

The Effect of Family Literacy Interventions On Children's Acquisition of Reading

From Kindergarten to Grade 3

*A Meta-Analytic Review
Conducted by Monique Sénéchal
For the National Center for Family Literacy*

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Summary

- **Goal.** Educators believe that parents can help their children learn to read. But what evidence supports this belief? And if parent involvement does matter, what kinds of parent involvement are most efficient? The goal of this report was to review the scientific literature on parent involvement in the acquisition of reading from kindergarten to grade 3.
- **Method.** In the present review, parent involvement in literacy acquisition was narrowly defined to include parent-child activities that focus on reading. Moreover, the 14 studies that were analyzed were those that included an intervention where researchers tested whether parent involvement enhanced children's literacy. Standard meta-analytic procedures were used to analyze the study outcomes.
- **Findings: Overall.** The combined results for the 14 intervention studies, representing 1174 families, were clear: Parent involvement has a positive impact on children's reading acquisition. The mean effect size for the combined studies was moderately large (effect size = .68). This effect size corresponds to a 10-point gain on a literacy test (with a standard deviation of 15) for the intervention children as compared to the control children.
- **Findings: Intervention type.** The three types of parent involvement represented in the review differed in their effectiveness. Having parents teach specific literacy skills to their children was two times more effective than having parents listen to their children read and six times more effective than encouraging parents to read to their children.
In the present review, providing supportive feedback to parents during the intervention did not alter effectiveness. Also, the duration of the intervention did not moderate its effectiveness.
- **Findings: Participant characteristics.** Parent involvement had a positive impact from kindergarten to grade 3. In addition, the interventions were as effective for children experiencing reading difficulties as they were for normally-developing children. Finally, the socioeconomic level of the participating families did not affect the positive impact of the interventions.
- **Findings: Study design.** Studies that included standardized tests yielded smaller effects than other studies.
- **Conclusion.** Parents can help their children learn to read. The effectiveness of parents' help, however, varies according to the type of parent-child activities. Educators, when deciding which type of intervention to implement, will have to weigh the differences in effectiveness across the different types of intervention against the amount of resources needed to implement the interventions.

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Introduction

Goal

Educators believe that parents can help their children learn to read. But what is the evidence that supports the idea that involving parents in their children's literacy acquisition will result in better outcomes for the children? And if parent involvement does matter, what kinds of parent-child interactions are associated with improvements in children's literacy acquisition? The goal of this report was to review the scientific literature on parent involvement in the acquisition of literacy from kindergarten to grade 3.

Context

Parents can be involved in their child's literacy development in a variety of ways. Indeed, parent involvement can be classified in at least three categories: school-based involvement, home-school conferencing, and home-based involvement (Fantuzzo et al., 2000; Hill and Craft, 2003). The first type of parental involvement is school-based involvement, which includes various parental activities and behaviors occurring in their children's school environment. Some examples of school-based involvement activities include volunteering in the classroom, acting as a chaperone for class field trips, participating in fundraising activities in the school, or planning classroom activities with teachers.

The second type of parental involvement is home-school conferencing, which involves communication between parents and teachers or other school staff regarding children's academic achievement, enjoyment of school, and rate of progress. Some examples of home-school conferencing activities include talking to a teacher about a child's areas of strength or weakness in school, attending parent-teacher conferences to discuss a child's progress and performance, scheduling meetings with school administrators in order to solve problems or to learn more about what is occurring in school, or talking with a child's teachers about classroom rules and daily class routines.

The third type of parental involvement is home-based involvement, which involves parents actively encouraging children to engage in learning in the home setting and providing learning opportunities for their children. Some examples of home-based involvement include reviewing a child's homework, spending time working with a child on number skills or reading and writing skills, bringing home learning materials such as books or educational videos for a child, or talking to a child about the parent's love for learning. In the present research synthesis, we focused on parent-child activities occurring at home that aimed at improving children's literacy.

One of the most studied parent-child activities that is assumed to promote early literacy is joint book reading. Indeed, the results of a meta-analytic review of 17 studies revealed an overall positive association between parents reading to their children and children's emergent literacy or reading achievement (Bus, van IJzendoorn, and Pellegrini, 1995). Another review of the research literature also revealed a positive association between joint book reading and early literacy in some, but not all, of the 12 correlational studies examined (Scarborough and Dobrich, 1994). These two reviews, however, included mostly correlational studies, and, therefore, it is impossible to assess whether book reading was the cause of the positive effects.

Another parent-child activity that has received attention is parents listening to their child read. Two reviews of studies that have examined the effect of parents listening report positive effects. One review included studies in which schools sent books home along with general information about how to encourage children to read as well as studies in which parents were given specific techniques on coaching their child during the reading (Toomey, 1993). In this review, it appeared that providing parents with simple but specific techniques showed greater benefits for children at risk of reading failure than did providing parents with general information. Another review (Topping and Lindsay, 1992) only examined studies that used a specific technique for listening to children read. This technique, called *paired reading*, is one where the parent reads along with the child, providing

corrective feedback and praise, until the child feels sufficiently confident to read alone. In this review again, positive effects are reported.

It seems that the four reviews described in the previous paragraphs support the idea that involving parents can enhance children's literacy development. There seems to be evidence that shared book reading as well as listening to children read are two parent-child activities that can have positive effects. There may, however, be other parent-child activities that have positive effects. For instance, direct teaching is another activity that is related to literacy acquisition (Evans, Shaw, and Bell, 2000; Sénéchal and LeFevre, 2002). The approach taken for the research synthesis reported here is different from the four previous reviews in a number of ways: (1) no *a priori* decisions were made about the type of parent-child activities to be included in the present review; (2) only intervention studies with control groups were included to allow us to make stronger statements about the role of parent involvement on the acquisition of reading; and (3) meta-analytic procedures were used to integrate the findings across studies.

Focus

In the present review, parent involvement in literacy acquisition was narrowly defined to include parent-child activities that focus on reading. No decisions or judgments were made ahead of time on the type of parent intervention to be included, and, therefore, a broad search of the research literature was conducted. Once the literature was surveyed and reviewed, the parent involvement interventions were classified in one of three categories. The first category consisted of studies where parents were asked to read to their child. Another category included interventions where parents were asked to listen to their child read. The final category included those interventions in which parents were trained to do literacy exercises with their child. This classification of the articles on parent involvement will be used to present the information about the studies.

In this review, reading acquisition is used as a general term that refers to the early literacy behaviors of children in kindergarten as well as the more advanced behaviors of children in grade 3. Therefore, reading acquisition includes early literacy behaviors such as knowledge of letter names and letter sounds, phoneme awareness, as well as early word reading. Reading acquisition also captures children's word recognition and reading comprehension. Children's spelling skills were also of interest, but the review conducted did not yield studies that focused on spelling skills. Although a few studies included kindergarten measures of early (or invented) spelling, their number was too small to warrant a different outcome category. Hence, these early spelling skills were included in the early literacy category. The definition of early literacy used in the present review excludes measures of child language such as vocabulary knowledge or listening comprehension. Some researchers have argued that it is important to distinguish early literacy from language development because they hold different relations to different types of parent-child activities (for example, Sénéchal, LeFevre, Smith-Chant, and Colton, 2000), and it remains to be tested whether improvement in the language skills of young children will eventually translate into improved literacy in grades 1 to 3.

The studies were selected to determine the *causal* role of parent actions in children's literacy development. The studies used in this analysis were those that included an intervention where researchers tested whether a particular kind of involvement would produce the desired outcomes in children. The selection of intervention studies that included control groups allowed an assessment of the relative impact of different kinds of parent-child activities in fostering literacy skills.

