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Approaches to Parent Involvement for Improving the Academic Performance of Elementary School Age Children

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Campbell Systematic Reviews

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Cover Sheet

Title

Approaches to Parent Involvement for Improving the Academic Performance of Elementary School Age Children

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Background

Introduction

The impact of parent involvement in a child's growth and development is generally accepted (Sheldon, 2003). However, educators, parent groups, and policy makers continue to debate the issue of whether or not parent involvement has a beneficial effect on the academic achievement of children (Epstein, 2001). A key element in these debates is how parent involvement is defined (Epstein, Sanders, Simon, Salinas, Jansorn, & Voorhis, 2002). Therefore, it is important to understand how parent involvement is defined before conclusions are drawn on the impact of parent involvement. In addition, it is important to understand what aspects of parent involvement have the greatest impact and whether the impact is consistent across children characteristics such as socioeconomic status, race, and the child's grade level, age, and gender. During the past several decades, there have been numerous primary studies investigating various aspects of parent involvement and the effect it has on children's learning. The No Child Left Behind Act (NCLB) has served to focus attention on the need and importance of parent involvement in their child's education.

This systematic review synthesizes findings from this research. For this review, parent involvement is defined as the active engagement of a parent with their child outside of the school day in an activity which centers on enhancing academic performance. This review is intended to provide evidence to policymakers that can guide their decisions about the level of investment in parent involvement, to educators that can guide the development of parent involvement programs for their school improvement plans, and to researchers in designing studies to rigorously investigate the effectiveness of parent involvement for improving elementary school children's academic performance in schools.

Findings from Primary Studies

The role that parents play in the academic achievement of their children has long been thought to be a centrally important one. However, it was not until the 1960's that the effects of programs designed to foster the role of parent involvement were systematically studied using an experimental design. Evaluation of the Head Start Program in the United States focused nationally on outcomes related to parent involvement (Coleman, Campbell, Hobson, McPartland, Mod, Weinfeld, & York, 1966). The results of this evaluation suggested a substantial relationship between the parent's involvement in their child's education and their child's success in academic domains. Subsequent studies supported the findings from Coleman, et al. (Duff & Adams, 1981; Henderson, 1987; 1988). Even so, quantitative evidence on the effect of parent involvement on student achievement has been mixed. For instance, researchers have reported effect sizes ranging from positive to negative to no significant differences between experimental and control groups (Griffith, 1996; Heller, & Fantuzzo, 1993; Henry, 1974; Keith, Reimers, Ferman, Pottenbaum, & Aubrey, 1986; Ryan, 1964; Searles, Lewis & Morrow, 1982).

Some of the discrepancies across studies can be explained by the nature of the data collection and research design. For example, some investigators studied the relationship between parent involvement and a child's school success using direct observation

(Arbuckle & MacKinnon, 1988), surveys or questionnaires, or both (Edwards & Warin, 1999). Other investigators mounted traditional experimental designs to compare student performance across randomly allocated groups (DeBaryshe, 1993; Woods, Barnard, & TeSelle, 1974).

Another potential source of discrepancy in the findings across studies relates to outcomes measured. Specifically, a variety of dependent variables have been reported in studies on parent involvement including reading achievement (Epstein, 1987; 1991; Tizard, Schofield, & Hewison, 1982; Trovato & Bucher, 1980; Walberg, Bole, & Waxman, 1980; Woods, Barnard, & TeSelle, 1974), math achievement (Fantuzzo, Davis, & Ginsburg, 1995; Heller & Fantuzzo, 1993; Morgan & Sorensen, 1999), and perceptual skills training (Garrison, 1977). Furthermore, differences in study findings and the conclusions often do not take into account other important factors that can affect the validity of study findings such as the reliability of scales and tests; controlling for important child background characteristics such as grade, age, socioeconomic status (SES); and controlling for important parent background characteristics such as SES, education and training (Reynolds, Weissberg, & Kasprow, 1992).

In addition, researchers have defined parent involvement differently or so broadly that it is difficult to understand how to measure it consistently. For example, one group of researchers defined parent involvement as parent participation in educational activities at both school and home (Christenson, Rounds, & Gorney, 1992). Epstein (1987) suggested that parent involvement is multi-dimensional and included: (1) parents providing a home environment that supports learning, (2) communication between parents and teachers on classroom performance, (3) parent's active attendance at school activities such as PTA, (4) parent's engagement and monitoring of home learning activities, and (5) parent's participation in school-based decision making such as school committees.

Typically, the study of parent involvement in home-school environments has identified educational activities that ranged from parent participation in parent-teacher organizations and conferences to specific training in activities designed to enhance an academic skill such as reading or math proficiency. The vast majority of the studies on parent involvement have focused on elementary school age children (Keith & Cool, 1992). Most schools in the US and abroad have some component of parent involvement integrated into a child's daily activities. Thus, differentiating the effects of parent involvement from other factors that affect student achievement can be difficult.

Findings from Narrative Reviews

In addition to the many primary studies on the statistical relationship between parent involvement and student achievement, several narrative summaries of parent involvement have been published over the past 20 years. Gordon (1977), for example, reviewed parent involvement programs and proposed a three dimensional model: (1) Parent Impact, (2) School Impact, and (3) Community Impact. Gordon's summary indicated that all three models produced positive effects, however, the summary was made without a quantitative analysis of the degree or nature of the intervention effects for any model. This narrative

summary provided promising framework to further examine the effect of parent involvement on their children's academic performance.

In a more comprehensive review than Gordon's (1977), Christenson, Rounds, and Gorney (1992) examined over 160 studies that described variations on parent involvement. These reports focused on family components of parent expectations and attributions, structure for learning, home affective environment, discipline, and parent involvement. Christenson, et al. concluded that while there is a positive correlation between student achievement and parent components, there are background variables underlying parent involvement components and student achievement. That is to say, the influence of other variables such as SES, ethnicity, or gender had not been adequately accounted for while studying the interactive nature of the intervention of parent involvement and student achievement.

In a recent synthesis, Mattingly, Prislin, McKenzie, Rodriguez, and Kayzar (2002) reviewed a total of 41 studies described as 'evaluations' of parent involvement programs. While this review did not provide a meta-analytic summary of these studies, the authors concluded that there was little evidence to support the efficacy of parent involvement programs to improve student achievement. Mattingly, et al. indicate that their results do not suggest that parent involvement programs are not effective but that the quality of the evidence is compromised due to methodological weaknesses.

Findings from Meta-Analyses

The first meta-analysis on the topic of parent involvement was conducted by Graue, Weinstein, and Walberg (1983) who quantitatively synthesized 29 empirical studies with various types of study designs conducted from 1970-1980 that focused on parent involvement and student academic success. Graue, et al. assessed a wide variety of parent involvement studies without specifically measuring the effect of a particular type of parent involvement, such as joint book reading or homework. Graue, et al. concluded that there was a significant academic advantage for those children whose parents participated in their child's educational program. However, the researchers did not investigate study design type (e.g., experimental versus quasi-experimental) or intervening variables (e.g., length of parent involvement).

Several meta-analyses have been reported in the area of parent involvement and can generally be categorized into one of two types of studies: correlational meta-analyses that assess the nature of the relationship between parent involvement activity and measured outcomes; or intervention effect meta-analyses that assess the impact of a formal program to change measured outcomes. We recognize that several correlational meta-analyses have contributed much to our understanding of the nature of the contributing variables and conditions. Rosenzweig (2000) assessed the association between parent practices and school success across 34 studies representing seven classes of outcome variables. She concluded that the 20 specific parent practices could account for 23% of the explained variance in children's academic performance. No attempt was made to address the causal impact of parent involvement on student achievement.

Similarly, Fan and Chen (2001) reviewed 25 studies that focused on the relationship between parent involvement and academic performance. They found that the overall strength of relationship was modest r=.25 but non-trivial. Fan and Chen's review focused on a correlational analyses rather than an intervention effect summary.

These correlation meta-analyses have certainly painted a fuller picture of the nature of parent involvement in improving the academic performance of children. However, two recent intervention effect meta-analyses were reported that provide an ongoing summary and discussion of the intervention effects of parent involvement programs (Jeynes, 2003; 2005). In the 2003 review, Jeynes examined the effect of various types of parent involvement on academic outcomes for minority students. Parent involvement was broadly defined as ranging from parent expectations of academic success to parents attending or participating in school functions.

