)	preschool	reading frequency	reading behavior	81 (40, 41)	1.81
Robinson, Larsen, & Haupt (1995)	intervention	lending	quasi (nonrigorous)	preschool	reading frequency	reading behavior	81 (40, 41)	1.81
Robinson, Larsen, & Haupt (1995)	intervention	lending	quasi (nonrigorous)	preschool	amount of time reading	reading behavior	81 (40, 41)	0.70
Robinson, Larsen, & Haupt (1995)	intervention	lending	quasi (nonrigorous)	preschool	amount of time reading	reading behavior	41 (20, 21)	−0.22
Sanders et al. (2000)	intervention	lending	quasi (nonrigorous)	preschool	home literacy orientation	reading behavior	124 (66, 58)	0.52
Whitehead (2004)	intervention	lending	quasi (nonrigorous)	elementary	reading frequency	reading behavior	92 (73, 19)	0.06
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	reading frequency	reading behavior	128 (64, 64)	4.86
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	reading frequency	reading behavior	110 (46, 64)	3.94
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	guardian/child shared reading	reading behavior	110 (46, 64)	−0.28
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	guardian/child shared reading	reading behavior	128 (64, 64)	0.14
Allington et al. (2010)	intervention	ownership	experimental (rigorous)	elementary	reading frequency	reading behavior	1,330 (852, 478)	0.18
Bean et al. (1990)	intervention	ownership	quasi (nonrigorous)	preschool	reading frequency	reading behavior	41 (27, 14)	−0.45

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Bean et al. (1990)	intervention	ownership	quasi (nonrigorous)	preschool	guardian/child shared reading	reading behavior	41 (27, 14)	0.69
Bean et al. (1990)	intervention	ownership	quasi (nonrigorous)	preschool	child play with print material	reading behavior	41 (27, 14)	−0.61
Billings (2009)	intervention	ownership	quasi (nonrigorous)	preschool	guardian/child shared reading	reading behavior	37 (22, 15)	−0.24
Billings (2009)	intervention	ownership	quasi (nonrigorous)	preschool	child play with print material	reading behavior	32 (17, 15)	0.61
Goldenberg, Reese, & Gallimore (1992)	intervention	ownership	quasi (rigorous)	kindergarten	child play with print material	reading behavior	10 (5, 5)	1.00
Golova et al. (1991)	intervention	ownership	quasi (rigorous)	preschool	reading frequency	reading behavior	130 (63, 67)	0.68
Golova et al. (1991)	intervention	ownership	quasi (rigorous)	preschool	guardian/child shared reading	reading behavior	130 (63, 67)	0.03
High et al. (1999)	intervention	ownership	quasi (rigorous)	preschool	guardian/child shared reading	reading behavior	153 (76, 77)	0.67
High et al. (1999)	intervention	ownership	quasi (rigorous)	preschool	guardian/child shared reading	reading behavior	153 (76, 77)	0.57
High et al. (1999)	intervention	ownership	quasi (rigorous)	preschool	home literacy orientation	reading behavior	153 (76, 77)	2.20
Kim & White (2008)	intervention	ownership	experimental (rigorous)	mixed-mult levels	reading frequency	reading behavior	207 (100, 107)	0.25
Kim & White (2008)	intervention	ownership	experimental (rigorous)	mixed-mult levels	reading frequency	reading behavior	207 (100, 107)	0.08
Kim & White (2008)	intervention	ownership	experimental (rigorous)	mixed-mult levels	reading frequency	reading behavior	200 (93, 107)	0.09
Mann et al. (2009)	intervention	ownership	quasi (nonrigorous)	preschool	reading frequency	reading behavior	37 (19, 18)	1.73

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
McCormick & Mason (1986)	intervention	ownership	quasi (rigorous)	kindergarten	reading frequency	reading behavior	23 (13, 10)	0.57
McCormick & Mason (1986)	intervention	ownership	quasi (rigorous)	kindergarten	child play with print material	reading behavior	23 (13, 10)	1.50
Mendelsohn et al. (2001)	intervention	ownership	quasi (nonrigorous)	preschool	guardian/child shared reading	reading behavior	122 (49, 73)	0.38
Mendelsohn et al. (2001)	intervention	ownership	quasi (nonrigorous)	preschool	home literacy orientation	reading behavior	122 (49, 73)	0.21
Needlman et al. (1991)	intervention	ownership	quasi (nonrigorous)	preschool	home literacy orientation	reading behavior	79 (39, 40)	0.33
Saint-Laurent & Gaisson (2005)	intervention	ownership	quasi (rigorous)	elementary	home literacy orientation	reading behavior	108 (53, 55)	1.09
Sharif, Reiber, & Ozuah (2002)	intervention	ownership	quasi (nonrigorous)	mixed-pre/elem	home literacy orientation	reading behavior	200 (100, 100)	0.41
Sharif, Reiber, & Ozuah (2002)	intervention	ownership	quasi (nonrigorous)	mixed-pre/elem	home literacy orientation	reading behavior	200 (100, 100)	0.23

[a] Numbers in parentheses represent numbers of children in intervention and comparison groups, respectively.

Table C5. Reports of Findings on Children's Access to Print Material and Basic Language Skills

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Aram & Levin (2002)	correlational	.	correlational (nonrigorous)	kindergarten	general language	basic language	81	0.45
Arterberry et al. (2007)	correlational	.	correlational (nonrigorous)	preschool	receptive language	basic language	449	0.30
Arterberry et al. (2007)	correlational	.	correlational (nonrigorous)	preschool	expressive language	basic language	449	0.37
Bing (1963)	correlational	.	correlational (nonrigorous)	elementary	expressive language	basic language	64	0.47
Bing (1963)	correlational	.	correlational (nonrigorous)	elementary	expressive language	basic language	60	0.49
Bingham (2007)	correlational	.	correlational (nonrigorous)	preschool	receptive language	basic language	120	0.07
Cooper et al. (2002)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	general language	basic language	176	0.70
Gaver (1963)	correlational	.	quasi (nonrigorous)	mixed-mult levels	general language	basic language	512	0.38
Gaver (1963)	correlational	.	quasi (nonrigorous)	mixed-mult levels	general language	basic language	512	0.26
Gaver (1963)	correlational	.	quasi (nonrigorous)	mixed-mult levels	general language	basic language	548	0.70
Gaver (1963)	correlational	.	quasi (nonrigorous)	mixed-mult levels	general language	basic language	548	0.68
Gaver (1963)	correlational	.	quasi (nonrigorous)	mixed-mult levels	general language	basic language	516	0.39
Gaver (1963)	correlational	.	quasi (nonrigorous)	mixed-mult levels	general language	basic language	516	0.28
Morrison & Cooney (2001)	correlational	.	correlational (nonrigorous)	elementary	reading readiness	basic language	198	1.35

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Share et al. (1983)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	general language	basic language	543	0.28
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	reading readiness	basic language	112	1.76
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	reading readiness	basic language	112	0.98
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	reading readiness	basic language	114	1.58
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	reading readiness	basic language	114	1.50
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	reading readiness	basic language	40	1.35
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	general language	basic language	40	2.60
Stephenson et al. (2008)	correlational	.	correlational (nonrigorous)	kindergarten	receptive language	basic language	61	−0.02
Theriot et al. (2003)	correlational	.	correlational (nonrigorous)	preschool	receptive language	basic language	64	2.30
Theriot et al. (2003)	correlational	.	correlational (nonrigorous)	preschool	expressive language	basic language	64	0.51
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	receptive language	basic language	227 (136, 91)	1.92
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	expressive language	basic language	121 (72, 49)	0.24
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	general language	basic language	227 (136, 91)	1.83

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	general language	basic language	261 (155, 106)	0.67
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	receptive language	basic language	512 (256, 256)	0.22
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	expressive language	basic language	512 (256, 256)	0.09
Neuman & Roskos (1993)	intervention	lending	experimental (rigorous)	preschool	expressive language	basic language	138 (98, 40)	0.55
Neuman & Roskos (1993)	intervention	lending	experimental (rigorous)	preschool	expressive language	basic language	138 (98, 40)	0.24
Neuman (1999)	intervention	lending	quasi (nonrigorous)	preschool	receptive language	basic language	128 (71, 57)	−0.03
Neuman (1999)	intervention	lending	quasi (nonrigorous)	preschool	receptive language	basic language	66 (35, 31)	0.23
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	expressive language	basic language	901 (343, 558)	0.55
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	expressive language	basic language	901 (343, 558)	0.53
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	expressive language	basic language	901 (343, 558)	0.52
Whitehurst et al. (1994b)	intervention	lending	experimental (rigorous)	preschool	general language	basic language	167 (94, 73)	0.09
Zevenbergen, Whitehurst, & Zevenbergen (2003)	intervention	lending	experimental (rigorous)	preschool	expressive language	basic language	124 (71, 53)	0.47