Assessing the causal role of parent involvement would not be possible from an analysis of studies with other research designs such as interventions without control groups, or descriptive and correlational studies that document the relations between parent involvement and child literacy, but do not control for alternative explanations for the findings. For instance, correlation coefficients do not control for the possibility that the relation between the two key variables is due to their common relation with a third variable. Recent research shows that the relations between the frequency and variability of book reading at home in kindergarten and reading comprehension in grade 3 can be explained by their common association to children's vocabulary knowledge (see Sénéchal and LeFevre, 2002).

When conducting research to assess the causality between a treatment and an outcome, the designs that have the highest degree of internal and external validity are experimental designs that include: (a) pre- and posttests; (b) randomized assignment to the treatment and control groups; and (c) a control group that receives an alternative form of treatment. Next in line in terms of design strength are experimental studies that have all of the above characteristics with one exception: The control group does not receive an alternative form of treatment. Next come studies for which participants are not assigned randomly, but are matched on key characteristics. Study designs are called quasi-experimental when the participants are not assigned randomly to the treatment and control groups. Quasi-experimental designs are weaker than experimental designs because they do not control for the possibility of a bias in participant assignment such that participants with specific characteristics (for example, high motivation) may be assigned to the intervention group, and that it may be those characteristics, not the treatment per se, that are responsible for the obtained effects.

The present review included experimental as well as quasi-experimental designs because Rosenthal

(1995) argued that the exclusion of quasi-experiments is too restrictive and it is best to (a) include these studies and (b) test whether the overall effects that were found were due to the presence of studies with weaker designs. Such a test was conducted in the present report.

Intervention studies without control groups were excluded from the present synthesis because this study design fails to separate the effects of normal maturation from those affected by the treatment or intervention. Generally, a young child will score better on most measures when they are older than when they are younger. Because both the experimental and control group continue to mature during the experiment, when they are compared, these gains are zeroed out. The effects of maturation are not zeroed out in the pre-/posttest design without a control group, and so these effects are almost always higher and are simply not comparable with the effect sizes that are used for the analyses reported here.

Questions Addressed

Meta-analytic procedures provide a test of the overall effect of parent involvement on children's literacy as well as a test of similarity in the size of the effects across studies (that is, a test of homogeneity). In the case when an overall effect is not based on a homogenous body of research, then one examines variables, labeled moderators, that might explain the variability in effects across studies.

Three categories of questions were addressed to test for potential moderators in the present synthesis. The first category documented whether characteristics of the interventions were related to the impact of parent involvement on children's reading acquisition. This category included questions such as whether different types of parent involvement have a differential effect on the acquisition of reading and whether the format and amount of parent training was associated with learning to read.

The second and third categories of questions examined whether there were other study characteristics that might moderate the effect of involving parents in their child's literacy acquisition. These analyses are supplementary to the first set of questions and become important when one finds considerable variability in effects across studies. The questions selected are those typical in meta-analytic research (for example, see the meta-analysis by Bus and van IJzendoorn, 1999; Ehri, Nunes, Willows, Schuster, Yaghoub-Zadeh, and Shanahan, 2001; also see the recommendations in Rosenthal, 1995).

The second category of questions addressed the issue of whether characteristics of the samples were associated with the relative impact of parent involvement. In this section, questions such as the role of the socioeconomic status of the family, as well as the grade and reading level of the children were examined. It was of interest to document the reading level of the parents, but none of the studies selected included measures of the reading skills of the parents.

The third category concerned questions about the design of the studies. For example, it examined whether the use of standardized tests or the sample size moderated the effect of parent involvement. The results of each question category will be described in a separate section.

Methodology

Finding the Studies

The database of studies included in the meta-analysis was established in three steps: (1) a search of electronic databases; (2) a search of review articles; and (3) a search of the reference sections of the articles selected in steps 1 and 2. The articles retained in the meta-analysis were those that met the following five selection criteria:

- Studies published in a peer-reviewed journal.
- Studies that used an experimental or a quasi-experimental design to allow us to make statements about causality.
- Studies that tested the hypothesis that parent involvement enhances the acquisition of reading.
 - Studies that included at least five participants.
- Studies that reported statistics permitting the calculation or estimation of effect sizes, or reported effect sizes.

Step 1: Electronic searches. The first step was to search the scientific literature to find articles on parent involvement. To do so, three sets of keywords were selected that would allow a systematic and thorough search of two electronic databases: PsycINFO and ERIC. The first set of keywords included 11 terms that described parent involvement, the second set included 21 terms that described reading and spelling, and the third set included four terms that described the grade levels of interest.

- **Set 1: Parent involvement.** Family environment, family influence, family literacy, home literacy practices, home experiences, parent involvement, parent participation, parent school relations, parent tutoring, parent curriculum, and parent-child reading.
- **Set 2: Literacy.** Alphabet, letter names, letter sounds, reading readiness, phoneme awareness, phonological awareness, decoding, reading, beginning reading, reading development, reading acquisition, word identification, word recognition, word reading, miscues, reading ability, reading achievement, reading comprehension, spelling, learning to spell, and invented spelling.
 - **Set 3: Grade level.** Kindergarten, grade 1, grade 2, and grade 3.

The electronic searches were performed by linking the key words within each set with the operator 'or' and linking each set with the operator 'and.' This search yielded 136 potential articles on parent involvement. The abstract for each article was examined and the studies that clearly did not meet the selection criteria were excluded. The application of these procedures resulted in the selection of 77 articles on parent involvement.

Step 2: Review articles. The reference sections of three review articles on parent involvement were hand-searched for studies that met the five criteria listed in the previous section and that were not found in the electronic searches. The review articles were those of Bus, van IJzendoorn, and Pellegrini (1995), Toomey (1993), and Topping and Lindsay (1992). The application of these procedures resulted in the selection of 22 additional articles on parent involvement.

Step 3: Selecting articles. The 99 articles found in steps 1 and 2 were obtained from libraries and examined to ensure that they met the five selection criteria. The application of this procedure resulted in the exclusion of 86 articles, and, consequently, 13 articles were analyzed further. In addition, three articles that described an intervention study without control groups were also retained as potential sources of additional research (Fry, 1977; Lopez and Cole, 1999; Mudre and McCormick, 1989).

Step 4: Reference sections. The reference sections of these 16 articles were hand-searched for additional articles that might have been missed in steps 1 and 2. The application of this procedure resulted in the examination of one additional intervention study. This study did not have a control group, and, consequently, was not included (Ebey, Marchand-Martella, Martella, and Nelson, 1999), nor did its reference section yield any additional article on parent involvement that met all five selection criteria.

A total of 13 articles were included in the meta-analysis. One of these articles (Leach and Siddall, 1990) included four conditions, and, consequently, it was decided to assign the two conditions described as the most intensive and specific as treatments and to match randomly with the treatments the remaining two conditions labeled controls. For the purpose of the meta-analysis, one treatment-control pair was labeled Study 1 and the other pair Study 2. Hence, the meta-analysis was conducted on 14 studies. Short summaries for each study are presented in tabular form at the end of this report.

The distribution of the excluded articles based on the five selection criteria is as follows: 67% of them did not meet the design criteria; 25% the specific hypothesis; 8% the relevant statistics; and 2% the publication criterion.

Selection bias. Studies that were included were those published in peer-reviewed journals. This selection criterion was used to assure that a panel of peers judged the study to be of sufficient methodological rigor to warrant publication. This criterion, of course, does not guarantee that the articles selected will be of high quality, nor does it imply that unpublished research or research published elsewhere is of lower quality. It simply assured that a panel of research peers had assessed the research. This criterion might, however, introduce a selection bias because it is typically the case that only statistically significant results are published in peer-reviewed journals. It was, therefore, important to verify whether the publication criterion did not overestimate the effect of parent involvement. One way to do so is to estimate the number of studies with null results that would be needed to bring down the combined effect found in the present report to a probability level of .05. Hence, a fail-safe number was calculated according to the formula presented in Mullen and Rosenthal (1985; see appendix). Given the findings of the present synthesis, more than 500 additional studies with null results would be required to change the overall findings.