This important meta-analysis significantly advanced the understanding of the effects of minority parent involvement on student achievement from an intervention or programmatic perspective. Jeynes conducted an extensive literature search of some 25 databases that produced 26 potential studies of which 20 had useable data and were included in the meta-analysis. Four different measures of academic achievement were identified for the review including a composite of the three academic measures. Jeynes found substantial positive effects of parent involvement for African Americans (d=0.31), Latinos (d=0.48), and Asians d=0.22). While the author did provide discussion regarding validity issues for the cohort of studies, no specific analysis of the quality of design was conducted as part of the meta-analysis.

In 2005, Jeynes reported a second study of the effects of parent involvement programs in which a total of 41 studies were coded and analyzed to address four research questions focusing on the general question of the degree to which parent involvement can improve educational outcomes for urban children. This study provided a more detailed expansive analysis of parent involvement programs by addressing important methodological issues of design, controls, and transparency of effect size calculations. Further, he provided an analysis of differences associated with the more direct parent involvement programs compared to the voluntary or pre-existing programs. While this review did provide for an assessment of the impact of what he termed "sophisticated controls" a more detailed analysis of the experimental design characteristics would seem warranted.

The Need for a Systematic Review

The weight of evidence for parent involvement as a mechanism for improving academic performance in children has been generally accepted but difficult to assess. Narrative reviews have included bibliographic searches and annotated bibliographies. Most concluded that there was a positive result for children whose parents were involved in their academic learning. However, one may question the validity of these conclusions given that the reviewers must subjectively evaluate numerous study characteristics and outcomes. (Bronfenbrenner,1974; Fantini, 1979; Henniger, 1979). Certainly some summaries such as Mattingly, et al. (2002) have produced conclusions contrary to others in the field (Jeynes,

2002, 2005). In addition many of the primary studies reported in the literature were more qualitative than quantitative. Even among the quantitative studies, the evidence is not clear and consistent as to whether parent involvement has a positive, negative, or null effect on elementary school age children's academic achievement. The reason for the lack of clarity is that researchers often have relied on retrospective surveys, correlational studies of existing conditions, and anecdotal observations of both the quality of parent involvement and student achievement.

We cannot turn to the two meta-analyses on the topic to reconcile the mixed conclusions reported in primary studies, because of their methodological limitations. At best, these meta-analyses *suggest* that parent involvement has a positive effect on achievement.

The purpose of this review is to apply a set of a priori systematic procedures leading to a meta-analysis of studies with adequate controls to produce the least biased estimate of the effect of parent involvement on student achievement. To control for variation in threats to internal validity of a particular study design, we limit our review to studies that include at least two groups and use random assignment to form a fair comparison between groups. In other words, we limited our review to studies that use a randomized controlled trial (RCT) design.

Objective

This review's objective is to summarize the most dependable evidence on the effect of parental involvement intervention programs for improving the academic performance of elementary school age children. The most dependable evidence is defined as studies that include at least two groups and use random assignment to form a fair comparison between groups.

Method

Information Retrieval

Following the policies and guidelines in the Campbell Collaboration's *Information Retrieval Methods Group (C2 IRMG) Policy Brief (2004)*, we considered the following information retrieval tasks and related activities:

a. Electronic Searches of Databases,
b. Hand Searches of Journals,
c. Contacting the Invisible College, and
d. Contributing to C2-SPECTR.

For the electronic searches, we documented our search strategies as recommended in the C2 IRMG Policy Brief by presenting tables that contain the following information:

a. Database Searched
b. Database Supplier (e.g., Ovid),

c. Time Period Searched (e.g., 1966 to 2003),
d. Search Strategy, and
e. Other notable features (e.g., whether database access required a subscription or whether the search was conducted in another language).

The purpose of this documentation is to enable other researchers to replicate our searches. Prior to searching, we consulted with Anne Wade, the Education Coordinating Group's Information Retrieval Liaison and Alan Gomersall and Lesley Grayson of the UK Center for Evidence Based Policy and Practice. They provided feedback on our target list of databases to search and on our search strategies used with these databases. A number of the databases on this list required special access, especially those outside the US. Anne Wade and Lesley Grayson searched those databases on our behalf.

Electronic Searches of Databases

We began with a search of 27 electronic databases. The purpose was to be as comprehensive as possible and thereby reduce bias in the search for evidence. Our information retrieval experts advised that we include databases most likely to catalog studies on parent involvement. We then modified the list by removing some databases and adding others. For each database, we used the following search keywords to locate potentially relevant studies for the review:

- Intervention Keywords: [1] parent* Involvement, or parent* participation, or parents-as-teachers, or parent* effectiveness, or parent* effectiveness training, or parent-child relationship, or parent* education;

- Outcome Keywords: reading, or literacy, or math*, or writing, or spelling, or science;

- Target Population Keywords: child*, or pre-school, or preschool, or school age*, or school-age*, or elementary school, or elementary-school, or elementary grades, or elementary-grades

We modified these terms to conform to each database's thesaurus, when a thesaurus was available, and to ensure that the universe of appropriate synonyms had been used during the search. Search term syntax was adapted to the requirements of specific databases. The process of locating relevant studies for review was iterative. Thus, for some database searches the final search strategy contained far fewer terms than those presented above.

Table 1 presents the results of our search of 27 databases supplied by entities in the United States, Canada, China, and the United Kingdom. Our intent was to include databases supplied by entities in other countries such as France and Germany. However, access to these databases (such as FRANCIS and SOLIS) was restricted to fee-paying subscribers. Still, as Table 1 shows, our search was comprehensive enough to retrieve over 800 citations with PsycINFO and ERIC yielding the highest number of citations at 205

[1] The asterisk represents a wildcard term such that the "parent*" term will search for "parent" and "parents" and "parental."

and 191, respectively. On average, our search strategy retrieved 30 citations per database.

We searched databases such as ERIC, Chinese ERIC and PsycINFO, and discovered that they catalog a significant amount of grey literature which consists of unpublished reports such as dissertations, organizational reports, and government documents. In addition, a number of databases that we searched, such as Social Science Research Network, Index to Theses, and Digital Dissertations only catalogued grey literature. Our ability to expand our searches to databases that catalog grey literature, especially those in Europe, was limited because most of these databases required a subscription.

Hand Searches of Journals

Parental involvement is an interdisciplinary topic and studies on it are published in a wide variety of journals. Originally, we planned to conduct hand searches of specific journals based on the number of randomized controlled trials published in a particular journal as identified through our searches. However, the majority of the randomized controlled trials were identified in the grey literature (dissertations specifically) for which hand searching is not possible. The randomized control trials we identified in academic journals were widely distributed across journals such that a hand search was neither an efficient nor a cost-effective use of human or economic resources.

Contacting the Invisible College

Previous research in the social sciences (Glass, 1981) and more recent research in the health sciences (Hopewell, Clarke, Lusher, Lefebvre, & Westby, 2002) have shown that including grey literature in a meta-analysis can reduce bias. How much bias is reduced will vary according to the amount and quality of the grey literature excluded from the review, and the review topic (Egger, Juni, Bartlett, Holenstein, & Sterne, 2003). For instance, unpublished studies reside in the file cabinets of researchers because the results of the study were not statistically significant. These, are particularly difficult to obtain without personal communication. To identify such studies, an email was sent to over 1,200 scholars, researchers, policymakers, and practitioners worldwide informing them of our review and requesting a referral to a potentially relevant study, a person who might know of such studies, or an organization that sponsors, conducts, or has an interest in parent involvement studies.

Seventy members of the invisible college responded to the email campaign. Of these, 17% (12/70) referred us to a study; 10% (7/70) referred us to an organization; and 70% (49/70) referred us to a researcher. Ten percent expressed interest in the review and requested a copy of the published version.

When respondents emailed us the full-text for a study, we included the study in the initial screening pool and reviewed the reference list for additional leads. When respondents emailed us a citation, we searched the appropriate database to retrieve the abstract and if it was relevant retrieved the full text for further screening. To follow up on referrals to

organizations and researchers, we sent the same email and followed the same process as when studies were referred to us.

None of the referrals led to our identifying a randomized controlled trial. However, we did collect a list of researchers, policymakers, and practitioners that expressed an interest and requested a copy of the final review.

Contributing to C2-SPECTR

All citations of studies identified during the information retrieval phase of this review and identified as a RCT or systematic review (that could have references to RCTs) were denoted as such with an asterisk in the tables of included and excluded studies. Studies not relevant to this review might be relevant to other C2 reviews and therefore are relevant for inclusion in the Campbell Collaboration's web-based Sociological, Psychological, Educational, and Criminological Trials Register (C2-SPECTR). As recommended in the IRMG Policy Brief, these tables will be forwarded to the person in the Campbell Collaboration currently responsible for cataloging studies in C2-SPECTR.