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Bean et al. (1990)	intervention	ownership	quasi (nonrigorous)	preschool	general language	basic language	37 (24, 13)	0.56
Bean et al. (1990)	intervention	ownership	quasi (nonrigorous)	preschool	reading test	basic language	37 (24, 13)	0.32
Golova et al. (1991)	intervention	ownership	quasi (rigorous)	preschool	general language	basic language	130 (63, 67)	0.03
High et al. (1999)	intervention	ownership	quasi (rigorous)	preschool	receptive language	basic language	151 (76, 75)	0.47
High et al. (1999)	intervention	ownership	quasi (rigorous)	preschool	expressive language	basic language	151 (76, 75)	0.26
Lonigan & Whitehurst (1998)	intervention	ownership	experimental (rigorous)	preschool	receptive language	basic language	46 (19, 27)	0.19
Lonigan & Whitehurst (1998)	intervention	ownership	experimental (rigorous)	preschool	receptive language	basic language	45 (14, 31)	0.05
Lonigan & Whitehurst (1998)	intervention	ownership	experimental (rigorous)	preschool	expressive language	basic language	45 (19, 26)	0.47
Lonigan & Whitehurst (1998)	intervention	ownership	experimental (rigorous)	preschool	expressive language	basic language	45 (19, 26)	0.36
Lonigan & Whitehurst (1998)	intervention	ownership	experimental (rigorous)	preschool	expressive language	basic language	45 (14, 31)	0.79
Lonigan & Whitehurst (1998)	intervention	ownership	experimental (rigorous)	preschool	expressive language	basic language	45 (14, 31)	0.75
Mann et al. (2009)	intervention	ownership	quasi (nonrigorous)	preschool	receptive language	basic language	37 (19, 18)	0.06

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Mann et al. (2009)	intervention	ownership	quasi (nonrigorous)	preschool	receptive language	basic language	37 (19, 18)	0.05
Mann et al. (2009)	intervention	ownership	quasi (nonrigorous)	preschool	expressive language	basic language	37 (19, 18)	0.64
Mann et al. (2009)	intervention	ownership	quasi (nonrigorous)	preschool	expressive language	basic language	183 (92, 91)	0.57
Mason et al. (1990)	intervention	ownership	experimental (rigorous)	preschool	general language	basic language	232 (116, 116)	0.02
McGill-Franzen et al. (1999)	intervention	ownership	experimental (rigorous)	mixed-pre/elem	receptive language	basic language	292 (139, 153)	−0.61
McGill-Franzen et al. (1999)	intervention	ownership	experimental (rigorous)	mixed-pre/elem	receptive language	basic language	317 (164, 153)	0.30
Mendelsohn et al. (2001)	intervention	ownership	quasi (nonrigorous)	preschool	receptive language	basic language	122 (49, 73)	0.70
Mendelsohn et al. (2001)	intervention	ownership	quasi (nonrigorous)	preschool	expressive language	basic language	122 (49, 73)	0.22
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	reading readiness	basic language	133 (65, 68)	0.04
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	reading readiness	basic language	144 (65, 79)	−0.13
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	1child request library visit	basic language	144 (81, 63)	−0.11
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	1child request library visit	basic language	131 (68, 63)	0.18
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	reading readiness	basic language	85 (42, 43)	0.00

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	reading readiness	basic language	85 (42, 43)	0.47
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	reading readiness	basic language	55 (27, 28)	0.30
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	reading readiness	basic language	55 (27, 28)	0.64
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	reading readiness	basic language	113 (57, 56)	0.04
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	reading readiness	basic language	113 (57, 56)	0.49
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	general language	basic language	85 (42, 43)	0.08
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	general language	basic language	85 (42, 43)	−0.10
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	general language	basic language	85 (42, 43)	−0.15
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	general language	basic language	85 (42, 43)	−0.60
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	general language	basic language	113 (57, 56)	−0.09
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	general language	basic language	113 (57, 56)	0.27
Sharif, Reiber, & Ozuah (2002)	intervention	ownership	quasi (nonrigorous)	mixed-pre/elem	receptive language	basic language	200 (100, 100)	0.37
Sharif, Reiber, & Ozuah (2002)	intervention	ownership	quasi (nonrigorous)	mixed-pre/elem	expressive language	basic language	200 (100, 100)	0.09
Whitehurst et al. (1994)	intervention	ownership	experimental (rigorous)	preschool	receptive language	basic language	53 (16, 37)	0.33

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Whitehurst et al. (1994)	intervention	ownership	experimental (rigorous)	preschool	receptive language	basic language	67 (19, 48)	0.38
Whitehurst et al. (1994)	intervention	ownership	experimental (rigorous)	preschool	expressive language	basic language	53 (16, 37)	−0.04
Whitehurst et al. (1994)	intervention	ownership	experimental (rigorous)	preschool	expressive language	basic language	53 (16, 37)	−0.03
Whitehurst et al. (1994)	intervention	ownership	experimental (rigorous)	preschool	expressive language	basic language	67 (19, 48)	0.47
Whitehurst et al. (1994)	intervention	ownership	experimental (rigorous)	preschool	expressive language	basic language	67 (19, 48)	−0.32
Whitehurst et al. (1994)	intervention	ownership	experimental (rigorous)	preschool	expressive language	basic language	67 (19, 48)	0.25

[a] Numbers in parentheses represent numbers of children in intervention and comparison groups, respectively.

Table C6. Reports of Findings on Children's Access to Print Material and Emergent Literacy Skills

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Aram & Levin (2002)	correlational	.	correlational (nonrigorous)	kindergarten	phonemic or phonological awareness	emergent lit skills	81	0.82
Aram & Levin (2002)	correlational	.	correlational (nonrigorous)	kindergarten	word recognition	emergent lit skills	81	1.28
Aram & Levin (2002)	correlational	.	correlational (nonrigorous)	kindergarten	word recognition	emergent lit skills	81	1.06
Bingham (2007)	correlational	.	correlational (nonrigorous)	preschool	emergent literacy (general)	emergent lit skills	120	0.07
Bingham (2007)	correlational	.	correlational (nonrigorous)	preschool	concepts about print	emergent lit skills	120	0.38
Cooper et al. (2002)	correlational	.	correlational (nonrigorous)	elementary	phonemic or phonological awareness	emergent lit skills	104	0.77
Cooper et al. (2002)	correlational	.	correlational (nonrigorous)	elementary	phonemic or phonological awareness	emergent lit skills	133	0.77
Cooper et al. (2002)	correlational	.	correlational (nonrigorous)	elementary	phonemic or phonological awareness	emergent lit skills	133	0.43
Ezell, Gonzales, & Randolph (2000)	correlational	.	correlational (nonrigorous)	preschool	concepts about print	emergent lit skills	96	0.65
Ezell, Gonzales, & Randolph (2000)	correlational	.	correlational (nonrigorous)	preschool	letter identification	emergent lit skills	96	0.00

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Ezell, Gonzales, & Randolph (2000)	correlational	.	correlational (nonrigorous)	preschool	sign/label/picture reading	emergent lit skills	96	0.94
Jacobson (1994)	correlational	.	correlational (nonrigorous)	kindergarten	emergent literacy (general)	emergent lit skills	176	1.03
Korat, Klein, & Segal-Drori (2007)	correlational	.	correlational (nonrigorous)	kindergarten	emergent literacy (general)	emergent lit skills	188	0.49
Korat, Klein, & Segal-Drori (2007)	correlational	.	correlational (nonrigorous)	kindergarten	emergent literacy (general)	emergent lit skills	188	0.52
Meyer, Linn, & Hastings (1990)	correlational	.	correlational (nonrigorous)	elementary	emergent literacy (general)	emergent lit skills	460	0.30
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	emergent literacy (general)	emergent lit skills	5,500	0.04
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	emergent literacy (general)	emergent lit skills	3,147	−0.04
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	emergent literacy (general)	emergent lit skills	3,287	0.37
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	emergent literacy (general)	emergent lit skills	3,148	0.26
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	emergent literacy (general)	emergent lit skills	4,996	0.02
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	emergent literacy (general)	emergent lit skills	4,432	−0.26
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	emergent literacy (general)	emergent lit skills	3,361	−0.52