Furthermore, the reliance on refereed publications ensured that the studies were largely or entirely obtainable, since it is difficult or impossible to conduct a comprehensive search of the unpublished literature. Such studies are not equally accessible, which could introduce a source of bias into the research and could prevent future replication.

Coding the Studies

The coding instrument included three sections that referred to the three categories of characteristics, namely, intervention, participant, and study characteristics. The characteristics were selected because they could be moderators of the effects found. As such, examining these characteristics may help in understanding potential variation across the studies. Each of the three categories of characteristics is

described in turn.

Intervention characteristics. An analysis of the characteristics of the interventions can reveal which aspects of the interventions were associated with the variation in effects across studies. Each study was coded on the following four intervention characteristics: (1) the type of parent involvement intervention with each specific intervention recoded into one of the following: parents read to their child; parents listen to their child read; and parents teach specific reading skills to their child; (2) the intensity of the parent training as indicated by the duration, in hours, of the workshops; (3) the presence or absence of supportive feedback given to parents during the intervention; and (4) the duration, in months, of the intervention.

The moderating effect of the presence or absence of materials provided by the researchers could not be examined because materials were provided through workshops/meetings in all but one study (Miller, Robson, and Bushell, 1986). In addition, the delivery mode of the parent training (workshops or handouts) was not examined further because only two studies provided handouts (Hannon, 1987; Vinograd-Bausell and Bausell, 1987).

Participant characteristics. The analysis of participant characteristics across the studies can show how the intervention effects relate to particular kinds of participants. For example, it is possible to determine if the impact of the interventions is different for different age groups. Each study was coded on the following three participant characteristics: (1) the grade level of the children; (2) the reading level of the children to reflect whether children were reading at a normal-level, at risk for reading difficulties, or having reading problems; and (3) the socioeconomic level of the families, to reflect whether families had a low or a middle to high income.

Study characteristics. The analysis of study characteristics allowed us to determine whether effects were related to quality factors or other aspects of the studies. Each intervention was coded on the following seven characteristics of study design: (1) the assignment of participants to the intervention and control groups (that is, random or not random); (2) the sample size; (3) the type of tests used to measure reading (that is, standardized or researcher-designed tests); (4) the timing of posttest administration (that is, were posttests administered immediately after the intervention or not); (5) the type of outcome measure used (that is, the specific measures were recoded into the following four sets of measures: early literacy, word reading, reading comprehension, or a composite of the previous measures); (6) the year of publication; and (7) the country in which the study was conducted.

It was impossible to analyze whether parents implemented the interventions correctly because intervention fidelity information was not reported in most studies. It was also impossible to code whether the control groups received a related treatment (or another type of treatment, or no treatment) because only two studies included a control group that received a related treatment (Study 1 and 2, Leach and Siddall, 1990). Another study included a control group that received a related treatment as well as a no-treatment control group, but failed to provide the means and standard deviations for the two control groups, and therefore, it was impossible to calculate separate effect sizes (Wilks and Clarke, 1988). The related treatments are described in the short summaries for these three studies presented at the end of the document.

Assessing Coder Reliability

Two coders, a principal and a secondary coder, rated each study. Inter-coder reliability was 94%, ranging from 100% agreement to 85% agreement on the 14 dimensions coded as well as the transcription of means, standard deviations, *F* statistics, and *p* values. Of the 22 disagreements, 14 were due to factual errors and were corrected, while the remaining eight disagreements were due to differences in interpretation and were not corrected. A third coder rated the dimensions that produced the eight interpretation disagreements, and the final coding value determined by two out of three coders was selected.

Using Effect Sizes as a Common Index of Intervention Efficiency Across Studies

The primary statistic used to integrate and compare the 14 studies was the effect size. In the present report, an effect size is the standardized difference between the intervention group and the control group (or an estimate of the difference). Hence, an effect size of 1 represents a difference of 1 standard deviation between the intervention and the control groups. For instance, if a study used a standardized test with a mean of 100 and a standard deviation of 15, then an effect size of 1 would represent a 15-point advantage for the intervention group over the control group. Similarly, an effect size of 0.50 would represent a 7.5-point difference between the intervention and the control groups, and an effect size of 0 would represent no difference between the intervention and the control groups. In the present report, the description of effect sizes in terms of points gained on a test were used to gauge the magnitude of the effects.

Another description of effect sizes corresponds to the educational relevance of the effect sizes. This second description is important because small effect sizes can still have educational importance. For

example, it may be the case that educators may want to promote the use of techniques that have small effect sizes because these techniques require very few resources as compared to techniques that have a greater effect size but require resources that are not available.

Meta-analytic Procedures

This section describes methodological details that will be of interest to those familiar with meta-analytic procedures. These methodological details are not necessary to understand the findings sections.

The effect size index selected in the present analysis was Cohen's *d*, a standardized measure of the difference between the performance of the children in the intervention group and those in the control group. Cohen's *d* is calculated by subtracting the mean of the control group from the mean of the intervention group, and dividing the obtained difference by the averaged standard deviations for the intervention and control groups.

There were two studies for which Cohen's *d* could not be calculated directly because the means and/or standard deviations for the intervention and control groups were not reported. For these studies, effect sizes were estimated from *F* statistics (Wilks and Clarke, 1988) or *p* values (Searls, Lewis, and Morrow, 1982). In the Wilks and Clarke (1988) study, the *F* statistic included two degrees of freedom in the denominator because there were three groups; this means that an overall effect size could be estimated, but this would be based upon all of the differences and not just the differences between the experimental and control condition. It was decided to use the *F* statistic, nonetheless, because a close inspection of the means and the description of the post-hoc tests revealed a clear advantage for the parent involvement group over the other two groups—in other words almost all of the difference captured by the *F* statistic was due to the treatment of interest. An additional study (Miller, Robson, and Bushell, 1986) reported a large pretest difference between the two groups of participants, and consequently, the *p* values that acknowledged this difference (that is, the *F* for the repeated measures analyses) were used. The formulas for calculating effect sizes from *F* or *p* values are given in the appendix at the end of the document.

Combining effect sizes within studies. Most studies in the database included multiple reading measures. In conducting meta-analyses, however, it is advisable to have a single estimate of effect size per study to ensure effect size independence. Producing a single estimate of effect size for each study was done in four steps: (1) for studies using standardized and experimenter-designed tests, only the standardized measures were used to optimize comparisons across studies; (2) for studies reporting composite scores as well as subtest scores for the same standardized test, only the composite scores were used; (3) for the two studies that included immediate and delayed posttests, only the measures for the immediate posttest were used to optimize the comparisons with the 10 studies that included immediate posttests only; and (4) effect sizes were computed for any remaining measure and the median effect size was used as a single estimate for each study.

Combining effect sizes across studies. Combining effect sizes across studies was conducted using standard meta-analytic procedures (Cooper and Hedges, 1994; Hedges and Olkin, 1985; and see the appendix). For the entire set of studies and each characteristic level, a homogeneity statistic was computed to assess whether the variability in effect sizes within the set of studies was greater than would be expected by chance (that is, $p \leq .05$). For each characteristic, a between-level statistic was computed to assess whether the different levels of the characteristic were statistically significant from each other. In all cases, mean effect sizes were weighted to acknowledge that studies with larger samples provide more reliable estimates of the population effect size and that the use of unweighted effect sizes will introduce some bias in the statistics. The weights used here were the inverse of the effect size variance for each study (Hedges, 1982). A fixed-effect model was used to compute within- and between-levels statistics. This means that significance testing is based on the total number of participants across studies, not the number of studies (Rosenthal, 1995).