Definition of Parent Involvement

The area of parent involvement has been studied under at least three different rubrics: involvement, programs, and interventions. Further, there is a distinction between the 'voluntary' or 'support' aspects of parent involvement such as school visits, and the more direct activities such as the parent reading with the child. This review uses a focused definition of parent involvement that reflects the implementation of a program in which the parent has a direct interaction with the child in either the delivery or monitoring of the program of intervention. Further, since both Mattingly, et al. (2002) and Jeynes (2005) use the term 'program' rather than intervention to describe the experimental condition we will use the term program to refer to what may be typically thought of as the 'parent involvement intervention or approach'.

Inclusion Criteria for Studies

Included studies reported the following characteristics of the intervention program: 1) Parent involvement with their child in academic support activities outside of school (e.g., reading or completing supplemental math problems with the child), and 2) Parent involvement (as defined in "1.") for a minimum of 20 days.

Included studies reported the following outcomes on children's academic performance in:

- reading,
- mathematics,
- spelling,
- writing,
- language arts, or

- science.

All included studies assigned participants to an experimental group and control (or comparison) group to create a fair comparison. A control group was defined as a non-intervention condition whereas a comparison group was defined as an alternative intervention condition.

This review was limited to RCTs in order to provide the least biased estimate of the effect of parent involvement on student achievement and to control for variation in threats to internal validity. Glazerman, Levy, & Meyers (2003) have demonstrated that compared to RCTs quasi-experiments tend to produce biased results and found it difficult to identify an aggregation strategy that removed that bias. In all that follows, a randomized trial is defined as a trial in which the participants were assigned prospectively to one or more alternative forms of intervention using a process of random allocation such as a random number generation or coin flip.

Once all potentially topic-relevant and research-design appropriate studies were retrieved, two reviewers evaluated each study independently for inclusion in the review. If there was a disagreement on the inclusion of a study, the source of the disagreement was identified and reconciled to a final decision. If a final decision still could not be reached, the full-text version of the study was submitted to the third reviewer for a decision. Reviewers were not blinded at any level of review to the name(s) of the author(s), institution(s) or publication source**.**

Retrieved studies were initially screened for topic relevance and research design quality based on the title and abstract. If the study's topic relevance or research design appropriateness could not be ascertained from the title or abstract the full text version of the study was retrieved. Differences of screening decisions were resolved by discussion of the two reviewers. If a final decision still could not be reached, the full-text version of the study was submitted to the third reviewer for a decision.

Coding Categories for Included Studies

Two reviewers independently coded each study for the characteristics that follow.

Design Characteristics

We evaluated the following characteristics of included randomized controlled trials (RCTs) in the review based on the following criteria if reported:

- Method of random assignment
- Attrition (overall and differential)

Two reviewers evaluated each study for attrition rates. Attrition rates were calculated based on a reduction of the number of participants from the pre-intervention to the post intervention measures. Studies were coded for the percent of participant attrition for both intervention and control groups.

Participant Characteristics

Each study reported data on a minimum of five participants in both experimental and control (or comparison) groups. The minimum number of group participants was selected in order to maintain the interpretability of the mean and standard deviation that were used in effect size and standard error calculations. Specific child participant characteristics for both the experimental and control (or comparison) groups were coded to include the following:

- Age
- Grade
- Gender
- Number of Participants
- SES
- Ethnicity

Intervention Characteristics

All intervention programs were implemented for a minimum of 20 school days (or four weeks) as this was considered to be a potentially minimally meaningful length of time that a school based program might be implemented and reflect substantive results. No studies were excluded due to length of the intervention program. All intervention programs involved planned and consistent direct contact between the parent(s) and child in an educational activity outside the school-day setting. Studies in which parents were engaged in a classroom activity as an aide or support personnel were excluded from the review. In addition, intervention programs that measured parent involvement for participation in school-related activities such as parent teacher organization meeting, school program attendance, or home visits were also excluded from the review.

We chose a focused inclusion and exclusion criteria for the intervention program for several conceptual reasons. First, it is the case that many parents work during the school day. A comparison of parent involvement activities occurring during the school day could potentially confound outcome interpretation of studies in which parents were not able to participate during schools hours. Secondly, we were interested in the *direct* impact of parent involvement on achievement and we viewed supportive activities as an *indirect* intervention program. We recognize that these 'support' activities are potentially important and viable strategies for improving children's academic performance and warrant further consideration.

The following approaches to parent involvement were identified in this review.

- Collaborative reading: Parents and children reading together as a structured activity.
- Education and training: A specific program designed to provide parents with appropriate teaching or support skills-based activities, materials, or information to be used with their

child outside the school day.

- Education and training in math: Specific program to provide parents with specific math skills to be applied to activities, materials, or information used with their child outside the school day.
- Education and training in science: Parents participate in workshops designed to guide parents on how to engage in specific science activities with their child.
- Math games: Parents use card and dice games that illustrate specific math skills.
- Reading games: Non-specific parent-child game activities that involve reading tasks.
- Parent rewards & incentives: Parents provide rewards or incentives to their child outside the school day for the child's performance in school.

Outcome Characteristics

Outcome measures for each intervention program contained a quantified assessment of educational performance using norm reference tests, criterion referenced tests, or rating scales of academic performance with appropriate evaluation of each measure's psychometric properties.

Timing of Outcome Measurement

Outcomes were measured at various points in time after the intervention was completed. Only those outcomes reported immediately post-intervention were included in the calculation and synthesis of the intervention's effect.

Data Extraction

Two reviewers extracted data from articles independently using a coding form to classify study methods, participant characteristics, intervention program characteristics, and outcomes. Uncertainty and disagreement between the two coders were resolved through discussion and consultation. If agreement could not be reached, a third reviewer was an arbiter. Consensus was reached for all coded studies in their final form reached consensus. If further information (e.g., missing data for effect size computations) was required in order to conduct appropriate analyses of outcomes, the first author of the study was contacted. When the requested data could not be obtained from the first author, the study was excluded from the analysis.

Effect Size Computations

Effect sizes from studies reporting continuous outcomes were calculated under the assumption of independent groups. Appropriate formulas, as documented in CMA 2.0,

(citation) were used to calculate a standardized mean difference with a small sample correction (Hedges g) from the following types of data:

- Post-test Means, Standard Deviations, Sample Size
- Difference in Post-test Means, Common Standard Deviations, Sample Size
- t-statistic, Group Sample Size
- Difference in Post-test Means, Common Variance, Group Sample Size

The formulas were implemented using CMA 2.0 (citation).

Synthesis of Effect Sizes

All studies reported outcomes on a continuous scale from posttest measures. Using the standardized mean difference (e.g., Hedges's *g)*, an effect size from each study was weighted by the inverse variance and averaged to arrived at an overall effect size[2]. For studies with multiple effect sizes, only one effect size per study was included in the synthesis. For example, when a study reported multiple outcomes for the same "intervention vs. control group" comparison, the resulting multiple effect sizes were averaged within that study, when conceptually appropriate, to arrive at a single effect size. When a study involved more than two groups, which allowed for multiple comparisons, only the "intervention vs. control group" comparison was used to arrive at a single effect size for that study.[3]

Homogeneity Analysis

A homogeneity analysis examined whether the variation in a set of effect sizes may be attributed to sampling error alone or to other factors. Data synthesis was conducted using both a fixed and random effects models and report the results of both were reported but rely on the random effects model data was relied on to interpret findings. Under the random effects model, the estimates vary from study to study because of differences among the study population parameters (between-studies variation) and the sampling of different subjects within the study populations (within-study variation). Results from the random effects model allow for inferences to the population of studies from which the set was sampled in which case results of the data synthesis can be extrapolated beyond the studies included in the meta-analysis (Kline, 2004).

Sensitivity Analysis

We tested the robustness of our meta-analytic results to any one study in the meta-analytic portfolio of studies through a sensitivity analysis. The one study removed analysis

[2] This weighting gives more precise studies (e.g., studies with larger sample sizes) greater weight than less precise studies in the average effect size.

[3] There were some studies included in the review for which there were more than one intervention group in which case there were multiple "intervention vs. control" group comparisons within a study (that were eligible for inclusion in the synthesis). In these cases, the resulting multiple effect sizes were averaged within the study to arrive at a single effect size.

assessed how the effect size changes with one study removed relative to the average effect size with all remaining studies included.