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Share et al. (1983)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	emergent literacy (general)	emergent lit skills	543	0.23
Snow et al. (1991)	correlational	.	correlational (nonrigorous)	elementary	word recognition	emergent lit skills	11	−0.28
Snow et al. (1991)	correlational	.	correlational (nonrigorous)	elementary	word recognition	emergent lit skills	12	−0.14
Snow et al. (1991)	correlational	.	correlational (nonrigorous)	middle	word recognition	emergent lit skills	9	0.35
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	emergent literacy (general)	emergent lit skills	40	1.31
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	phonemic or phonological awareness	emergent lit skills	40	1.31
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	letter identification	emergent lit skills	40	1.46
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	letter identification	emergent lit skills	40	1.39
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	letter identification	emergent lit skills	40	1.28
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	letter identification	emergent lit skills	40	1.18
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	letter or word identification	emergent lit skills	40	1.09
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	letter or word identification	emergent lit skills	40	1.01
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	letter or word identification	emergent lit skills	40	0.87
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	letter or word identification	emergent lit skills	40	0.56

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Stephenson et al. (2008)	correlational	.	correlational (nonrigorous)	kindergarten	phonemic or phonological awareness	emergent lit skills	61	0.28
Stephenson et al. (2008)	correlational	.	correlational (nonrigorous)	kindergarten	letter identification	emergent lit skills	61	0.43
Stephenson et al. (2008)	correlational	.	correlational (nonrigorous)	kindergarten	word reading	emergent lit skills	61	−0.04
Stephenson et al. (2008)	correlational	.	correlational (nonrigorous)	kindergarten	word reading	emergent lit skills	61	0.18
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	word recognition	emergent lit skills	176	1.16
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	word recognition	emergent lit skills	176	0.95
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	word recognition	emergent lit skills	176	0.50
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	word recognition	emergent lit skills	176	0.44
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	middle	oral story retelling	emergent lit skills	269 (178, 91)	2.18
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	word recognition	emergent lit skills	134 (80, 54)	0.09
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	oral story retelling	emergent lit skills	512 (256, 256)	0.38
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	word recognition	emergent lit skills	512 (256, 256)	0.15

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	word recognition	emergent lit skills	82 (38, 44)	−0.53
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	word recognition	emergent lit skills	69 (35, 34)	−0.11
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	word recognition	emergent lit skills	85 (50, 35)	−0.39
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	word recognition	emergent lit skills	89 (40, 49)	−0.14
Koskinen et al. (2000)	intervention	lending	quasi (rigorous)	elementary	oral story retelling	emergent lit skills	70 (29, 41)	0.51
Koskinen et al. (2000)	intervention	lending	quasi (rigorous)	elementary	oral story retelling	emergent lit skills	86 (45, 41)	0.49
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	oral story retelling	emergent lit skills	88 (43, 45)	2.60
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	oral story retelling	emergent lit skills	85 (40, 45)	1.63
Neuman & Roskos (1993)	intervention	lending	experimental (rigorous)	preschool	sign/label/picture reading	emergent lit skills	89 (49, 40)	1.11
Neuman (1999)	intervention	lending	quasi (nonrigorous)	preschool	concepts about print	emergent lit skills	128 (71, 57)	0.48
Neuman (1999)	intervention	lending	quasi (nonrigorous)	preschool	concepts about print	emergent lit skills	66 (35, 31)	0.55
Neuman (1999)	intervention	lending	quasi (nonrigorous)	preschool	letter identification	emergent lit skills	128 (71, 57)	0.14
Neuman (1999)	intervention	lending	quasi (nonrigorous)	preschool	letter identification	emergent lit skills	66 (35, 31)	2.92
Neuman (1999)	intervention	lending	quasi (nonrigorous)	preschool	letter identification	emergent lit skills	66 (35, 31)	4.24

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Neuman (1999)	intervention	lending	quasi (nonrigorous)	preschool	sign/label/picture reading	emergent lit skills	128 (71, 57)	0.30
Neuman (1999)	intervention	lending	quasi (nonrigorous)	preschool	word recognition	emergent lit skills	66 (35, 31)	0.64
Neuman (1999)	intervention	lending	quasi (nonrigorous)	preschool	story telling (local)	emergent lit skills	128 (71, 57)	−0.51
Neuman (1999)	intervention	lending	quasi (nonrigorous)	preschool	story telling (global)	emergent lit skills	128 (71, 57)	−0.01
Neuman (1999)	intervention	lending	quasi (nonrigorous)	preschool	emergent lit skills	emergent lit skills	66 (35, 31)	5.32
Neuman (1999)	intervention	lending	quasi (nonrigorous)	preschool	emergent lit skills	emergent lit skills	66 (35, 31)	5.03
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	concepts about print	emergent lit skills	901 (343, 558)	0.39
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	concepts about print	emergent lit skills	901 (343, 558)	0.28
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	concepts about print	emergent lit skills	901 (343, 558)	0.09
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	letter identification	emergent lit skills	901 (343, 558)	0.20
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	letter identification	emergent lit skills	901 (343, 558)	0.09
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	letter identification	emergent lit skills	901 (343, 558)	0.02
Whitehurst et al. (1994b)	intervention	lending	experimental (rigorous)	preschool	phonemic or phonological awareness	emergent lit skills	167 (94, 73)	0.03
Whitehurst et al. (1994b)	intervention	lending	experimental (rigorous)	preschool	concepts about print	emergent lit skills	167 (94, 73)	0.62

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Whitehurst et al. (1994b)	intervention	lending	experimental (rigorous)	preschool	printing/hand-writing	emergent lit skills	167 (94, 73)	0.52
Zevenbergen, Whitehurst, & Zevenbergen (2003)	intervention	lending	experimental (rigorous)	preschool	oral story retelling	emergent lit skills	124 (71, 53)	0.24
Zevenbergen, Whitehurst, & Zevenbergen (2003)	intervention	lending	experimental (rigorous)	preschool	oral story retelling	emergent lit skills	124 (71, 53)	0.20
Zevenbergen, Whitehurst, & Zevenbergen (2003)	intervention	lending	experimental (rigorous)	preschool	oral story retelling	emergent lit skills	124 (71, 53)	0.00
Zevenbergen, Whitehurst, & Zevenbergen (2003)	intervention	lending	experimental (rigorous)	preschool	ask questions during reading time	emergent lit skills	124 (71, 53)	0.00
Zevenbergen, Whitehurst, & Zevenbergen (2003)	intervention	lending	experimental (rigorous)	preschool	ask questions during reading time	emergent lit skills	124 (71, 53)	0.00
Zevenbergen, Whitehurst, & Zevenbergen (2003)	intervention	lending	experimental (rigorous)	preschool	inferring character states	emergent lit skills	124 (71, 53)	0.58
Zevenbergen, Whitehurst, & Zevenbergen (2003)	intervention	lending	experimental (rigorous)	preschool	inferring author states	emergent lit skills	124 (71, 53)	0.00

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	oral story retelling	emergent lit skills	110 (46, 64)	1.41
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	oral story retelling	emergent lit skills	128 (64, 64)	1.18
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	story telling (global)	emergent lit skills	110 (46, 64)	4.06
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	story telling (global)	emergent lit skills	128 (64, 64)	3.19
Bean et al. (1990)	intervention	ownership	quasi (nonrigorous)	preschool	active participation in storybk reading	emergent lit skills	37 (24, 13)	0.73
Bean et al. (1990)	intervention	ownership	quasi (nonrigorous)	preschool	ask questions during reading time	emergent lit skills	37 (24, 13)	0.02
Goldenberg, Reese, & Gallimore (1992)	intervention	ownership	quasi (rigorous)	kindergarten	emergent literacy (general)	emergent lit skills	10 (5, 5)	0.67
Goldenberg, Reese, & Gallimore (1992)	intervention	ownership	quasi (rigorous)	kindergarten	phonemic or phonological awareness	emergent lit skills	10 (5, 5)	0.52
Goldenberg, Reese, & Gallimore (1992)	intervention	ownership	quasi (rigorous)	kindergarten	phonemic or phonological awareness	emergent lit skills	10 (5, 5)	0.52
Hancock (2002)	intervention	ownership	experimental (rigorous)	kindergarten	emergent literacy (general)	emergent lit skills	52 (26, 26)	0.66
Levenstein, Levenstein, & Oliver (2002)	intervention	ownership	quasi (nonrigorous)	preschool	emergent literacy (general)	emergent lit skills	24,335 (18, 24,317)	0.71