To assess whether some studies yielded effect sizes that were outliers, the distribution of effect sizes was examined by calculating the homogeneity statistic for the entire set of studies but removing each study one at a time (Hedges and Olkin, 1985). This procedure revealed one potential outlier (Vinograd-Bausell and Bausell, 1987). The analyses were run with and without this study to assess whether its presence altered the pattern of statistically significant results. In all but two analyses, the inclusion of this study did not alter the findings, and, consequently, all studies were included. The analyses for which the outlier affected the outcome were run without the outlier, as described in the appropriate sections.

Findings: Overall Effects

Does Parent Involvement Influence Reading Acquisition?

Yes. Combining the results of the 14 intervention studies, representing 1174 families, shows that

parent involvement does have a positive impact on children's reading acquisition. The mean weighted effect size was moderately large at 0.68 (with 95% confidence intervals from 0.56 to 0.81). This effect size corresponds to a 10-point gain on a standardized test (with a standard deviation of 15) for the intervention children as compared to the control children. There was, however, considerable variability in the magnitude of effect sizes across studies, ranging from a low of 0.07 to a high of 2.02. As a consequence of the variability across studies, it is necessary to assess whether the characteristics of the studies could account for the variability across studies.

The next three sections of the findings attempt to explain why the study results were so variable. To do so, the characteristics of the interventions, the participants, and designs of the 14 studies with control groups were examined. The characteristics of each study are presented in Table 1 and the findings are reported in three sections. Within each section, the findings are presented as answers to questions, with the first part of the answer describing the distribution of studies across characteristic levels, and the second part addressing whether these specific characteristics were moderators that explained differences in the impact of the interventions. In addition, each section contains a summary table that presents the tests conducted to assess whether the effect sizes were different for characteristic level.

Findings: Intervention Characteristics

The findings for the four intervention characteristics are presented as answers to questions. The first part of each answer is a description of the characteristic levels and the final part is the statistical comparison in effectiveness among the different levels of the characteristic.

1. Is the Type of Parent Involvement Related to Reading Acquisition?

There were three levels of parent involvement. The first level, labeled *Read to Child*, included two studies in which parents were encouraged to read to their child. Parents in one study were instructed by researchers on appropriate reading practices such as how to read aloud effectively to their children, how to choose appropriate books, select a quiet environment and an optimal time of day, and how to ensure child interest in the books (Foster and Bitner, 1998).

Parents in another study were encouraged to engage in scripted parent-child interactions and extended book-related discussions, as well as to complete book-based activities related to monthly themes (for example, vocabulary enrichment) with their child (Jordan, Snow, and Porche, 2000).

In the second level, parents listened to their child read. This second category was labeled *Listen to Child Read* and included five studies. In all but one study (Miller, Robson, and Bushell, 1986) in the *Listen to Read* category, children's books were sent home from school. The techniques to train parents varied. In two studies, teachers or researchers provided general suggestions to parents for listening to their child read (Hannon, 1987; Tizard, Schofield, and Hewison, 1982).

Parents read along with their child and provided corrective feedback in three studies. In two of these studies, the paired reading technique was employed (Leach and Siddall, Study 1, 1990; Miller, Robson, and Bushell, 1986). The paired reading technique involves a parent and a child reading aloud simultaneously. The child tries to read every word, and if the child makes a mistake he or she is given time to repeat the word correctly. During simultaneous reading, the child knocks to signify his desire to read alone, at which time the parent stops reading aloud. If the child makes a mistake or cannot read a word alone, the parent provides the correct word for the child to repeat. At this time simultaneous reading recommences until the child knocks again.

Parents encouraged their child to use context cues in one study. In this study, parents were trained to use meaning, context, and phonic cues instead of direct word prompts, to praise their child, and to delay intervention when their child struggled while reading a word (Wilks and Clarke, 1988).

The third level of interventions was labeled *Parents Teach Child Literacy Skills* and included seven studies in which parents were trained to teach their child specific skills that are linked to reading. For example, parents taught their child the alphabet in some studies, and parents taught word reading in others.

Parents were given specific exercises to do with their child in four studies. Parents were trained to use word cards in order to help their child learn to read new words and sentences containing these words (Vinograd-Bausell and Bausell, 1987). Parents learned to select suitable reading environments, to correct their child's errors, and to teach letter-sound correspondence and letter-sound blending (Kraft, Findlay, Major, Gilberts, and Hofmeister, 2001).

Table 1. Intervention, Participant, and Study Characteristics for Each of the 14 Studies

Parent Involvement Type	Intervention Characteristics			Participant Characteristics			Study Characteristics					Effect size (d)	
	Training hrs	Supportive feedback	Duration (mon)	Grade	Reading level	SES	Random assignment	N	Test time	Standard test given	Outcome measure		Country
Parents Read to Child													
Foster and Binger (1998)	-	No	3	K	2	1	Yes	35	1	Yes	1	USA	0.07
Jordan and others (2000)	5	No	5	K	1	2	Yes	248	1	Yes	1	USA	0.20
Parents Listen to Child Read													
Hanson (1987)	-	Yes	36	Mixed	1	1	No	157	1	Yes	3	UK	0.13
Leach and Siddall, Study 1 (1990)	1.5	Yes	2.5	1	1	-	Yes	20	1	Yes	4	AUS	1.71*
Miller and others (1986)	2	Yes	1.5	3	3	-	Yes	54	1	Yes	4	UK	0.42
Tizard and others (1982)	-	Yes	24	Mixed	1	1	Yes	137	1/D	Yes	3	UK	0.89*
Wilks and Clarke (1998)	4	No	1	3	1	-	Yes	42	D	Yes	4	AUS	0.57*
Parents Teach Specific Literacy Skills													
Faires and others (2000)	1.5	No	1.3	1	3	1	No	8	1	No	2	USA	0.73
Kraft and others (2001)	2	Yes	4	K	1	2	No	43	1	Yes	2	USA	0.41
Leach and Siddall, Study 2 (1990)	4.5	Yes	2.5	1	1	-	Yes	20	1	Yes	4	AUS	1.15*
Mehran and White (1988)	8	Yes	9	1	2	1	No ^a	76	1/D	Yes	4	USA	0.46*
Niedermeyer (1970)	1.5	Yes	3	K	1	2	No	148	D	No	1	USA	1.37*
Searls and others (1982)	1	No	5	1	1	-	No ^a	50	1	Yes	4	USA	0.73*
Vitogral-Bansoff and Bansoff (1987)	-	No	0.5	1	1	-	Yes	136	1	No	2	USA	2.02*

Grade: K = kindergarten, Mixed = a combination of grades;
 Reading Level: 1 = normal, 2 = at risk, 3 = remedial;
 SES: 1 = Low income, 2 = Middle/high income;
 N = total sample size;
 Test time: 1 = immediately after the intervention, D = after a delay.

Outcome measure: 1 = early literacy, 2 = word reading, 3 = reading comprehension, 4 = composite measure;
 - A hyphen indicates missing information.
^a Participants were matched
 * $p \leq .05$ one tailed

Parents provided their child with practice exercises to learn to read one-syllable words, to recognize and say beginning consonant and ending vowel-consonant sounds, and to blend beginning and ending sounds to sound out new words (Niedermeyer, 1970). Parents engaged in daily activities with their child involving phonics rules, basal readers, sight words, letter-sound correspondence, and recommended children's books. These activities were designed to reinforce reading skills taught to children at school (Searls, Lewis, and Morrow, 1982).

In the other three studies, parents were given a structured program that included exercises as well as books or texts. The difficulty level of the texts was controlled and the texts promoted, in some cases, specific letter-sound knowledge and/or the reading of specific words.