Publication Bias

To assess publication bias, we used the trim and fill procedure and visually inspected the resulting Funnel Plot (Rothstein, Sutton, and Borenstein, 2005).

Incomplete Reporting of Study Data

RCTs that met our inclusion criteria reported enough information to compute effect sizes. If information reported in an RCT was insufficient to compute an effect size, we attempted to contact the author(s). For example, we contacted the author of one study but the author was unresponsive. In a second instance, we were unable to locate the author or anyone who could assist us. In both cases, we excluded the studies from the analysis, rather than replacing the missing effect size value with zero which Pigott (2001) has shown to be an inappropriate option. This option tends to underestimate the effect size variance and can lead to incorrect inferences.

Post Hoc Subgroup and Moderator Analyses

As part of the meta-analysis, we conducted a sub-group and moderator analysis to examine differences in the average effect sizes by the following study-level characteristics: 1) Method of Parent Involvement and 2) Publication Type. Meta-Regression was used to assess the relationship between length of intervention and effect size.

Results

Descriptive Statistics for Included Studies

Nineteen RCTs met the inclusion criteria for the systematic review. One study, Phillips (1990), did not advance to the analysis stage because of a mismatch between the unit of assignment (schools) and the unit of analysis (students). Because outcomes were analyzed at the student level but the students were nested within the randomly assigned classrooms, their achievement measures were not independent. The remaining eighteen studies were published between 1964 and 2000 with the majority published as dissertations (67%). Most of the lead authors were female (83%).

The length of the parent involvement intervention programs ranged from 4 to 104 weeks with a mean of 23.2 weeks and a median of 10.5 weeks. The discrepancy between the mean and median was due to 1 study reporting 104 weeks of intervention. The most frequently reported method of parent involvement was collaborative reading (n = 8) followed by education and training (n = 4).

Of the studies that reported the socioeconomic status of the parents, 73% were from mixed SES, 9% were from middle SES and 18% were from lower SES. Of the studies that reported the ethnicity of the child, 25% were African American, 25% were Caucasian and

50% were of mixed ethnicities. Most of the intervention programs involved a mix of primary grades (47%) while 11% involved kindergarten, 11% involved first grade and 21% involved second grade; the remaining 10% were not reported.

All but one study was conducted in public schools (one study's school type was unreported) with twelve studies reporting a school location of suburban, urban, or rural. The majority (85%) were conducted in the United States while 10% were conducted in the UK and 5% were conducted in Canada. Most studies exhibited no differential attrition (70%).

Meta-Analysis of Included Studies

General Effects of Parent Involvement

We first assessed the general effects of parent involvement without respect to particular outcome domains. That is, we answered the general question, "Does PI result in an improvement in children's academic performance?"

This analysis suggests that parent involvement intervention programs of the kind reviewed here have a positive and significant effect on student achievement at the global level. Figure 1 shows the average effect of parent involvement on elementary school-age children's achievement across the domains of reading, math and science under fixed and random effects models. Figure 1 illustrates that this average effect was d= 0.43 using a fixed effects model.

When the 95% confidence interval for this effect size is considered, we observe that the average effect of parent involvement on achievement ranges from d= 0.30 to 0.56 and is statistically significant. This means that academic performance of children in the parent involvement group was approximately half a standard deviation higher than the academic performance of children in the control group.

A test of heterogeneity for the average effect size was applied to asses the amount of variability in study effect sizes beyond sampling error. The test produced a significant Q value of ($Q = 35.6$, df 17, $p < .01$) which means the variability in the effect sizes can be attributed to factors other than sampling error alone.

Another way to express the heterogeneity of effect sizes is by using an I^2 value to quantify variation in effect sizes beyond sampling error. Under the fixed effects model, 52% of the variability of the effect size was beyond what was expected from random error (i.e., within study sampling of subjects). Thus, all subsequent results are reported using the results from a random effects model although we present effects sizes from both types of models so the reader can compare the results from both.

Under the random effects model, the overall achievement effect of parent involvement increased slightly to d=0.45 as did the confidence interval (95% CI =.025 to 0.66). These results further support the positive and significant impact of parent involvement on children's academic performance across achievement domains.

Publication Bias

Figure 2 shows that the 18 studies conform to the shape of the funnel plot are clearly symmetrically distributed around the vertical line that divides the funnel plot in half. This symmetry suggests the absence of publication bias. Further, when we applied the Trim and Fill analysis to these data (which trims excessively large studies and imputes small studies that are allegedly missing), the recomputed average effect size, displayed as the second diamond at the bottom of the funnel plot, does not change. These analyses show that the observed effect size of d=0.45 is based on an unbiased set of studies.

Sensitivity of Average Effect Size to One Study

A sensitivity analysis is important because it tells whether the positive average effect size of parent involvement was skewed by an exceptionally large effect size from any one study. For example, in the Heller (1993) study we found an effect size of 1.5. This effect size is three times as large as the average effect size of d=0.45 for all eighteen studies. Using the one study removed analysis, we assessed the average effect size and its corresponding confidence interval when each individual study's effect was removed from the average effect size calculation.

Figure 3 illustrates that the removal of any one study from the average effect size computation has little impact on the resulting effect size point estimate and its associated confidence interval. For example, Figure 3 also illustrates that when the Heller (1993) study is removed from the meta-analysis, the average effect size reduces to d=0.38 (95% CI = 0.26 to 0.53). Removing the Powell-Smith study which had the largest negative effect size increased the effect size slightly to d=0.45 (95% CI = 0.32 to 0.58). This analysis suggests that the average effect of d=0.45 on children's academic performance is not substantially impacted by one particular study.

Cumulative Analysis of the Effect of Parent Involvement

The results from the meta-analysis up to this point show that effect of parent involvement on achievement is *positive, statistically significant, and stable* with respect to the removal of any one study. The 18 studies in the meta-analysis embody 40 years of research resulting in an average effect of parent involvement on children's academic performance of d=0.45. We were intrigued by the following question: "In what year would we have discovered that the cumulative effect of parent involvement was positive if we had tracked the reporting of these studies?" To address this question, we conducted a cumulative analysis which adds the effect and sample size of the second study to the first. The effect of each subsequent study (i.e., the third, fourth, fifth, and so on) is then added to the cumulative effect (and sample size) of the preceding studies until all study effects and sample sizes have been aggregated.

Figure 4 presents the results of the cumulative analysis. Figure 4 reveals that if researchers had tracked effect sizes of RCTs on parent involvement since the first study was reported in the literature in 1964, they would have discovered that by 1971 the cumulative effect of

parent involvement was positive and statistically significant. This effect has remained unchanged for more than three decades.

We turn now to examine the effect of parent involvement on the specific areas of reading, math, and science achievement.

Specific Effects of Parent Involvement

Reading Achievement

The achievement outcome most frequently reported for the included studies was reading which was assessed using norm and criterion referenced instruments. Results, summarized in Figure 5, are similar to those previously discussed for the effects of parent involvement on achievement in general. The average effect of parent involvement on reading achievement is positive and slightly larger than d=0.42 and statistically significant (95% CI = 0.18 to 0.66).

How sensitive was the average effect size for reading to the average effect size for any one study? Figure 6 shows that the average effect size is robust to the removal of any one study's effect size. The one study removed analysis produced effects within the range of d=0.37 to 0.49. In addition the confidence intervals associated with these effect sizes remained constant across the analysis.

Math Achievement

We reviewed RCTs that test the effects of parent involvement programs on children's math performance. Figure 7 shows that the point estimate for the average effect size in math achievement was d=0.54, borderline statistically significant, and substantially less precise (95% CI =0.02 to 1.07) than effect sizes for achievement in general and reading achievement in particular. The average effect size in math achievement reflected a substantial amount of heterogeneity in study effect sizes (I^2 = 67.9%).

Figure 7 also shows that one study, Heller (1993), exhibited an effect size of d=1.50 (95% CI = 0.88 to 2.11) that is substantially larger than the effect size for each of the other four studies. When the effect size for Heller (1993) is Windsorized, Figure 8 shows that the average effect size is reduced to d=0.34.and is statistically significant (95% CI = 0.06 to 0.62).

Science Achievement

Only one study included in this review, Kosten (1997), focused on children's performance in science and revealed a d=.075 effect size (95% CI= -0.57 to 0.72). While we cannot generalize the results, there is a statistically non-significant effect of parent involvement on children's science performance.