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Levenstein, Levenstein, & Oliver (2002)	intervention	ownership	quasi (nonrigorous)	preschool	emergent literacy (general)	emergent lit skills	24,337 (20, 24,317)	−0.40
Levenstein, Levenstein, & Oliver (2002)	intervention	ownership	quasi (nonrigorous)	preschool	emergent literacy (general)	emergent lit skills	23,187 (22, 23,165)	0.18
Levenstein, Levenstein, & Oliver (2002)	intervention	ownership	quasi (nonrigorous)	preschool	emergent literacy (general)	emergent lit skills	22,356 (21, 22,335)	0.60
Mann et al. (2009)	intervention	ownership	quasi (nonrigorous)	preschool	phonemic or phonological awareness	emergent lit skills	37 (19, 18)	0.56
Mann et al. (2009)	intervention	ownership	quasi (nonrigorous)	preschool	phonemic or phonological awareness	emergent lit skills	37 (19, 18)	0.09
Mann et al. (2009)	intervention	ownership	quasi (nonrigorous)	preschool	rhyme awareness	emergent lit skills	37 (18, 19)	0.50
Mann et al. (2009)	intervention	ownership	quasi (nonrigorous)	preschool	rhyme awareness	emergent lit skills	37 (18, 19)	0.46
Mason et al. (1990)	intervention	ownership	experimental (rigorous)	preschool	concepts about print	emergent lit skills	232 (116, 116)	0.07
Mason et al. (1990)	intervention	ownership	experimental (rigorous)	preschool	letter identification	emergent lit skills	232 (116, 116)	0.92
McCormick & Mason (1986)	intervention	ownership	quasi (rigorous)	preschool	emergent literacy (general)	emergent lit skills	52 (26, 26)	1.25
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	letter identification	emergent lit skills	45 (23, 22)	0.51
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	letter identification	emergent lit skills	45 (23, 22)	0.38

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	letter identification	emergent lit skills	45 (23, 22)	0.16
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	letter identification	emergent lit skills	45 (23, 22)	0.04
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	letter identification	emergent lit skills	53 (26, 27)	−0.28
McCormick & Mason (1986)	intervention	ownership	quasi (rigorous)	kindergarten	letter identification	emergent lit skills	24 (13, 11)	1.15
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	sign/label/picture identification	emergent lit skills	45 (23, 22)	0.51
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	sign/label/picture identification	emergent lit skills	45 (23, 22)	0.12
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	sign/label/picture identification	emergent lit skills	45 (23, 22)	0.49
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	word reading	emergent lit skills	45 (23, 22)	0.32
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	word recognition	emergent lit skills	53 (26, 27)	−0.08
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	word reading	emergent lit skills	45 (23, 22)	0.51
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	word reading	emergent lit skills	45 (23, 22)	−0.07
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	Printing/hand-writing	emergent lit skills	45 (23, 22)	0.34
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	Printing/hand-writing	emergent lit skills	45 (23, 22)	−0.17
McCormick & Mason (1986)	intervention	ownership	quasi (rigorous)	kindergarten	Printing/hand-writing	emergent lit skills	23 (13, 10)	0.54

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
McGill-Franzen et al. (1999)	intervention	ownership	experimental (rigorous)	mixed-pre/elem	phonemic or phonological awareness	emergent lit skills	292 (139, 153)	-1.25
McGill-Franzen et al. (1999)	intervention	ownership	experimental (rigorous)	mixed-pre/elem	phonemic or phonological awareness	emergent lit skills	317 (164, 153)	0.77
McGill-Franzen et al. (1999)	intervention	ownership	experimental (rigorous)	mixed-pre/elem	concepts about print	emergent lit skills	317 (164, 153)	2.00
McGill-Franzen et al. (1999)	intervention	ownership	experimental (rigorous)	mixed-pre/elem	concepts about print	emergent lit skills	292 (139, 153)	−0.18
McGill-Franzen et al. (1999)	intervention	ownership	experimental (rigorous)	mixed-pre/elem	letter identification	emergent lit skills	317 (164, 153)	1.76
McGill-Franzen et al. (1999)	intervention	ownership	experimental (rigorous)	mixed-pre/elem	letter identification	emergent lit skills	292 (139, 153)	−0.03
McGill-Franzen et al. (1999)	intervention	ownership	experimental (rigorous)	mixed-pre/elem	word reading	emergent lit skills	317 (164, 153)	2.60
McGill-Franzen et al. (1999)	intervention	ownership	experimental (rigorous)	mixed-pre/elem	concepts about print	emergent lit skills	292 (139, 153)	−0.23
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	emergent literacy (general)	emergent lit skills	42 (24, 18)	0.48
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	emergent literacy (general)	emergent lit skills	146 (81, 65)	0.14

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	emergent literacy (general)	emergent lit skills	134 (69, 65)	0.26
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	emergent literacy (general)	emergent lit skills	36 (18, 18)	0.83
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	word reading	emergent lit skills	85 (42, 43)	0.58
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	word reading	emergent lit skills	85 (42, 43)	0.81
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	word reading	emergent lit skills	85 (42, 43)	0.58
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	word reading	emergent lit skills	85 (42, 43)	0.81
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	word reading	emergent lit skills	113 (57, 56)	0.58
Phillips et al. (1990)	intervention	ownership	experimental (rigorous)	kindergarten	word reading	emergent lit skills	113 (57, 56)	0.81
Saint-Laurent & Gaisson (2005)	intervention	ownership	quasi (rigorous)	elementary	writing content	emergent lit skills	108 (53, 55)	0.66
Saint-Laurent & Gaisson (2005)	intervention	ownership	quasi (rigorous)	elementary	interest in reading, reading frequency	emergent lit skills	108 (53, 55)	0.31

[a] Numbers in parentheses represent numbers of children in intervention and comparison groups, respectively.

Table C7. Reports of Findings on Children's Access to Print Material and Reading Performance

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Anglum, Bell, & Roubinek (1990)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	357	0.49
Anglum, Bell, & Roubinek (1990)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	389	0.41
Anglum, Bell, & Roubinek (1990)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	236	0.39
Applebee, Langer & Mullis (1988)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	21,700	0.49
Applebee, Langer & Mullis (1988)	correlational	.	correlational (nonrigorous)	middle	reading test	reading performance	10,850	0.53
Applebee, Langer & Mullis (1988)	correlational	.	correlational (nonrigorous)	high	reading test	reading performance	16,819	0.69
Barrett (1999)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	65	−0.34
Barrett (1999)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	65	0.00
Barrett (1999)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	65	0.35
Barrett (1999)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	65	0.00
Barrett (1999)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	65	0.07
Barrett (1999)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	65	0.42
Briggs (1977)	correlational	.	correlational (nonrigorous)	kindergarten	reading test	reading performance	152	0.76

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Durkin (1966)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	120	0.17
Elley (1992)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	46	1.00
Elley (1992)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	40	0.80
Elley (1992)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	40	0.48
Elley (1992)	correlational	.	correlational (nonrigorous)	mixed-mid/high	reading test	reading performance	40	0.95
Farris & Hancock (1991)	correlational	.	correlational (nonrigorous)	middle	reading test	reading performance	92	0.19
Foertsch (1992)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	9,068	0.40
Foertsch (1992)	correlational	.	correlational (nonrigorous)	mixed-mid/high	reading test	reading performance	8,808	0.44
Foertsch (1992)	correlational	.	correlational (nonrigorous)	high	reading test	reading performance	8,500	0.40
Foertsch (1992)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	16,960	0.36
Foertsch (1992)	correlational	.	correlational (nonrigorous)	mixed-mid/high	reading test	reading performance	17,451	0.44
Foertsch (1992)	correlational	.	correlational (nonrigorous)	high	reading test	reading performance	16,701	0.40
Froese (1997)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	55	1.06
Froese (1997)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	55	0.36
Froese (1997)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	55	0.34
Goodson (1973)	correlational	.	correlational (nonrigorous)	high	reading test	reading performance	84	0.63