In one study, parents were trained to implement the *Teach Your Child to Read in 100 Easy Lessons* program (Engelmann, Haddox, and Bruner, 1983), an empirically validated reading program for the parents of preschool children (Leach and Siddall, Study 2, 1990). In another study, parents were trained to use the Reading Recovery model, which included lessons involving reading new and unfamiliar books, letter identification, decoding unfamiliar words, writing a sentence or story, and reassembling a cut-up sentence or story (Faires, Nichols, and Rickelman, 2000). In a final study, parents were trained using the *Reading Made Easy* program (Harrison, 1981) that involved teaching sounds and letters, basic sight words, blending sounds, and decoding words (Mehran and White, 1988).

Training parents to teach their child reading with specific exercises produced the greatest results, with a mean weighted effect size of 1.15. This would correspond to a 17-point increase on a standardized measure for the intervention children as compared to the control children. The five studies where parents were trained to listen to their child read produced a moderate effect size (0.51) which indicates that, after the intervention, the intervention children made gains of 8 points on a standardized measure compared to the control children. The difference between these two types of interventions was statistically significant: Training parents to teach their child was more effective intervention than training parents to listen to their child read.

In contrast to the above results, the two studies where parents read to their child produced a small effect size (0.18) that was not different from 0. That latter finding is important because it suggests that having parents read to their child may not improve early literacy skills as defined in the present study.

The studies within each of the three intervention categories showed considerable variability. In the subsequent analyses, we examined whether other intervention variables explained the variability across studies.

2. Is the Amount of Training Parents Received Related to Intervention Outcomes?

The studies were divided into two levels. There were six studies for which the amount of parent training lasted between one to two hours and four studies for which the training lasted between three to eight hours.

In the set of 10 studies that could be included in this analysis, studies that provided less training (two hours or less) yielded larger effect sizes than studies that provided more training (three to eight hours). A close inspection of this finding, however, revealed that it is probably due to the fact that four of the six less-training studies were ones where parents were trained to teach. Hence, this finding was not interpreted further.

3. Is Providing Parents with Supportive Feedback Related to Intervention Outcomes?

In eight studies, parents were given feedback during the intervention either through home visits or telephone interviews. In most cases, the feedback was to help parents implement the intervention techniques. In six studies, parents were not given such feedback. Note that most studies did not provide enough information about the duration or type of supportive feedback given to parents to allow further descriptions of this characteristic.

In the present set of studies, providing supportive feedback did not produce better child outcomes than the studies that did not.

4. Is the Length of the Intervention Related to Intervention Outcomes?

Studies were classified according to three levels, namely, short, somewhat short, and long interventions. Preliminary analyses revealed that the study by Vinograd-Bausell and Bausell (1987) acted as an outlier, and, consequently, it was excluded in the analyses presented below. There were three short interventions that were 1.5 months or shorter (mean length was 1.3 months, range 1.0 to 1.5 months), there were seven somewhat short interventions lasting between 2.5 to 5 months (mean = 3.6 months), and there were three long interventions that lasted 10 months or longer (mean length was 20 months, range 9 to 36 months). In the set of studies, the intervention length did not affect study outcomes.

Summary Table of statistical Results

Table 2 summarizes the statistical analyses that were conducted for this section on intervention characteristics. It presents: (a) the number studies and of participating families for each characteristic level; (b) the results of a test to assess whether the studies included in each level produced homogeneous effect sizes; (c) the mean effect size (that is, d) for each level; (d) the confidence interval (for $p = .05$) for each effect size; and (e) the results of between-levels comparisons.

Examination of the confidence intervals is very useful for three reasons. First, confidence intervals provide a gauge with which the variability across studies can be appreciated. Hence, wide confidence intervals reflect that the studies included are more variable as compared to narrower confidence intervals. Second, confidence intervals that include zero are not statistically significant. And third, comparisons of the confidence intervals across levels allow one to assess whether the different levels are statistically different from each other. That is, levels whose confidence intervals do not overlap are statistically significantly different from each other.

As indicated in Table 2, the attempts to explain the variability across studies by grouping the studies that shared common intervention characteristics did not result in more homogeneous effect sizes. This indicates that the effect sizes for the studies within a set are more different from each other than would be expected by chance ($p \leq .05$). Second, this variability is also seen in the width of the confidence intervals. This band around the mean effect size for each level of the characteristics is much wider when the study results are more variable. Hence, caution should be used in interpreting the results.

Table 2. Tests for Intervention Characteristics

Characteristic	n	Within-levels homogeneity	Mean weighted <i>d</i>	95% confidence interval	Between-levels difference
Type of Parent Involvement					
Read to child (2)	283	Yes	0.18	-0.07 to 0.44	
Listen to child read (5)	410	No	0.51	0.31 to 0.71	Teach > Read
Teach child to read (7)	481	No	1.15	0.95 to 1.34	Teach > Listen
Amount of Parent Training					
Short: 1-2 hours (6)	323	No	0.96	0.73 to 1.19	
Long: 3-8 hours (4)	386	Yes	0.35	0.13 to 0.56	Short > Long
Supportive Feedback					
Yes (8)	655	No	0.69	0.52 to 0.85	
No (6)	519	No	0.68	0.49 to 0.87	No difference
Length of Intervention^a					
Short: < 1.5 months (3)	104	Yes	0.50	0.10 to 0.91	
Somewhat short ^b (7)	564	No	0.63	0.45 to 0.81	
Long: > 910 months (3)	370	No	0.46	0.25 to 0.67	No difference

^a The study by Vinograd-Bausell and Bausell was excluded because it was an outlier in this analysis.

^b Somewhat short studies were between 2.5 and 5 months in length.

Findings: Participant Characteristics

The findings for the three participant characteristics are described below.

1. Is the Grade Level of the Participating Children Related to Intervention Outcomes?

Studies were divided into two levels: early literacy and more advanced reading. The four early literacy studies included children in kindergarten, and the 10 more advanced reading studies included children in grades 1 to 3. The five studies that included children from different grades were included in the advanced reading category because they included older children. The impact of the parent involvement interventions for the children in grades 1 to 3 was similar to that for the kindergarten children.

2. Is the Reading Level of the Participating Children Related to Intervention Outcomes?

Eleven studies were conducted with normally developing children, and four studies were conducted with children who were at risk for reading difficulties or who experienced reading difficulties. The impact of the parent involvement interventions did not differ between the studies that included children reading at a normal level and those that included children reading below or at risk of reading below grade level.

3. Is the Socioeconomic Status of the Participating Families Related to Intervention Outcomes?

The families in five studies were low income, whereas families in three studies included a range from middle to high income. The remaining eight studies did not provide sufficient information about socioeconomic status to establish the economic levels of the participating families. Effect sizes did not differ between the families that came from middle/high- or low-income backgrounds.

Summary Table of statistical Results

Table 3 summarizes the statistical findings of the section on participant characteristics. As indicated in the table, the attempts to explain the variability in study outcomes by grouping the studies that shared common participant characteristics did not result in significant differences or in more homogeneous effect sizes. Hence, caution should be used in interpreting the results.

Table 3. Tests for Participant Characteristics

Characteristic Level (# of studies)	n	Within-levels homogeneity	Mean weighted <i>d</i>	95% confidence interval	Between-levels difference
Grade					
Kindergarten (4)	474	No	0.56	0.36 to 0.76	
Grades 1 to 3 (10)	700	No	0.77	0.56 to 0.97	No difference
Reading Level					
Normal (10)	1001	No	0.74	0.61 to 0.88	
Special (4)	173	Yes	0.38	0.08 to 0.68	No difference
SES					
Low (5)	413	No	0.43	0.23 to 0.63	
Middle to High (3)	439	No	0.61	0.40 to 0.81	No difference

Findings: Study Characteristics

The findings for the seven study characteristics are presented below.

1. Does the Manner of Assigning Participants to the Intervention and the Control Group Influence the Intervention Outcome?

Eight studies used an experimental design in which the participants were randomly assigned to the intervention and control groups. In the remaining six studies, participants were not randomly assigned to the intervention and control groups (although participants were matched in two of these six studies, see Table 1). It was usually the case in these studies that parents volunteered for the intervention or that an entire classroom participated in the intervention.