Post Hoc Subgroup and Moderator Analyses

The results reported to this point enabled us to assess the main effect of parent involvement on achievement in general as well as specifically for reading, math and science. The effect of parent involvement may, however, vary by study characteristics such as the method of parent involvement. In other words, they may be interaction effects (at the study level) that might be uncovered through a planned, post-hoc subgroup analysis. Only three potential moderator variables provided an opportunity to unpack for whom parent involvement make the most difference: Approach of Parent Involvement, Length of Parent Involvement, and Publication Type.

Parent Involvement Intervention Programs

We examined average effect size varied by type of parent involvement for the 18 included studies. Figure 9 shows that intervention programs in which parents provided some kind of reward or incentive for their child's academic performance in math produced the largest average effect of d=1.18 (95% CI = .56 to 1.79).

Intervention programs in which parents were provided with education and training to improve their child's general academic performance produced the next largest positive and statistically significant effect size of d=0.61 (95% CI = 0.25 to 0.97) followed by studies in which parent's played reading games with their child.

Length of Intervention Program

A meta-regression analysis is presented in Figure 10 and shows there is no evidence of a relationship between the length of parent involvement and effect size ($\hat{b}$ = 0.01, 95% CI = 0.00 to 0.01). This means that parent involvement intervention programs that are longer in duration do not produce larger effects that parent involvement intervention programs that are shorter in duration. However, the pattern of the available data does not permit one to make an inference about the linear relationship between parent involvement and the length of the intervention program.

Publication Type

This review focused on two types of publications: Grey Literature and Journal Publication. The Grey Literature included Dissertations and unpublished reports and comprised 67% of the included studies. Figure 11 shows a summary of the study effects for each publication type, in which parent involvement was compared to a control group. The summary of those studies in the grey literature yielded an effect size of d=.36 (CI 0.12 to 0.61) for the Grey Literature while those reported in journal publications yielded an effect size of d=.63 (95% CI 0.29 to 0.98).

Summary

Effects of Parent Involvement

Overall. It is clear that parent involvement has a positive and significant effect on children's overall academic performance. It is also clear that the effect is large enough to have practical implications for parents, practitioners, and policymakers (d= 0.45). The overall effect suggested that when parents participated in academic enrichment activities with their children outside of school, the benefits were manifest in improved academic performance in school. This result was striking when one considers that the median length of parent involvement was only 11 weeks. These finding are generally consistent with the results reported by Jeynes (2005) which reported d=.31 for those studies he classified as direct parent involvement programs. Further, both Jeynes findings and those of this study argue against the conclusions of Mattingly, et al. (2000). While Mattingly et al. concluded that there is little effect of parent involvement on academic performance, this review has uncovered compelling support for the use of a parent involvement program as a viable supplementary intervention to improve children's academic performance in school, and for the parent involvement component of the No Child Left Behind mandate

Reading Achievement. Parent involvement produced a positive and significant effect on children's reading performance (d =0.41). This result suggested that when parents participated in reading related activities with their children outside of school, a significant improvement in reading performance was manifest in school. Given the concern for improved literacy among school age children, the data from this review supports the need for parents, practitioners, and policymakers to consider parent involvement in reading related activities with their children as a viable strategy to support school-based reading instruction.

Math Achievement. Parent involvement in math achievement produced the largest specific effect on children's academic performance (d = 0.54). However, this result was biased by the Heller (1993) study which produced an effect size that was three times as large as the effect size for any other study. When this study was removed from the analysis, the impact of parent involvement on math achievement was reduced by approximately 50% to a non-significant effect. The results do not support the use of parent involvement as a recommended strategy to improve children's math achievement in school. However, the quality of the Heller study and the size of the impact of parent involvement on children's math performance were so large, for a single study, that it should not be overlooked given the concern with improving children's math achievement in the United States.

Parent Involvement Intervention Program. A goal of this review was to determine the parent involvement intervention program that produced the largest effect. Four approaches were investigated: Collaborative Reading, Education & Training, Games, and Rewards & Incentives. The largest impact of parent involvement on children's academic performance were produced by Rewards & Incentives (d = 1.18) and Education & Training (d= 0.61). However, the effect by parent involvement intervention program was confounded with other study characteristics such as children's grade level—the Rewards & Incentives intervention program was implemented with 4th and 5th graders, while the Education & Training

intervention program was implemented with 1st and 2nd graders measured by reading outcomes.

Implications for Policy and Practice

- This review concluded that there was substantial support for the positive impact of parent involvement with children outside of school to improve children's academic performance in school.
- The evidence suggested that the greatest impact of parent involvement on children's academic performance is in reading.
- A subgroup analysis indicated that the method of parent involvement produced positive and significant effects for some strategies (Education and Training and Rewards and Incentives) but not others.
- The positive effect of parent involvement on children's academic performance was achieved with parent involvement methods implemented between 6 and 28 weeks.

Implications for Research

- There is a need to improve the quality of RCTs on parent involvement through adequate funding so that researchers can hire and train a sufficient number of research staff, recruit participants, and conduct fidelity of intervention and RCT implementation checks.
- There is a need to replicate high quality RCTs identified in this review as producing unusually large and significant effects such as the Heller and Fantuzzo (1993) and Fantuzzo, Ginsberg, and Davis (1995) studies.
- Although the evidence from this review pointed to positive and significant effects measured immediately following an intervention program. There is little evidence on the sustainability of these effects.
- A research policy is needed that fosters a research agenda on parent involvement that results in a balanced production of studies focused on the method of parent involvement, domain of achievement, and participant characteristics.

Implications for Reviewers

Publication Bias. Research has shown that studies published journals have a tendency to report larger effect sizes that studies published in grey literature. Our analysis of the 18 included studies revealed that their effect sizes differed by publication source. The average effect size of studies published in journals was almost twice as large as effect sizes from studies published in grey literature. This means that if we had retrieved studies from journals only, we would have *over estimated* the effect of parent involvement on children's academic performance by approximately 100%. Conversely, if we had retrieved studies from the grey literature only, we would have *under estimated* the effect of parent involvement on children's academic performance by approximately 50%. Therefore, these results support the need for a comprehensive search strategy to retrieve studies from both journals and the grey literature.

Review Limitations

Information Retrieval. We limited our search to English literature databases because of restrictions to electronic access, subscription fees, and language barriers.

Included Studies. The majority of studies (n = 12) came from dissertations. This limitation reflects less on the meta-analysis and more on the investments in the quality of RCTs conducted in the field of parent involvement.

Definition of Parent Involvement. Parent involvement is recognized as having many dimensions. We defined parent involvement narrowly (i.e., parents were required to actively engage with the child).

Definition of Target Population. This review focused on RCTs that assessed the effect of parent involvement on elementary school aged children. The nature of parent involvement changes with age and may require a qualitatively different type of parent involvement with the child. The outcomes are recognized as core learning skills fundamental to educational development. Finally, this review does not speak to the effect of parent involvement on children with special needs, such as dyslexia, etc.

Definition of Outcomes. This review focuses on educational achievement of the child only. It does not examine other important psycho-social outcomes for the child such as learning attitude, self esteem, and locus of control.

Review Maintenance

In accord with the IRMG Policy Brief, the authors will examine the review every 3 years for update. Reasons for updating or not updating the review will be documented and forwarded to the Education Coordinating Group liaison to the IRMG (as recommended in the IRMG Policy Brief),

Responsible Reviewer(s) for Update of Review

The first author will be responsible for updating the review

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None.

Statement Concerning Conflict of Interest

None known.