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Gustafson (2001)	correlational	.	correlational (nonrigorous)	mixed-mult levels	fluency	reading performance	216	1.18
Hall & Coles (1999)	correlational	.	correlational (nonrigorous)	middle	child's assessment of reading ability	reading performance	15,952	0.37
Heyns (1978)	correlational	.	correlational (nonrigorous)	middle	reading test	reading performance	1,492	0.04
Heyns (1978)	correlational	.	correlational (nonrigorous)	middle	reading test	reading performance	1,495	0.01
Hurd, Dixon, & Oldham (2006)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	1,080	0.10
Krashen (1995)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	41 U.S. states	1.13
Krashen & O'Brian (1996)	correlational	.	correlational (nonrigorous)	high	reading test	reading performance	33 high schools	0.42
Krashen & O'Brian (1996)	correlational	.	correlational (nonrigorous)	middle	reading test	reading performance	53 middle schools	0.28
Lamme & Olmsted (1976)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	38	1.42
Lance, Welborn, & Hamilton-Pennell (1993)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	134	1.31
Lance, Welborn, & Hamilton-Pennell (1993)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	134	1.46
Lance, Welborn, & Hamilton-Pennell (1993)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	134	0.77

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Lance, Welborn, & Hamilton-Pennell (1993)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	134	1.06
Lance, Welborn, & Hamilton-Pennell (1993)	correlational	.	correlational (nonrigorous)	middle	reading test	reading performance	134	1.04
Lance, Welborn, & Hamilton-Pennell (1993)	correlational	.	correlational (nonrigorous)	high	reading test	reading performance	134	2.34
McQuillan (1997)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	51 U.S. States	0.69
McQuillan (2006)	correlational	.	correlational (nonrigorous)	high	comprehension	reading performance	24	0.52
McQuillan (2006)	correlational	.	correlational (nonrigorous)	high	vocabulary	reading performance	133	0.43
McQuillan (2006)	correlational	.	correlational (nonrigorous)	high	vocabulary	reading performance	133	0.41
Meyer, Linn, & Hastings (1990)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	460	0.31
Morrison & Cooney (2001)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	198	0.80
Morrison & Cooney (2001)	correlational	.	correlational (nonrigorous)	elementary	62	reading performance	198	1.03
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	5,500	0.26
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	3,147	0.08
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	3,287	0.58
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	3,148	0.43

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	4,996	0.20
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	4,432	0.26
Myrberg & Rosén (2008)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	3,361	−0.18
Napoli (1968)	correlational	.	correlational (nonrigorous)	middle	reading test	reading performance	40	0.82
Roberts et al. (1984)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	127	−0.16
Roberts et al. (1984)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	134	0.70
Roberts et al. (1984)	correlational	.	correlational (nonrigorous)	middle	reading test	reading performance	203	0.39
Sheldon & Carrillo (1952)	correlational	.	correlational (nonrigorous)	.	reading test	reading performance	374	0.36
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	reading test	reading performance	112	1.01
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	reading test	reading performance	112	1.01
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	reading test	reading performance	114	1.09
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	reading test	reading performance	114	1.01
Snow et al. (1991)	correlational	.	correlational (nonrigorous)	elementary	comprehension	reading performance	11	0.08
Snow et al. (1991)	correlational	.	correlational (nonrigorous)	elementary	comprehension	reading performance	12	0.08
Snow et al. (1991)	correlational	.	correlational (nonrigorous)	middle	comprehension	reading performance	9	0.75
Snow et al. (1991)	correlational	.	correlational (nonrigorous)	elementary	vocabulary	reading performance	11	−0.12
Snow et al. (1991)	correlational	.	correlational (nonrigorous)	elementary	vocabulary	reading performance	12	0.18

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Snow et al. (1991)	correlational	.	correlational (nonrigorous)	middle	vocabulary	reading performance	9	0.72
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	comprehension	reading performance	40	2.27
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	comprehension	reading performance	40	1.80
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	comprehension	reading performance	40	1.46
Walberg & Tsai (1985)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	1,459	0.63
White & Dewitz (1996)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	7,062	0.41
White & Dewitz (1996)	correlational	.	correlational (nonrigorous)	middle	reading test	reading performance	5,551	0.50
White & Dewitz (1996)	correlational	.	correlational (nonrigorous)	high	reading test	reading performance	5,569	0.42
White & Dewitz (1996)	correlational	.	correlational (nonrigorous)	elementary	reading test	reading performance	5,335	0.52
White & Dewitz (1996)	correlational	.	correlational (nonrigorous)	middle	reading test	reading performance	5,547	0.56
White & Dewitz (1996)	correlational	.	correlational (nonrigorous)	high	reading test	reading performance	4,840	0.47
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	comprehension	reading performance	176	0.54
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	comprehension	reading performance	176	0.42
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	comprehension	reading performance	176	0.40
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	comprehension	reading performance	176	0.37
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	comprehension	reading performance	176	0.67

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Linnakylä, Malin, & Taube (2004)	correlational		correlational (nonrigorous)	high	reading test	reading performance	3,372	0.22
Linnakylä, Malin, & Taube (2004)	correlational		correlational (nonrigorous)	high	reading test	reading performance	3,492	0.43
Singleton (2002)	intervention	lending	quasi (nonrigorous)	high	vocabulary	reading performance	170 (34, 136)	.
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	comprehension	reading performance	227 (136, 91)	3.88
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	comprehension	reading performance	265 (159, 106)	1.09
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	middle	comprehension	reading performance	270 (179, 91)	1.28
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	middle	comprehension	reading performance	232 (145, 87)	1.63
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	middle	vocabulary	reading performance	232 (145, 87)	1.99
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	middle	grammar	reading performance	269 (178, 91)	0.05
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	middle	grammar	reading performance	232 (145, 87)	1.63
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	fluency	reading performance	512 (256, 256)	0.19

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	comprehension	reading performance	512 (256, 256)	0.34
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	vocabulary	reading performance	512 (256, 256)	0.33
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	reading test	reading performance	512 (256, 256)	0.32
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	grammar	reading performance	512 (256, 256)	0.33
Faires, Nichols, & Rickelman (2000)	intervention	lending	quasi (rigorous)	elementary	reading test	reading performance	8 (4, 4)	0.73
Fisher, Lapp, & Flood (2001)	intervention	lending	quasi (nonrigorous)	mixed-mult levels	reading test	reading performance	674 (319, 355)	.
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	reading test	reading performance	82 (38, 44)	0.24
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	reading test	reading performance	69 (35, 34)	0.18
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	reading test	reading performance	85 (50, 35)	−0.16
Ingham (1981)	intervention	lending	quasi (nonrigorous)	middle	reading test	reading performance	89 (40, 49)	0.22
Koskinen et al. (2000)	intervention	lending	quasi (rigorous)	elementary	text level	reading performance	72 (31, 41)	−0.51
Koskinen et al. (2000)	intervention	lending	quasi (rigorous)	elementary	text level	reading performance	87 (46, 41)	−0.03
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	comprehension	reading performance	88 (43, 45)	2.60

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	comprehension	reading performance	85 (40, 45)	1.38
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	reading test	reading performance	88 (43, 45)	0.65
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	reading test	reading performance	88 (43, 45)	0.17
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	reading test	reading performance	85 (40, 45)	0.20
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	reading test	reading performance	85 (40, 45)	0.13
Pilgreen (2000)	intervention	lending	quasi (nonrigorous)	high	reading test	reading performance	248 (131, 117)	0.20
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	fluency	reading performance	901 (343, 558)	0.39
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	fluency	reading performance	901 (343, 558)	0.22
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	fluency	reading performance	901 (343, 558)	−0.01
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	vocabulary	reading performance	901 (343, 558)	0.41
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	vocabulary	reading performance	901 (343, 558)	0.26
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	vocabulary	reading performance	901 (343, 558)	−0.04
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	text level	reading performance	901 (343, 558)	0.37
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	text level	reading performance	901 (343, 558)	0.33