It was very important to test whether the overall effects obtained were not due to the presence of studies with a weaker experimental design. The effect sizes for studies that assigned participants randomly did not differ from those that did not randomly assign participants to the intervention and control groups.

2. Is the Size of the Sample Related to Intervention Outcomes?

Studies were divided into two levels of sample sizes based on whether the sample was smaller than 50 or 50 and larger. There were six studies with smaller samples (28 participants, on average) and eight studies with larger sample sizes (126 participants, on average). Studies that included smaller samples did not differ from studies that included larger samples.

3. Is the Timing of the Posttest Related to Intervention Outcomes?

In the group of studies reviewed, there were 10 studies that tested the impact of the intervention immediately after its completion. There were two studies that included an immediate and a delayed posttest. For these two studies, one follow-up posttest was administered 10 months after the end of the study (Mehran and White, 1988), and the other follow-up was three years after the end of the study (see Hewison, 1988 that reports the follow-up to Tizard, Schofield, and Hewison 1982). There were two studies that assessed the intervention after a delay. The delay was 20 weeks for Wilks and Clarke (1988), and two weeks for Niedermeyer (1970). To test whether the timing of the posttest influences the intervention outcome, the 10 studies with an immediate posttest were contrasted to the four studies that included delayed posttests.

In the present set of studies, the mean weighted effect size for studies that tested children's reading performance after a delay did not differ from that of studies in which children were tested immediately after the intervention.

4. Is the Use of Standardized Tests Related to Intervention Outcomes?

There were 11 studies for which standardized measures were used, and three studies for which researcher-designed tests were used. Studies that included standardized measures yielded, on average,

smaller effect sizes than did studies that used researcher-designed tests. This finding can be interpreted in two ways. On one side, the use of standardized tests typically produces smaller effect sizes, but may allow one to generalize findings. On another side, researcher-designed tests may be more sensitive to the changes that occur during the interventions.

5. Is the Type of Reading Measure Related to Intervention Outcomes?

The studies included a variety of reading measures. Preliminary analyses revealed that the Vinograd-Bausell and Bausell (1987) study was an outlier in this analysis, and it was consequently removed. Two of the remaining studies measured children's early literacy exclusively, three studies assessed word reading exclusively, two tested reading comprehension exclusively, and six studies included a combination of these measures.

In the present set of studies, the mean weighted effect size across the sets of studies that included different types of measures did not differ from each other.

6. Is the Publication Year of the Study Related to Intervention Outcomes?

The studies were divided into two levels: recent and older studies. There were eight studies that were published between 1990 and 2001 and there were six studies that were published between 1970 and 1989.

Older studies reported, on average, larger effects than did recent studies. This finding, however, was due to the presence of the two Shared Reading studies in the more recent set, and it was no longer significant once these two studies were removed. This suggests that year of publication was not a moderator for the entire set of studies.

7. Is the Country in which the Study Was Conducted Related to Intervention Outcomes?

The studies were divided into two levels: those that were conducted in the United States and those that were not. Eight studies were conducted in the US, and six others were conducted in England, Australia, and New Zealand. There was no difference in the size of effects as a function of where the study was conducted.

Summary Table of statistical Results

Table 4 summarizes the statistical findings of the section on study design characteristics. As indicated in the table, the attempts to explain the variability in study outcomes by grouping the studies that shared common design characteristics generally did not result in more homogeneous effect sizes. Hence, caution should be used in interpreting the results.

Table 4. Tests for Study Characteristics

Characteristic Level (# of studies)	n	Within-levels homogeneity	Mean weighted <i>d</i>	95% confidence interval	Between-levels difference
Participant Assignment					
Random (8)	692	No	0.74	0.57 to 0.90	
Non-random (6)	482	No	0.61	0.43 to 0.80	No difference
Sample Size					
< 50 (6)	168	Yes	0.59	0.28 to 0.91	
≥ 50 (8)	1006	No	0.70	0.57 to 0.83	No difference
Time of test					
Immediately (10)	771	No	0.56	0.40 to 0.71	
Delayed (4)	356	No	0.77	0.55 to 0.99	No difference
Type of Tests					
Standardized (11)	882	No	0.43	0.29 to 0.57	
Not standardized (3)	292	Yes	1.61	1.35 to 1.88	Standardized < Not
Outcome measure^a					
Early Literacy (3)	431	No	0.46	0.26 to 0.67	
Word Reading (2)	51	Yes	0.46	-0.10 to 1.01	
Reading Comprehension (2)	294	Yes	0.46	0.22 to 0.69	
Composite Measure (6)	262	Yes	0.65	0.39 to 0.90	No difference
Publication Year					
≤ 1989 (8)	800	No	0.84	0.69 to 0.99	
≥ 1990 (6)	374	Yes	0.35	0.13 to 0.57	1989 > 1990
Country					
US (8)	744	No	0.78	0.62 to 0.93	
Not US (6)	430	No	0.54	0.34 to 0.74	No difference

^a The study by Vinograd-Bausell and Bausell (1987) was excluded because it was an outlier in this analysis.

Implications

The studies reviewed suggest that parents of children in kindergarten to grade 3 can help their children learn to read. Parents are most helpful when they are trained to teach specific skills to their child. Training parents on how to listen to their child read had a smaller effect on children's reading acquisition, and training parents to read to their child did not affect reading acquisition.

These findings are limited in two important ways. First and foremost, a limited number of studies were found that met the selection criteria. This lack of intervention research was most evident when examining the effect of shared reading. This was certainly disappointing given the widespread recommendations given to parents on how to help their children learn to read. Because of the limited number of studies available for examination, it was not possible to determine from the available data whether particular types of intervention approaches might be more or less effective for children with and without identified reading problems, for children from different SES backgrounds, or for older versus younger children.

The second limitation of the present research synthesis is that combining the studies failed to produce homogeneous effect sizes. The attempts to explain this variability in terms of types of interventions, participant characteristics, or differences in study designs also failed. Hence, the findings must be interpreted with caution.

Should Educators Train Parents to Teach Their Children to Read?

Yes. The studies included in the present report suggest that training parents to teach their child specific reading skills can have a large effect on children's reading performance.

The global effectiveness of parent teaching has been demonstrated in the present review, but the effectiveness of the different types of teaching interventions remains to be investigated. As described previously, the interventions differed in the nature of the instructional program as well as the skills that were taught.

Educators will want to know what is the most effective way to train parents to teach their children reading skills. From the present review, it is unclear whether it is training parents to do focused exercises with their children or incorporating these exercises into a more global program of instruction that is more effective. It is also unclear whether it is best to design interventions that match closely the school curriculum, and what is the optimal proportion of new and familiar material to be included in the exercises. Answers to these questions await future research. In the meantime, educators could use some of the already existing programs and adapt them to their specific needs.

Educators will also want to know what aspects of reading are most likely to be affected by parent teaching. Should the interventions focus on letter-sound knowledge with young children, on sound blending and word reading with beginning readers, and on more fluent word reading and comprehension with more advanced readers? Again, understanding what aspects of reading are most affected by parent teaching awaits future research.

Should Educators Encourage Parents to Listen to Their Children Read?

Yes. The finding that training parents to listen to their children read has an impact on children's reading is consistent with the broad review conducted by Toomey (1993). Toomey's literature review was broader than the present meta-analysis because he included unpublished manuscripts and book chapters in his review of research on parents listening to their children read. Nonetheless, both reviews point to the same conclusion: Encouraging and training parents to listen to their children read can be effective in promoting reading acquisition.