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Tables

Table 1. Methodological Adequacies

Study	Method	Participants	Intervention	Outcome(s)	Statistical Model
Aronson, E. 1986	Ind. RCT	Tx1=22, Tx2=22, C=22; age=NR; gender=NR; grade=1st; SES=middle; race=NR	10 weeks (one and a half hours per week); Tx1=parent training workshop with written materials; Tx2=written materials only	Reading	TOT
Clegg, B. 1971	Ind. RCT	Tx=10, Int.C=10, Ext.C=10; grade=2nd; SES=mixed; Race= African American, Caucasian	8 weeks (30 minutes per day); Tx=reading games	Reading	ITT
Ellis, M. 1996	Ind. RCT	Tx=20; C=38; mean age=8; gender=53%male; grade=2nd-3rd; SES=unclear; Race=Hispanic, Caucasian, Middle Eastern	12 weeks (one hour per week); Tx=parent training workshop	Reading	TOT
Fantuzzo, et. al 1995	Ind. RCT	Grades 4-5;Tx1=23; Tx2=24 C=25; 51% male; Race= African American; SES=Low	10 weeks (45 min 2x/wk): T1x=reciprocal peer tutoring in classroom + parent home rewards; T2x=reciprocal peer tutoring only	Math	ITT
Heller & Fantuzzo, 1993	Ind. RCT	T1=26, T2=28, C=26; mean age= 10; 42% male; grade=4th-5th; SES=Low to low middle; Race=African American	8 months (45 min 2x/wk); T1x=reciprocal peer tutoring in classroom + parent home rewards; T2x=reciprocal peer tutoring only	Math	TOT
Henry, B. 1974	Ind. RCT	T1=14, T2=13, C=13; age=NR; gender=100%males; grade=Kdg; SES=Low middle; Race=NR	24 weeks (two to three times per week); T1x=fathers reading to child; T2x=mothers reading to child; C= unplanned reading	Reading	TOT
Hewison, J. 1988	Group RCT	T=41, C=34; mean age=11	3 year follow-up to Tizard, et al. 1982	Reading	TOT

Table 1 (Continued.)

Hirst, 1972	Ind. RCT	Tx=48, C=48; grade 2; 50% male	16 weeks(1 min/sch day); Child practices reading w/ Parent	Reading	TOT
Joy, J.A. 1996	Ind. RCT	grade 3-5 children; 8 to 11 yrs Tx1=29, Tx2=29, Ctl=28	10 wks parent plays math games	Math	TOT
Kosten 1991	Ind. RCT	grade 2-3; Tx=17, C=18	4 weeks(2 hour wkshp 1x/wk); science activities in workshop	Science	TOT
Meteyer 1998	Ind. RCT	Tx=25, C=27 grade 4	6 seeks (1 1/2 training session); parents assisted with math homework	Math	TOT
Miller 1993	Ind. RCT	Tx1=15x Tx2=15, Tx3=16x C=15; grade=2 & -3	15 weeks (Tx1 & Tx2 received three training sessions; Tx1 & Tx3 received biweekly feedback) reading to child 5-15 minutes several times per week	Reading	TOT
Peeples 1996	Ind. RCT	50 grade=1st children Tx=25, C=25;	Home Enrichment Learning Program, length of prg unclear; Tx1=at home only, Tx2=home & school, tx3=school only	Reading	ITT
Philips, L.M. 1990	Group RCT	18 Kdg classes w 309 children; Tx1=82; Tx2=76; Tx3=79; C=82	24 weeks using *Little Book* curriculum materials	Reading	TOT
O'Neil 1975	Ind. RCT	T1=6; T2=8; C=9; age=NR; gender=65% male; grade=1st, 2nd, 3rd; SES=NR; Race=NR	10 weeks (30 minutes, four times per week); written materials; Tx1 received training and feedback, Tx2 (written materials olny)	Reading	TOT
Powell-Smith, et al. 2000	Ind. RCT	Tx1=12, Tx2=12, C=12; mean age=8; gender= 50% grade=2; Race=American Indian, Hispanic, Caucasian	5 weeks (20 minutes, four times per week); Tx1 reading curriculum text; Tx2 reading library books	Reading	TOT
Roeder, C.B. 1993	Ind. RCT	89 6th graders: Tx1=20, Tx2=24, C=23;	12 weeks; Parents assisted child at home using grade level curriculum; Video, Direct Parent Instruction	Math	TOT
Ryan 1964	Ind. RCT	10 2nd grade classrooms=232 children;Tx= 5 classes, C= 5 Ctl classes	Sept to Mar; Tx=Active PI, C=Incidental PI	Reading	ITT
Tizard (1982)	Group RCT	8 schools w/ Tx and C classes	2 year program; Tx=parents listening to child read	Reading	TOT

Table 2. Studies Excluded from the Systematic Review

Albright, M., I. (2002). Enhancing parent-teacher communication and parent involvement in children's spelling homework. Unpublished doctoral dissertation, University of Illinois at Chicago.
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Table 2. (Continued.)

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Table 3. Reasons Studies Were Excluded from the Systematic Review

Author	**Reason for Exclusion**
Albright, MI (1997)	Author did not report enough data for effect size computations
Allison, D.E. and Gray, R.E. (1970)	The intervention was not direct parent involvement
Ames, C. and others (1995)	The intervention was not direct parent involvement
Anderson (1986)	Study did not use an RCT design
Debaryshe, B.D. (1987)	Study participants were too young
Dusewicz, R.A. (1975)	Study used an RCT design, but kids were too young
Edward (1987)	Study did not use an RCT design
Edwards and Warren (1999)	Article was an essay rather than an empirical study
Garrison (1977)	Study did not use an RCT design
Grant, E.E. (1971).	Mismatch between the unit of assignment and the unit of analysis.
Gray, R.F. and Allison, D.E. (1970)	The intervention was not direct parent involvement
Green (1984)	Author did not report enough data for effect size computations
Herts, R.S. (1990)	Study did not use an RCT design
Hewison and Tizard (1980)	RCT but not an intervention
Kitchens (1975)	RCT but middle school
Kock, E.A. (1965)	The intervention was not direct parent involvement
Luchuck, V. (1998)	Study did not use an RCT design
Maertens, N. and Johnston, J. (1972)	The intervention was not direct parent involvement
Miller and Narrett (1995)	Duplicate
O'Mahoney (1984)	Study did not use an RCT design
Overett and Donald (1998)	Study did not use an RCT design
Philips, L.M. (1990)	The unit of assignment did not match the unit of analysis
Rich, R. (1976)	Author did not report enough data for effect size computations
Stevens and Slavin (1992)	Not a study on parent involvement
Sumantri (1983)	Study participants were too old
Taylor, F. (1996)	Study did not use an RCT design
Hewison and Tizard (1980)	The study was not about parent involvement as an intervention
Travato and Bucher (1980)	Authors did not report enough data for effect size computations
Woods, Barnard, TeSelle (1974)	Author did not state that the groups were formed using random assignment

Table 4. Documentation of Search Strategies for the Systematic Review

Database	Country	Supplier	Years	Strategy	Citations
PsycINFO	US	CSA	Up to 2004	((parent* Involvement) or (parent* participation) or parents-as-teachers or (family involvement)) and ((Read* achievement) or (science achievement) or (math* achievement) or (write* achievement)) and pt=(empirical or quantitative)	205
ERIC	US	CSA	Up to 2004	((parent* Involvement) or (parent* participation) or parents-as-teachers or (family involvement)) and ((Read* achievement) or (science achievement) or (math* achievement) or (write* achievement)) and pt=((reports: research) or dissertations/theses)	191
Chinese Eric	US	Hong Kong Institute of Educational Research	Up to 2004	parent and involvement and learning	5
C2-SPECTR	US	The Campbell Collaboration	Up to 2004	All Indexed Fields = Parent Involvement or All Non-Indexed Fields = Parent Involvement	18
Cochrane Central Register of Controlled Trials	US	The Cochrane Collaboration	Up to 2004	(parent$ adj1 Involvement or parent$ adj1 participation or parents-as-teachers or family adj1 involvement) and achievement	0
Childdata	UK	National Children's Bureau	All	parent educators'	77
Digital Dissertations	CN	PROQUEST	Up to 2004	KEY(parent? Involvement or parent? Participation) and KEY((elementary or primary or kindergarten) and (achievement or success)) and KEY(random? Or control)	42
Inside	UK	British Library	All	(parent$ or famil$ or home or background) and achieve$ in conference papers only	42
Planex	UK	IDOX	All	(parent* or famil*) and (science or math* or read* or writ*) and achieve*	34
Policy File	US		Up to 2004	Parent and involvement and achievement	4
Sage Family Abstracts	US	OCLC	Up to 2004	((parent* Involvement) or (parent* participation) or parents-as-teachers or (family involvement)) and ((Read* achievement) or (science achievement) or (math* achievement) or (write* achievement))	26
Sage Urban Studies Abstracts	US		Up to 2004	(parent* Involvement or parent* participation or parents-as-teachers or family involvement) and (Read* achievement or science achievement or math* achievement or write* achievement)	26

Table 4 (Continued.)