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	text level	reading performance	901 (343, 558)	0.08
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	fluency	reading performance	38 (19, 19)	0.18
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	fluency	reading performance	25 (13, 12)	−0.01
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	fluency	reading performance	32 (16, 16)	0.21
Reis et al. (2007)	intervention	lending	experimental (rigorous)	middle	fluency	reading performance	37 (18, 19)	0.13
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	fluency	reading performance	34 (17, 17)	−0.34
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	fluency	reading performance	31 (15, 16)	0.36
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	fluency	reading performance	29 (15, 14)	0.28
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	comprehension	reading performance	38 (19, 19)	0.40
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	comprehension	reading performance	25 (13, 12)	−0.19
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	comprehension	reading performance	32 (16, 16)	0.34
Reis et al. (2007)	intervention	lending	experimental (rigorous)	middle	comprehension	reading performance	37 (18, 19)	0.74
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	comprehension	reading performance	34 (17, 17)	−0.70
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	comprehension	reading performance	31 (15, 16)	−0.03
Reis et al. (2007)	intervention	lending	experimental (rigorous)	elementary	comprehension	reading performance	29 (15, 14)	0.37
Sheveland (1996)	intervention	lending	experimental (rigorous)	middle	comprehension	reading performance	53 (28, 25)	0.55

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Tizard, Schofield, & Hewison (1982)	intervention	lending	experimental (rigorous)	elementary	reading test	reading performance	66 (22, 44)	1.15
Tizard, Schofield, & Hewison (1982)	intervention	lending	experimental (rigorous)	elementary	reading test	reading performance	72 (23, 49)	0.50
Tizard, Schofield, & Hewison (1982)	intervention	lending	experimental (rigorous)	elementary	reading test	reading performance	58 (24, 34)	0.35
Tizard, Schofield, & Hewison (1982)	intervention	lending	experimental (rigorous)	elementary	reading test	reading performance	65 (28, 37)	0.43
U.S. Department of Education (2009)	intervention	lending	quasi (rigorous)	elementary	reading test	reading performance	256 (128, 128)	0.50
U.S. Department of Education (2009)	intervention	lending	quasi (rigorous)	elementary	reading test	reading performance	256 (128, 128)	0.12
U.S. Department of Education (2009)	intervention	lending	quasi (rigorous)	high	reading test	reading performance	130 (65, 65)	0.46
U.S. Department of Education (2009)	intervention	lending	quasi (rigorous)	high	reading test	reading performance	130 (65, 65)	0.05
Whitehead (2004)	intervention	lending	quasi (nonrigorous)	elementary	child's assessment of reading ability	reading performance	92 (73, 19)	0.51

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Zevenbergen, Whitehurst, & Zevenbergen (2003)	intervention	lending	experimental (rigorous)	preschool	comprehension	reading performance	124 (71, 53)	0.00
Kelly-Vance & Schreck (2002)	intervention	lending & ownership	experimental (rigorous)	mixed-mult levels	fluency	reading performance	56 (28, 28)	0.68
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	comprehension	reading performance	110 (46, 64)	2.26
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	comprehension	reading performance	128 (64, 64)	1.84
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	vocabulary	reading performance	110 (46, 64)	1.53
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	vocabulary	reading performance	128 (64, 64)	1.30
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	reading test	reading performance	128 (64, 64)	0.84
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	reading test	reading performance	110 (46, 64)	0.13
Allington et al. (2010)	intervention	ownership	experimental (rigorous)	elementary	reading test	reading performance	1,330 (852, 478)	0.14
Allington et al. (2010)	intervention	ownership	experimental (rigorous)	elementary	reading test	reading performance	695 (444, 251)	0.14
Kim & White (2008)	intervention	ownership	experimental (rigorous)	mixed-mult levels	fluency	reading performance	207 (100, 107)	0.03
Kim & White (2008)	intervention	ownership	experimental (rigorous)	mixed-mult levels	fluency	reading performance	207 (100, 107)	0.00
Kim & White (2008)	intervention	ownership	experimental (rigorous)	mixed-mult levels	fluency	reading performance	200 (93, 107)	−0.11
Kim & White (2008)	intervention	ownership	experimental (rigorous)	mixed-mult levels	reading test	reading performance	207 (100, 107)	0.14
Kim & White (2008)	intervention	ownership	experimental (rigorous)	mixed-mult levels	reading test	reading performance	207 (100, 107)	0.07
Kim & White (2008)	intervention	ownership	experimental (rigorous)	mixed-mult levels	reading test	reading performance	200 (93, 107)	0.02

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Mason et al. (1990)	intervention	ownership	experimental (rigorous)	preschool	reading test	reading performance	232 (116, 116)	0.00
McCormick & Mason (1986)	intervention	ownership	quasi (rigorous)	kindergarten	fluency	reading performance	24 (13, 11)	1.93
McCormick & Mason (1986)	intervention	ownership	quasi (rigorous)	kindergarten	fluency	reading performance	24 (13, 11)	1.83
McCormick & Mason (1986)	intervention	ownership	quasi (rigorous)	kindergarten	fluency	reading performance	24 (13, 11)	1.76
McCormick & Mason (1986)	intervention	ownership	quasi (rigorous)	kindergarten	fluency	reading performance	24 (13, 11)	1.60
McCormick & Mason (1986)	intervention	ownership	quasi (rigorous)	kindergarten	fluency	reading performance	24 (13, 11)	1.36
McCormick & Mason (1986)	intervention	ownership	quasi (rigorous)	kindergarten	fluency	reading performance	24 (13, 11)	1.01
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	comprehension	reading performance	45 (23, 22)	1.95
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	comprehension	reading performance	45 (23, 22)	1.51
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	comprehension	reading performance	45 (23, 22)	1.02
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	comprehension	reading performance	45 (23, 22)	0.83
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	comprehension	reading performance	45 (23, 22)	−0.21
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	comprehension	reading performance	45 (23, 22)	0.13
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	comprehension	reading performance	45 (23, 22)	0.09
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	comprehension	reading performance	53 (26, 27)	1.17
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	comprehension	reading performance	53 (26, 27)	0.75
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	comprehension	reading performance	53 (26, 27)	0.38

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
McCormick & Mason (1986)	intervention	ownership	quasi (rigorous)	kindergarten	reading test	reading performance	23 (13, 10)	1.10
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	reading test	reading performance	100 (51, 49)	0.10
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	reading test	reading performance	105 (58, 47)	0.12
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	reading test	reading performance	99 (50, 49)	0.29
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	reading test	reading performance	129 (73, 56)	0.29
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	reading test	reading performance	95 (52, 43)	0.38
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	reading test	reading performance	104 (55, 49)	0.43
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	reading test	reading performance	104 (55, 49)	0.50
Phillips, Norris, & Mason (1996)	intervention	ownership	experimental (rigorous)	elementary	reading test	reading performance	118 (62, 56)	0.49
Rucker (1982)	intervention	ownership	experimental (rigorous)	middle	reading test	reading performance	53 (27, 26)	0.55
Rucker (1982)	intervention	ownership	experimental (rigorous)	middle	reading test	reading performance	104 (47, 57)	0.45
Saint-Laurent & Gaisson (2005)	intervention	ownership	quasi (rigorous)	elementary	comprehension	reading performance	108 (53, 55)	0.47

[a] Numbers in parentheses represent numbers of children in intervention and comparison groups, respectively.

Table C8. Reports of Findings on Children's Access to Print Material and Their Performance on Writing Tasks

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	writing (general)	writing performance	112	0.70
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	writing (general)	writing performance	112	0.68
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	writing (general)	writing performance	114	1.46
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	writing (general)	writing performance	114	1.39
Speece et al. (2003)	correlational	.	correlational (nonrigorous)	elementary	spelling	writing performance	40	0.98
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	middle	writing (general)	writing performance	269 (178, 91)	0.06
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	middle	writing (general)	writing performance	232 (145, 87)	1.65
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	writing (general)	writing performance	512 (256, 256)	0.24
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	spelling	writing performance	512 (256, 256)	0.27
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	writing structure	writing performance	512 (256, 256)	0.31
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	writing structure	writing performance	512 (256, 256)	0.00

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	writing content	writing performance	512 (256, 256)	0.21
Elley & Mangubhai (1983)	intervention	lending	quasi (rigorous)	elementary	dictation	writing performance	512 (256, 256)	0.04
Koskinen et al. (2000)	intervention	lending	quasi (rigorous)	elementary	vocabulary (written)	writing performance	85 (46, 39)	−1.74
Koskinen et al. (2000)	intervention	lending	quasi (rigorous)	elementary	vocabulary (written)	writing performance	70 (31, 39)	−0.42
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	writing (general)	writing performance	88 (43, 45)	2.55
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	writing (general)	writing performance	85 (40, 45)	1.52
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	writing story	writing performance	88 (43, 45)	2.11
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	writing story	writing performance	85 (40, 45)	0.51
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	narrative versus expository writing	writing performance	88 (43, 45)	−1.29
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	narrative versus expository writing	writing performance	85 (40, 45)	−0.33
Neuman (1999)	intervention	lending	quasi (nonrigorous)	preschool	writing (general)	writing performance	128 (71, 57)	0.58