Educators will want to know what is the most effective way to train parents to listen to their children read. Given the limited number of relevant studies that met the selection criteria for this report, and the variability among these studies, no conclusions can be drawn regarding the relative effectiveness of various listening approaches or combinations of approaches for enhancing young children's literacy skills. For example, it is unclear whether it is more effective to provide children with corrective feedback to build accurate and efficient word reading skills, to encourage children to use context clues to aid comprehension, or to praise and read along with children to promote self-confidence and motivation. Evidence on the relative effectiveness of different approaches awaits further research. In the meantime, these aspects could be incorporated in any training program.

It is the case that this type of intervention presupposes some level of reading fluency from the parents. How best to implement the training with parents who have poor literacy skills themselves remains to be investigated.

Should Educators Encourage Parents to Read to Their Children?

One of the most important findings here was the dearth of intervention research on parent reading with children in kindergarten to grade 3. Parents are often told that reading to their child is the best way to prepare the child to learn to read. Given the wide acceptance of this recommendation, one would expect it to have a strong research foundation. The present analysis, however, revealed very limited intervention research on the topic for this age group. Only two of the 14 studies reviewed were interventions where parents read to their child. Most disappointingly, the results of the two studies failed to find support for the idea that parent reading enhanced early literacy.

In contrast to the present results, a meta-analysis conducted by Bus, van IJzendoorn, and Pellegrini (1995) showed that there was a statistically significant link between parent-child book reading at home and reading acquisition (with a child age range between 42 and 96 months). They reported moderate effect sizes between book reading and early literacy or reading achievement. That is, they reported combined effect sizes of 0.58 and 0.55 for early literacy (16 studies) and reading achievement (nine studies), respectively. In a similar vein, Scarborough and Dobrich (1994) reported a median correlation of 0.28 (seven studies) between parent-preschooler reading and reading achievement in grade school and a median correlation of 0.27 between shared reading and early literacy (eight studies). To reconcile the differences in conclusion between the present review and the other reviews, one has to consider the nature of the literature reviewed as well as the inclusion/exclusion of language measures. Bus and others as well as Scarborough and Dobrich reviewed many correlational studies. As discussed previously, the difficulty with correlations is that they do not allow one to make statements about causation, nor do they control for the possibility that the relation between the two key variables is due to their common relation with a third variable. For instance, recent research shows that the relations between the frequency and variability of book reading at home in kindergarten and reading comprehension in grade 3 can be explained by their common association to children's vocabulary knowledge (see Sénéchal and LeFevre, 2002).

The present review did not include correlational research or research with language outcomes, but

focused exclusively on intervention studies that assessed the role of parent involvement in children's reading. The findings of the two intervention studies that trained parents to read to their child did not support the idea that reading books to children promotes early literacy directly. It is possible, however, that the relation between book reading and reading achievement is indirect. Three examples of possible indirect relations that could be tested in intervention research are presented in the next paragraph.

It is possible that training parents to read to their child enhances the child's language, which, in time, may result in better reading comprehension. In addition, it is also possible that book reading increases children's knowledge of literate discourse, which, in time, might facilitate reading (for example, Purcell-Gates, McIntyre, and Freppon, 1995). Finally, book reading in kindergarten might increase children's motivation to read, which, in time, will result in more frequent and fluent reading for pleasure.

In the meantime, reading books to children is an activity that should be encouraged, but educators will have to be careful about the claims they make for the benefits of parent book reading. Reading books to children can be encouraged because it is a wonderful sharing time, and it exposes children to ideas, concepts, and language that can be novel, more varied, and more complex than those introduced during parent-child conversations.

Conclusion

In the present meta-analysis, home teaching and parent listening enhanced children's literacy skills. Although the two types of interventions produced positive effects, they did differ in efficacy as well as the resources required from educators. Specifically, home teaching was twice as effective in enhancing literacy than was parent listening to the child read aloud. Home teaching, however, necessitates more resources from educators.

Asking parents to listen to their child read requires minimal resources from educators. Educators can send information about reading in a handout and provide parents with appropriate children's books. Training parents to listen to their child read requires more resources because educators need to prepare and give workshops where parents will learn specific techniques. Once the techniques are acquired, however, parents are simply asked to apply them when they listen to their child read. Here again, educators provide parents with appropriate children's books. Finally, training parents to teach their child with specific exercises and structured programs requires the most resources from educators because they need to design or select the exercises and programs, design or select suitable reading materials, and train parents.

Educators, when deciding which type of intervention to implement, will have to weigh the differences in effectiveness across intervention type against the amount of resources needed to implement the intervention.

Future Directions for Research

There are still many questions left unanswered. Researchers will want to understand better what aspects of the interventions are responsible for the study outcomes. Many of these issues were discussed in the previous sections. For instance, what are the beginning reading skills that are most easily taught by parents? What is the optimal timing for parent teaching: before, during, or after specific skills are taught in school? What is the role of corrective feedback when parents listen to their child read? What are the types of children's books that are most helpful? Is it the case that parent teaching is most effective in the beginning phases of reading, whereas listening to children read is most effective once children have acquired some reading fluency? How can these interventions be implemented with parents who have low literacy skills themselves?

Some studies included in this review were difficult to analyze because they were written vaguely, making it difficult to understand what the researchers did and what they found. Moreover, 40% of the studies failed to report adequately the socioeconomic status of the families, 76% did not report the education level of the parents, and none assessed the literacy level of the parents. In addition, most studies did not provide enough precise information about the duration and/or type of supportive feedback given to parents. The results of the present review highlight the importance of collecting and reporting demographic information on the participating families and of providing complete descriptions of the intervention conducted, how the implementation was assessed, the measures used, and the means and standard deviations for each of the measures used.

The results of the present review also highlight the importance of study quality because it affects the magnitude of the effect sizes. Four studies were excluded from the present synthesis because they did not include a control group. Moreover, 8% of the studies found were excluded because they did not provide sufficient information to calculate effect sizes. Consider also that 81% of the studies that included a control group did not administer an alternative treatment to the control families.

Greater attention to study design quality and to reporting precisely the findings will allow researchers to have a greater impact on how best to help parents help their child learn to read.

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Articles included in the meta-analyses are preceded by an asterisk. The Hewison (1988) study is a follow-up to the study by Tizard and others (1982).

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^a *The Leach and Siddall study included four conditions. The two most intensive conditions were labeled interventions and the remaining two were randomly assigned to each intervention. Hence, the study was divided into two independent studies in the present meta-analysis.*

Appendix: Statistical Formulas

Effect size (ES) calculations:

1. Cohen's d , where t is treatment group and c is control group, and sqrt = square root.

$$M_t - M_c / (\text{sqrt}(((N_t - 1) * (SD_t)^2) + ((N_c - 1) * (SD_c)^2)) / ((N_t - 1) + (N_c - 1)))$$

2. In the studies without means and standard deviations, Cohen's d was obtained as follows:

$$\begin{aligned} d_{\text{equal } N_s} &= 2t / \text{sqrt}(\text{df error}) \\ d_{\text{unequal } N_s} &= t(N_t + N_c) / \text{sqrt}(\text{df error}) * \text{sqrt}(N_t * N_c) \\ t &= \text{sqrt } F \text{ (that is, } t \text{ can be replaced with the square root of } F \text{)} \\ &\text{from } p \text{ by using } d = z(\text{sqrt}(1/N_t + 1/N_c)) \end{aligned}$$

Combining weighted effect sizes across studies, where weights acknowledge a study's sample size:

1. Combining and weighting effect sizes were calculated according to formulas in Cooper and Hedges (1994, p. 268).

$$\begin{aligned} d_{\text{combined}} &= \Sigma(\text{weight}_{\text{study}} * d_{\text{study}}) / (\Sigma \text{weight}_{\text{study}}) \\ \text{weight}_{\text{study}} &= 1 / \text{variance}_{\text{study}} \\ \text{variance}_{\text{study}} &= (N_t + N_c / N_t * N_c) + ((d_{\text{study}})^2 / 2 (N_t + N_c)) \\ \text{variance } d_{\text{combined}} &= 1 / (\Sigma \text{weight}_{\text{study}}) \end{aligned}$$

2. Tests of homogeneity for entire set of studies and for each class, as well as 95% CIs were calculated according to Hasselblad and Hedges (1995, p. 172).

$$\begin{aligned} X^2 &= \Sigma \text{weight}_{\text{study}} (d_{\text{study}} - d_{\text{combined}})^2 \text{ with } k-1 \text{ dfs. (} k = \text{number of studies)} \\ 95\% \text{ CIs} &= \text{mean weighted } d \pm 1.96 * \text{sqrt}(\text{variance } d_{\text{combined}}) \end{aligned}$$

3. Tests for outliers were done by computing Q for entire number of studies removing one study at a time. If the study is an outlier, there should be a dramatic effect on Q with that study removed (Hedges & Olkin, 1985, p. 256).