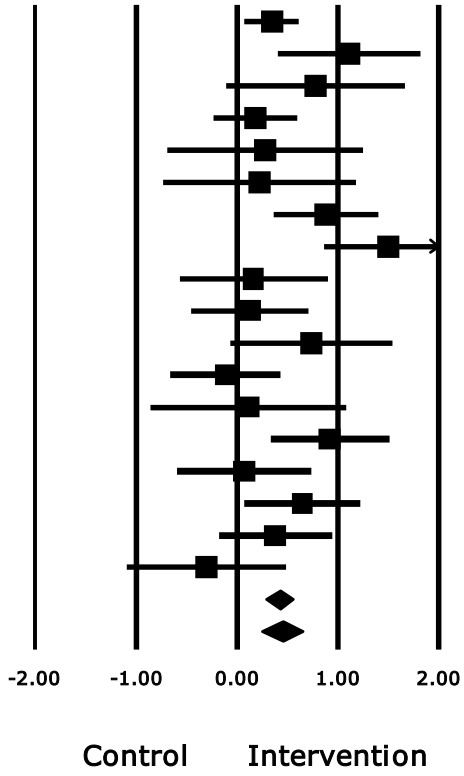
SocioFile	US	CSA	Up to 2004	((parent* Involvement) or (parent* participation) or parents-as-teachers or (family involvement)) and ((Read* achievement) or (science achievement) or (math* achievement) or (write* achievement))	19
Social Science Reseach Network	US (?)		Up to 2004	Parent and Involvement	11
Index to Theses	US		Up to 2004	Parent and Involvement	2
British Library	UK	British Library	All	parent* and achieve* or famil* and achieve*	19
Education OnLine	UK	University of Leeds	All	'parent participation' or 'family involvement'	18
PAIS International	US	CSA	Up to 2004	((parent* Involvement) or (parent* participation) or parents-as-teachers or (family involvement)) and achieve*	7
Sociology: Sage Full Text Collections	US	CSA	Up to 2004	((parent* Involvement) or (parent* participation) or parents-as-teachers or (family involvement)) and ((Read* achievement) or (science achievement) or (math* achievement) or (write* achievement))	6
Criminology: Sage Full Text Collections	US	CSA	Up to 2004	(parent* Involvement or parent* participation or parents-as-teachers or family involvement) and (Read* achievement or science achievement or math* achievement or write* achievement)	1
ISI Citations Index	US	ISI	Up to 2004	TS = (parent* Involvement or parent* participation or parents-as-teachers or family involvement) and TS= (Read* achievement or science achievement or math* achievement or write* achievement)	43
EconLit	US	CSA	Up to 2004	((parent* Involvement) or (parent* participation) or parents-as-teachers or (family involvement)) and achieve*	6
International Bibliography of Social Sciences	US	CSA	Up to 2004	((parent* Involvement) or (parent* participation) or parents-as-teachers or (family involvement)) and ((Read* achievement) or (science achievement) or (math* achievement) or (write* achievement))	3

Table 4 (Continued.)

Department for Education and Skills	UK	UK Government	All	'parents'	2
CBCA Education	CN	PROQUEST	1982-Present	SU(parents and parenting) and SU(education). Limited to peer reviewed journals.	0
Canadian Research Index	CN	MicroMedia	1982-Present	(parent* or famil*) and (involvement or participation) and (kindergarten or elementary or primary) and (achiev* or success*)	0
Academic Search Primer	US	EBSCOHost	1975 - Present	(DE "EDUCATION -- Parent participation") or (DE "PARENT-teacher cooperation") or (DE "PARENTS as teachers") and (achiev* or success*) AND (elementary or primary education or kindergarten) and control group. Limited to scholarly journals	0
Total					807
Minimum					0
Average					30
Median					11

Figure 1. Effect of Parent Involvement on Children's Academic Performance

Model	Study name	Comparison	Outcome	Statistics for each study			Sample size	
				Hedges's g	Lower limit	Upper limit	Group-A	Group-B
	Ryan (1964)	parent_vs_control	Combined	0.347	0.088	0.605	5	5
	Aronson (1966)	Combined	Read_Ach	1.109	0.421	1.798	18	18
	Clegg (1971)	Combined	Combined	0.776	-0.098	1.651	10	10
	Hirst (1974)	parent_vs_control	Combined	0.181	-0.217	0.579	48	48
	Henry (1974)	Combined	Combined	0.281	-0.677	1.239	7	11
	O'Neil (1975)	Combined	Combined	0.223	-0.724	1.169	7	9
	Tizard (1982)	Combined	Read_Comp	0.879	0.369	1.390	26	43
	Heller (1993)	parentrpt_vs_control	Combined	1.496	0.881	2.110	26	26
	Miller (1993)	Combined	Combined	0.164	-0.557	0.884	16	13
	Roeder (1993)	parent_vs_control	Math_Ach	0.123	-0.445	0.692	23	23
	Fantuzzo (1995)	Combined	Combined	0.741	-0.047	1.529	13	13
	Ellis (1996)	parent_vs_control	Combined	-0.116	-0.652	0.420	20	38
	Joy (1996)	Combined	Cr_Math_Ach	0.114	-0.842	1.071	10	9
	Peeples (1996)	parent_vs_control	Combined	0.920	0.345	1.495	25	25
	Kosten (1997)	parent_vs_control	Science_Ach	0.075	-0.573	0.723	17	18
	Hewison (1988)	Combined	Read_Comp	0.646	0.089	1.203	21	35
	Meteyer (1998)	parent_vs_control	Combined	0.381	-0.164	0.925	25	27
	Powell-Smith (2000)	Combined	Combined	-0.298	-1.076	0.480	12	12
Fixed				0.430	0.299	0.561		
Random				0.453	0.248	0.659		



Heterogeneity Statistics for a Fixed Effects Model: Q =35.6, df = 17, p = 0.005, and I squared = 52.3.

Figure 2. Funnel Plot of Standard Error by Hedges's g

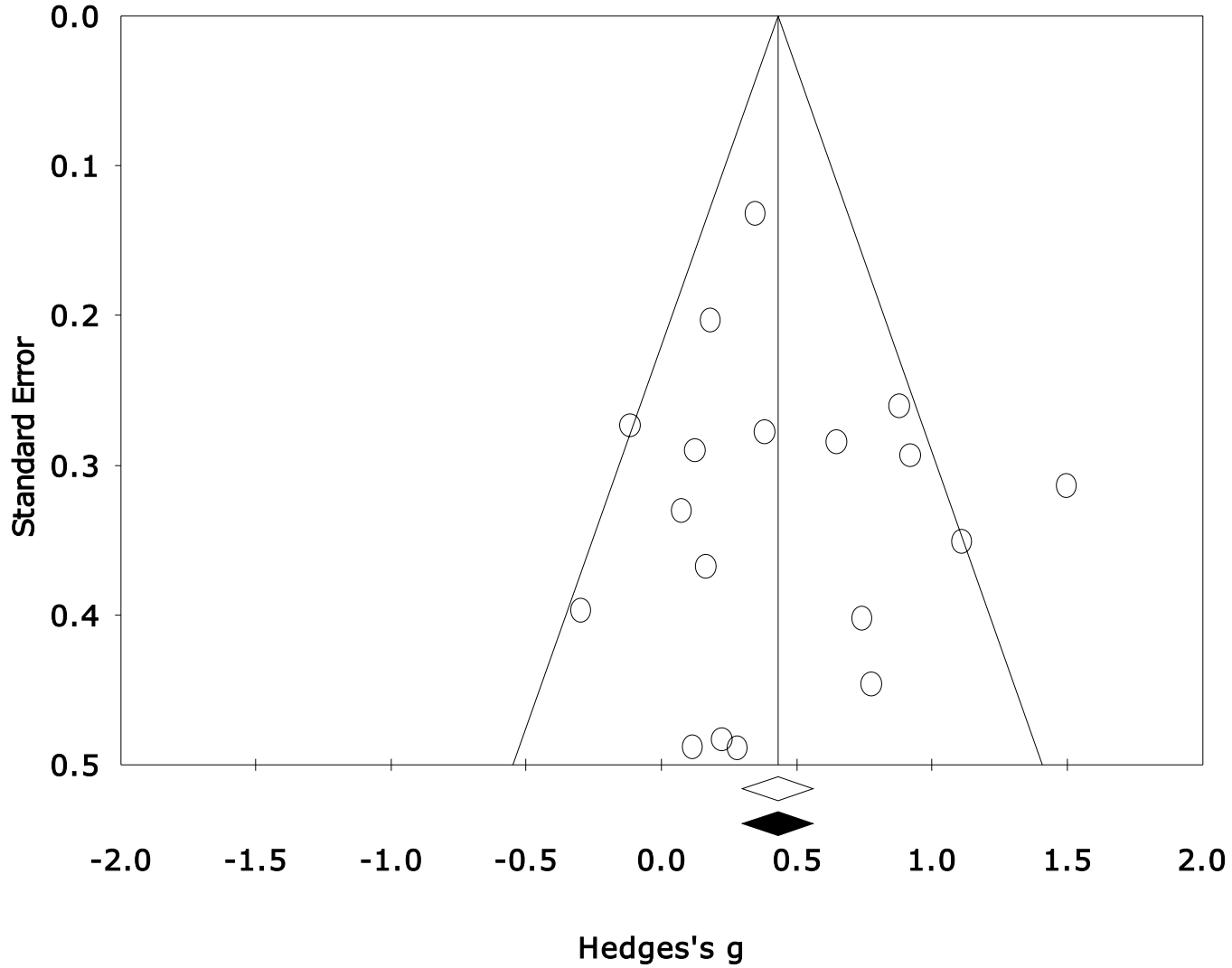
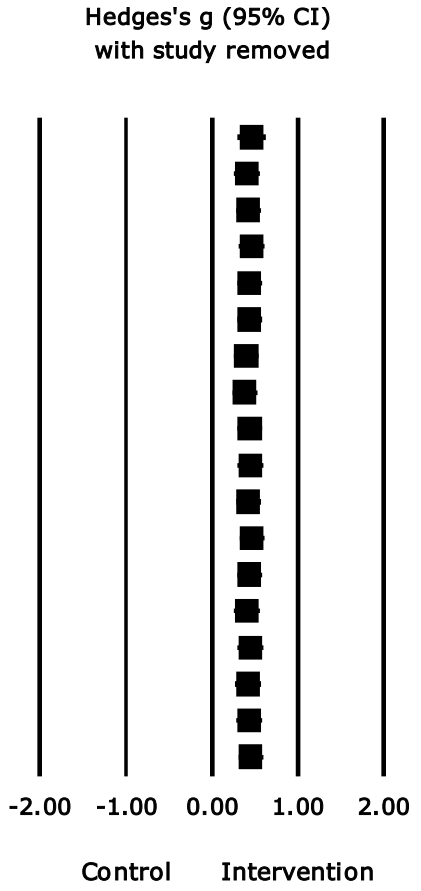