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Neuman (1999)	intervention	lending	quasi (nonrigorous)	preschool	writing (general)	writing performance	66 (35, 31)	1.03
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	child requests to be read to/interest in reading	writing performance	901 (343, 558)	0.32
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	child requests to be read to/interest in reading	writing performance	901 (343, 558)	0.25
Raban & Coates (2004)	intervention	lending	quasi (nonrigorous)	mixed-pre/elem	child requests to be read to/interest in reading	writing performance	901 (343, 558)	0.02
Zevenbergen, Whitehurst, & Zevenbergen (2003)	intervention	lending	experimental (rigorous)	preschool	child requests to be read to/interest in reading	writing performance	124 (71, 53)	−0.28
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	writing story	writing performance	110 (46, 64)	2.52
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	writing story	writing performance	110 (46, 64)	1.60
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	writing story	writing performance	128 (64, 64)	1.33
Morrow (1992)	intervention	lending & ownership	experimental (rigorous)	elementary	writing story	writing performance	128 (64, 64)	0.94
Bean et al. (1990)	intervention	ownership	quasi (nonrigorous)	preschool	writing (general)	writing performance	41 (27, 14)	0.74
Mason et al. (1990)	intervention	ownership	experimental (rigorous)	preschool	writing (general)	writing performance	232 (116, 116)	0.02

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	spelling	writing performance	45 (23, 22)	0.72
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	spelling	writing performance	45 (23, 22)	0.44
McCormick & Mason (1984)	intervention	ownership	quasi (rigorous)	kindergarten	spelling	writing performance	53 (26, 27)	−0.18
McGill-Franzen et al. (1999)	intervention	ownership	experimental (rigorous)	mixed-pre/elem	spelling	writing performance	317 (164, 153)	1.96
McGill-Franzen et al. (1999)	intervention	ownership	experimental (rigorous)	mixed-pre/elem	spelling	writing performance	292 (139, 153)	−1.71
Saint-Laurent & Gaisson (2005)	intervention	ownership	quasi (rigorous)	elementary	vocabulary (written)	writing performance	108 (53, 55)	0.72
Saint-Laurent & Gaisson (2005)	intervention	ownership	quasi (rigorous)	elementary	spelling	writing performance	108 (53, 55)	0.59
Saint-Laurent & Gaisson (2005)	intervention	ownership	quasi (rigorous)	elementary	writing structure	writing performance	108 (53, 55)	0.59
Saint-Laurent & Gaisson (2005)	intervention	ownership	quasi (rigorous)	elementary	writing content	writing performance	108 (53, 55)	0.24

[a] Numbers in parentheses represent numbers of children in intervention and comparison groups, respectively.

Table C9. Reports of Findings on Children's Access to Print Material and Other Academic Outcomes

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Aram & Levin (2002)	correlational	.	correlational (nonrigorous)	kindergarten	grades in math	general ac. achieve	81	0.47
Feitelson & Goldstein (1986)	correlational	.	quasi (nonrigorous)	kindergarten	general academic achievement	general ac. achieve	204	.
Gaver (1963)	correlational	.	quasi (nonrigorous)	mixed-mult levels	62	general ac. achieve	512	0.69
Gaver (1963)	correlational	.	quasi (nonrigorous)	mixed-mult levels	62	general ac. achieve	548	0.97
Gaver (1963)	correlational	.	quasi (nonrigorous)	mixed-mult levels	62	general ac. achieve	516	0.19
Meyer, Linn, & Hastings (1990)	correlational	.	correlational (nonrigorous)	elementary	tests in science	general ac. achieve	460	0.33
Morrison & Cooney (2001)	correlational	.	correlational (nonrigorous)	elementary	guardian impression of child's knowledge	general ac. achieve	198	1.06
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	grade promotion	general ac. achieve	112	1.62
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	grade promotion	general ac. achieve	114	1.25
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	62	general ac. achieve	112	1.01
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	62	general ac. achieve	112	0.85
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	62	general ac. achieve	112	0.80
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	62	general ac. achieve	114	1.15

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	62	general ac. achieve	114	1.09
Simner (1992)	correlational	.	correlational (nonrigorous)	mixed-pre/elem	62	general ac. achieve	114	1.01
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	achievement gap	general ac. achieve	176	−0.31
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	achievement gap	general ac. achieve	176	0.00
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	achievement gap	general ac. achieve	176	0.00
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	achievement gap	general ac. achieve	176	0.00
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	achievement gap	general ac. achieve	176	0.00
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	achievement gap	general ac. achieve	176	0.00
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	achievement gap	general ac. achieve	176	0.00
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	achievement gap	general ac. achieve	176	0.00
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	achievement gap	general ac. achieve	176	0.00
Wilkinson (1998)	correlational	.	correlational (nonrigorous)	elementary	achievement gap	general ac. achieve	176	0.00

Citation	Study Type	Type of Intervention	Research Design	Grade Level	Outcome	Outcome Category	Sample Size (Tx, C)[a]	Effect Size
Singleton (2002)	intervention	lending	quasi (nonrigorous)	high school	attitude toward academic subject, child requests to be read to	general ac. achieve	170 (34, 136)	0.60
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	tests in science	general ac. achieve	88 (43, 45)	1.77
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	tests in science	general ac. achieve	88 (43, 45)	0.12
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	tests in science	general ac. achieve	85 (40, 45)	−0.07
Morrow, Pressley, & Smith (1995)	intervention	lending	correlational (nonrigorous)	elementary	tests in science	general ac. achieve	85 (40, 45)	−0.15
McCormick & Mason (1986)	intervention	ownership	quasi (rigorous)	kindergarten	guardian impression of child's knowledge	general ac. achieve	24 (13, 11)	1.07

[a] Numbers in parentheses represent numbers of children in intervention and comparison groups, respectively.

Appendix D
Coding Sheets Used in This Meta-Analytic Review

SAMPLE ID ___ ___ ___ ___ ___ -___ ___ ___ ___ ___

REPORT-LEVEL INFORMATION

___ ___ ___ ___ ___1st 5 letters of 1st author's last name **[AUTHOR]** (e.g., Lindsay = LINDS)

___ ___ ___ ___ Year of publication **[YEAR]**

Report title _____

_____

_____

_____

___ ___ Type of publication **[PUBTYPE]**

01 Journal publication
02 Chapter in an edited book
03 Complete book
04 Report from government agency
05 Report from government-sponsored research group
06 Report from program developer
07 Report from independent researcher(s)
08 Conference presentation
09 Doctoral dissertation/Master's thesis
10 Other (specify) **[PUBOTHR]** _____

___ ___ ___ ___ If journal, initials of name of journal **[JOURNAL]** (e.g., EEPA= Education Evaluation and Policy Analysis)

___ Journal/report peer reviewed? **[PEERREV]**

0 = No
1 = Yes
2 = Don't know

_____Type of study **[STUDYTYP]**:

1 = Correlational study on children's access to print and outcomes (SKIP TO STUDY INFO)
2 = Comparison of children participating in a program/intervention versus those who do not

SAMPLE ID ___ ___ ___ ___ ___ -___ ___ ___ ___ ___

PROGRAM/INTERVENTION INFORMATION

___ Program type **[PROGTYPE]**:

1 Book ownership/distribution
2 Book access/lending (library/bookmobile/book flood)

___ Are children given choice of books **[BKCHOICE]** 0 = no, 1 = yes, 9 = don't know

___ Books screened for appropriateness **[SCREEN]** 0 = no, 1 = yes, 9 = don't know

___ All children receive books/access or just qualifying students **[QUALIFY]**

1 = All children at site
2 = Just low SES/FRL eligible children
3. = Subset of children based on another parameter

____ ____ Lower bound age range of children eligible for program **[LOWAGE]**

____ ____ Upper bound age range of children eligible for program **[UPPERAGE]**

Note: conversion of grades to ages:

PK = 3.5,	6th = 11.5
K = 5.5,	7th = 12.5
1st = 6.5,	8th = 13.5
2nd = 7.5,	9th = 14.5
3rd = 8.5,	10th = 15.5
4th = 9.5,	11th = 16.5
5th = 10.5	12th = 17.5

___ ___ Number of book distributions per year (number of books received by children) **[NBOOKS]**

___ ___ Number of weeks between distributions **[NWEEKS]**

____ Timing of distributions **[TIMING]**

1 = School year only; 2 = Year-round; 3 = Summer only; 9 = Don't know

____ Program includes guidance to parents/guardians on reading **[GUIDANCE]**

0 = No, 1 = Yes, 9 = Don't know

____ Program include parent/guardian/adult-child coreading component ("reading with your child") **[COREAD]**

0 = No, 1 = Yes; 2 = Assumed because of child's age; 9 = Don't know

____ Program included formal questions for parents/guardians to ask children while reading books? **[FORMALQS]**

0 = No, 1 = Yes, 9 = Don't know

____ Program aligned with student assignments in school or a quiz? (e.g., children expected to do book reports?) **[SCHLWORK]**

0 = No, 1 = Yes, 9 = Don't know

____ ____ Organization sponsoring the book program **[SPONSOR]**

01 School
02 Afterschool program
03 Boys/Girls club
04 Juvenile detention center
05 Prison program
06 Hospital/Medical clinic
07 Teen mom programs (e.g., "shared beginnings") book for child only
08 Teen mom programs (e.g., "shared beginnings") book for mom and child
09 Multiple sponsors
10 Other community organization (specify) **[SPSROTHR]**_____

_____ Does program/intervention require community buy-in/matching funds? **[CMTYFNDS]**

0 = No, 1 = Yes, with population based scale; 2 = Yes, uniform scale; 9 = Don't know

_____ Book program include bilingual books? **[BLNGLBKS]** (e.g., books having text in Spanish and English)

0 = No, 1 = Yes, bilingual, 2 = In child's native language (not dominant language),
3 = In language other than child's native language, 9 = Don't know

____ Motivational/Community events connected with access/distribution (festivals, etc.)? **[EVENTS]**

0 = No, 1 = Yes, 9 = Don't know

If yes, specify nature of event **[EVNTTYPE]** _____

____ Program encourages volunteer involvement in access/distribution? **[VOLS]**

0 = No, 1 = Yes, 9 = Don't know

____ Does the program accompany broader literacy initiative? **[BKADDON]**

0 = No; 1 = Yes, parent-oriented program;
2 = Yes, teacher-led activities accompany program;
3 = Parent and teacher-led activities accompany program; 9 = Don't know

SAMPLE ID ___ ___ ___ ___ ___ -___ ___ ___ ___ ___

DESIGN-RELATED INFORMATION

____ Research design **[DESIGN]**

1. Correlational [examines simple relationship: access to print and achievement]
2. One group pretest-posttest
3. Regression continuity
4. Comparison between two sites (one getting tx, other comparison)
5. Nonequivalent group design—larger number of units
6. Nonequivalent group design with similar units (post hoc)
7. Nonequivalent group design with a priori effort to match groups or control differences statistically
8. Group design with some "randomlike" assignment to groups (letter of alphabet, etc.)
9. Randomized group design
10. Other (specify) **[DSGNOTHR]** _____

____ Unit of assignment **[UNITASSG]**

1. Nations/countries
2. States
3. Districts
4. Schools
5. Classrooms
6. Students

____ Unit of analysis **[UNITANAL]**

4. Nations/countries
5. States
6. Districts
4. Schools
5. Classrooms
6. Students

____ Units randomly selected to participate in study? **[RNDMSLCT]**

1. No, sample of convenience
2. No, sampled units met certain eligibility requirements
3. Yes
4. Other (specify) _____ **[OTHRSLCT]**
11. Don't know

_____ Number of districts in study **[NDISTRCT]**

_____ Number of schools in study **[NSCHOOLS]**

_____ Number of classrooms in study **[NCLSSRMS]**

_____ Number of students in study **[NSTUDENT]**

____ Study conducted in USA? **[USSTUDY]**

0 = No-→ specify country **[OTHRNATN]** _____
1 = Yes
9 = Don't know

SAMPLE ID ___ ___ ___ ___ ___ -___ ___ ___ ___ ___

____ _____ If conducted in USA, identify state by two-letter postal code. **[STATE]**
(MP = multiple states)

____ Study setting **[SETTING]**

1. Urban schools;
2. Suburban schools
3. Rural schools
4. Mixed schools
9. Don't know

SAMPLE ID ___ ___ ___ ___ ___ -___ ___ ___ ___ ___
|----------*STUDY ID*----------||*sample*|

SAMPLE INFORMATION (corresponds with effect size)

_____ **[SAMPLEID]** [*1st 3 digits study ID, last two digits sample within study*]

_____ [**SAMPLEN]** Total number of children in sample

_____ Total number of boys **[NBOYS]**

_____ Total number of girls **[NGIRLS]**

Economically disadvantaged children

____ Does sample consist of a migrant or highly mobile population? **[MOBILITY]**

0 = No; 1 = Yes; 9 = Don't know

_____ Total number low socioeconomic status **[NLOWSES]**

___ Source of SES information: **[SESSOURC]**
1. Free or reduced-price lunch eligibility
2. Other _____ **[SESOTHR]**

_____ Number Caucasian children **[NWHITE]** **Race/Ethnicity Info**

_____ Number Asian-American children **[NASIAN]**

_____ Number African-American children **[NBLACK]**

_____ Number Hispanic children **[NHISPNC]**

_____ Number Native American/Eskimo/Pacific Island children **[NNATAM]**

Language Information

_____ Number of children with English as primary language **[NENGLSPK]**

_____ Number of children with English as second language **[NENG2LNG]**

_____ Number of non-English-speaking children **[NNONENG]**

_____ Number of children with disabilities **[NDISABL]** **Disability Information**

_____# with learning disabilities **[NLDISABL]**

_____# with physical disabilities **[NPDISABL]**

_____Lower-bound age of children **[SAMPLAGE]**

_____Upper-bound age of children **[SAMPUAGE]**

_____% Attrition rate among sample (100—retention rate) **[ATTRIT]**

SAMPLE ID ___ ___ ___ ___ ___ -___ ___ ___ ___ ___
|----------*STUDY ID*----------||*sample*|

EFFECT SIZE INFORMATION

____ ____ Outcome measure/Dependent variable **[DV]**

See codes on supplemental sheet

____ Reliability of Outcome/Dependent measure **[DVREL]**

____ Outcome category **[DVCAT]**

1. Attitudes
2. Reading interest/motivation
3. Reading behavior
4. Basic language skills
5. Emergent literacy skills
6. Reading performance
7. Writing performance
8. Other academic performance/achievement

_____ **[INTRMEAN]** If group design, Mean of intervention group

_____ [**INTRSD]** If group design, Std Deviation of intervention group

_____ **[NINTER]** If group design, number in intervention group

_____ **[CNTRMEAN]** If group design, Mean of control group

_____ [**CNTRSD]** If group design, Std Deviation of control group

_____ **[NCNTRL]** If group design, number in control group

____ **[DIRECT]** Direction of finding (positive favors intervention) + , −, 0

____ Test statistic **[STATTYPE]**
1. Pearson correlation coefficient (*r*)
2. Chi square (X^2)
3. *t*-score
4. *F* from regression
5. *F* from group ANOVA
6. Other _____

____ If Correlation, regression, HLM, reliability of PREDICTOR variable **[PREDREL]**

____ If Correlation, regression, HLM, lag between T1 & DV **[LAG]**

_____ **[TESTSTAT]** test statistic

_____ **[DFTEST]** degrees of freedom (error) for test

_____ **[PLEVEL]** *p*-level

_____ **[EFFECTSZ]** effect size in standard deviation units (*d*-index)

Ways to calculate effect size:

With means & standard deviations: $d = \frac{x_1 - x_2}{\frac{SD_1 + SD_2}{2}}$

No means/sds but *t*-statistic: $d = \frac{2t}{\sqrt{df_{error}}}$

Note: *F* with 1 df = 2t

No means/sds but *r*-statistic: $d = \frac{2r}{\sqrt{1 - r^2}}$

No means/sds but X^2 statistic for 2 × 2 matrix: $r = \sqrt{\frac{\chi^2}{n}}$