4. Contrasts between two sets of studies were computed with the formulas below where 1 and 2 refer to each set of studies, respectively (Hasselblad and Hedges, 1995, p. 174):

$$\begin{aligned} z &= (d_{\text{combined } 1} - d_{\text{combined } 2}) / \text{sqrt}(\text{variance } d_{\text{combined } 1} + \text{variance } d_{\text{combined } 2}) \\ 95\% \text{ CI: } &(d_{\text{combined } 1} - d_{\text{combined } 2}) \pm 1.96 * \text{sqrt}(\text{variance } d_{\text{combined } 1} + \text{variance } d_{\text{combined } 2}) \end{aligned}$$

Fail safe number (N) where k is the number of studies in the analysis (Mullen and Rosenthal, 1985, p. 53):

$$\begin{aligned} N_{(p=.05)} &= (\Sigma z_{\text{study}} / 1.645)^2 - k \\ \text{where } z_{\text{study}} &= r_{\text{study}} * \text{sqrt}(N_t + N_c) \text{ and } r_{\text{study}} = d_{\text{study}} / \text{sqrt}(d_{\text{study}}^2 + 4) \end{aligned}$$

Study Summaries

The summaries are organized by intervention type. T = Treatment; C = Control

Parents Read to Child				
Intervention	Participants		Reading measures	Results
	Number	Characteristics		
<i>Foster & Bitner (1998)</i>				
Parents were encouraged to read aloud to their children daily. They were also instructed on appropriate reading practices such as how to read aloud effectively to their children, appropriate book choice, etc.	T: 19; C: 16	Children were at-risk for future difficulty because of their low socioeconomic status.	An Observation Survey of Early Literacy Achievement (Clay, 1993)—alphabet	T > C
<i>Jordan, Snow, & Porche (2000)</i>				
Parents engaged in scripted parent-child interactions and extended book-related discussions with their children around specified themes.	T: 177; C: 71	No information provided	Comprehensive Assessment Program	T > C
Parents Listen to Child Read				
<i>Hannon (1987)</i>				
Teachers encouraged parents to listen to their children read aloud to them up to five times per week and sent home handouts that outlined suggestions for reading.	T: 76; C: 81	No information provided	NFER (Reading Test A)—reading comprehension Young's Group Reading	T > C

Parents Listen to Child Read				
Intervention	Participants		Reading measures	Results
	Number	Characteristics		
<i>Leach & Siddall (1990) Study 1^a</i>				
T: Parents were trained to use the paired reading procedure. C: Parents listened to their child read and had received a brief summary of suggestions for helping their child read at home.	T: 10; C: 10	Normal beginning readers participated. Their mean age was 5 years and 7 months.	Neale: Accuracy & Comprehension	T > C
<i>Miller, Robson, & Bushell (1986)</i>				
Parents were trained to use the paired reading procedure.	T: 33; C: 21	Children had a deficit of more than 18 months in reading age and their mean chronological age was 9 years and 10 months.	Neale: Accuracy & Comprehension	Accuracy: T > C Comprehension: T = C
<i>Tizard, Schofield, & Hewison (1982)</i>				
Parents listen to their child read. Researchers visited parents and children in their homes 2-3 times per term to observe the children reading to their parents and to provide suggestions regarding good reading practice.	T: 51; C: 86	The sample was multiracial and almost entirely working-class.	Pretest: Southgate Group Reading Test; posttest: NFER Test A	T > C
<i>Wilks & Clarke (1988)</i>				
T: Parents were trained to increase the use of meaning, context, and phonic cues when listening to their child read. C: Mothers in the encouraged group received the same training as the trained mothers received in the first two hour-long sessions, but did not attend the third and fourth training sessions. Mothers in the control group received no training.	T: 14; C: 28	Children aged 8 to 9 years who were average or below average readers.	Neale: Comprehension (Accuracy results not used for lack of information necessary to compute ES).	T > C

Parents Teach Child to Read				
Intervention	Participants		Reading measures	Results
	Number	Characteristics		
<i>Faires, Nichols, & Rickelman (2000)</i>				
Parents were trained with the Reading Recovery model (Clay, 1985). It included rereading two or more unfamiliar books, letter identification, writing a sentence or a story, reassembling a cut-up sentence or a story, and reading a new book.	T: 4; C: 4	No information provided	Word recognition	T ≥ C
<i>Kraft, Findley, Major, Gilberts & Hofmeister (2001)</i>				
Parents were trained to choose a suitable reading environment, teach letter-sound correspondence and blending of letter sounds, and methods of error correction.	T: 20; C: 23	Children between the ages of 5 and 6 with no reported learning difficulties. Parents were highly educated and of middle-class socioeconomic status.	Woodcock: Word recognition & Word attack	T > C
<i>Leach & Siddall (1990) Study 2^a</i>				
T: Parent training was derived from <i>Teach Your Child To Read in 100 Easy Lessons</i> (TYCTOR, Englemann et al., 1983). C: Parents were trained to use the pause, prompt, praise technique when they listened to their child read.	T: 10; C: 10	Normal beginning readers participated. Their mean age was 5 years and 7 months.	Neale: Accuracy & Comprehension	T > C

^aIn the meta-analysis, the two conditions that were most intensive were assigned as treatments and the two remaining conditions were randomly assigned as control conditions.

Parents Teach Child to Read				
Intervention	Participants		Reading measures	Results
	Number	Characteristics		
<i>Meltran & White (1988)</i>				
A parent-implemented tutoring program for struggling readers. The program, adapted from <i>Reading Made Easy</i> (Harrison, 1981), included basic procedures for teaching sounds and letters, basic sight words, blending of sounds, and decoding words. It provided tutoring techniques and suggestions for reading activities.	T: 38; C: 38	At-risk for reading difficulties; age 7; matched on a teacher-administered test of reading competence.	Woodcock-Johnson: composite	T ≥ C
<i>Niedermeyer (1970)</i>				
A parent-assisted learning program that gave classroom-related practice to children at home. The program used practice exercises to learn to read one-syllable words, recognize and say beginning consonant sounds and vowel-consonant ending sounds, and blend previously-learned beginning and ending sounds.	T: 68; C: 80	Schools were located in a middle-class, suburban area.	Graphemic knowledge	T > C
<i>Searls, Lewis, & Morrow (1982)</i>				
In the Parents as Tutors program, parents learned various methods of implementation such as games and reading activities, and they were given a detailed handbook about pre-reading skills and methods of teaching these skills. The intervention included the use of weekly calendars containing daily activities designed to reinforce reading skills taught at school.	T: 25; C: 25	Grade 1 students matched on pre-reading skills test scores, age, sex, race, and socioeconomic status.	MAT: composite	T > C
<i>Vinograd-Bussell & Bussell (1987)</i>				
Parents implemented a home tutoring program requiring no direct parent-educator interaction. Parents received a package containing 20 word cards and instructions on how to use them.	T: 67; C: 69	No information provided	Word recognition	T > C

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