Figure 3. Effect of Parent Involvement on Children's Academic Performance: 1 Study Removed

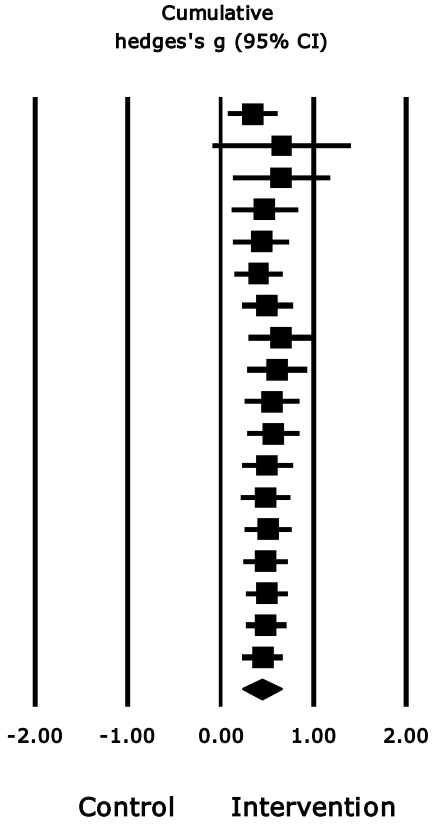
Study name	Comparison	Outcome	Point	Lower limit	Upper limit
Ryan (1964)	parent_vs_control	Combined	0.458	0.306	0.610
Aronson (1966)	Combined	Read_Ach	0.404	0.271	0.538
Clegg (1971)	Combined	Combined	0.422	0.289	0.554
Hirst (1974)	parent_vs_control	Combined	0.460	0.321	0.599
Henry (1974)	Combined	Combined	0.432	0.300	0.565
O'Neil (1975)	Combined	Combined	0.434	0.301	0.566
Tizard (1982)	Combined	Read_Comp	0.398	0.262	0.533
Heller (1993)	parentrpt_vs_control	Combined	0.379	0.245	0.513
Miller (1993)	Combined	Combined	0.439	0.305	0.572
Roeder (1993)	parent_vs_control	Math_Ach	0.447	0.312	0.581
Fantuzzo (1995)	Combined	Combined	0.421	0.288	0.554
Ellis (1996)	parent_vs_control	Combined	0.464	0.329	0.599
Joy (1996)	Combined	Cr_Math_Ach	0.436	0.303	0.568
Peeples (1996)	parent_vs_control	Combined	0.403	0.268	0.537
Kosten (1997)	parent_vs_control	Science_Ach	0.445	0.311	0.579
Hewison (1988)	Combined	Read_Comp	0.417	0.282	0.552
Meteyer (1998)	parent_vs_control	Combined	0.433	0.298	0.568
Powell-Smith (2000)	Combined	Combined	0.451	0.318	0.584



Heterogeneity Statistics for a Fixed Effects Model: Q =35.6, df = 17, p = 0.005, and I squared = 52.3.

Figure 4. Effect of Parent Involvement on Children's Academic Performance: Cumulative Analysis

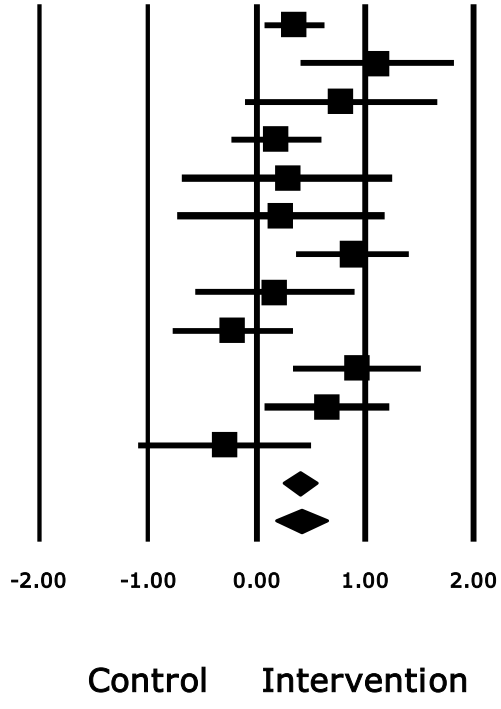
Study name	Comparison	Outcome	Cumulative statistics				
			Point	Lower limit	Upper limit	Group-A	Group-B
Ryan (1964)	parent_vs_control	Combined	0.347	0.088	0.605	5	5
Aronson (1966)	Combined	Read_Ach	0.659	-0.076	1.394	18	18
Clegg (1971)	Combined	Combined	0.654	0.143	1.166	28	28
Hirst (1974)	parent_vs_control	Combined	0.476	0.132	0.820	5	5
Henry (1974)	Combined	Combined	0.440	0.149	0.731	35	39
O'Neil (1975)	Combined	Combined	0.408	0.160	0.656	42	48
Tizard (1982)	Combined	Read_Comp	0.502	0.238	0.766	67	91
Heller (1993)	parentrpt_vs_control	Combined	0.654	0.315	0.992	93	117
Miller (1993)	Combined	Combined	0.604	0.291	0.916	109	130
Roeder (1993)	parent_vs_control	Math_Ach	0.550	0.262	0.838	23	23
Fantuzzo (1995)	Combined	Combined	0.562	0.293	0.832	122	143
Ellis (1996)	parent_vs_control	Combined	0.499	0.234	0.765	142	181
Joy (1996)	Combined	Cr_Math_Ach	0.480	0.226	0.734	151	190
Peeples (1996)	parent_vs_control	Combined	0.515	0.270	0.759	176	215
Kosten (1997)	parent_vs_control	Science_Ach	0.485	0.252	0.719	193	233
Hewison (1988)	Combined	Read_Comp	0.496	0.277	0.715	214	268
Meteyer (1998)	parent_vs_control	Combined	0.487	0.283	0.691	239	295
Powell-Smith (2000)	Combined	Combined	0.453	0.248	0.659	251	307
			0.453	0.248	0.659		



Heterogeneity Statistics for a Fixed Effects Model: Q =35.6, df = 17, p = 0.005, and I squared = 52.3.

Figure 5. Efficacy of Parent Involvement on Reading Achievement

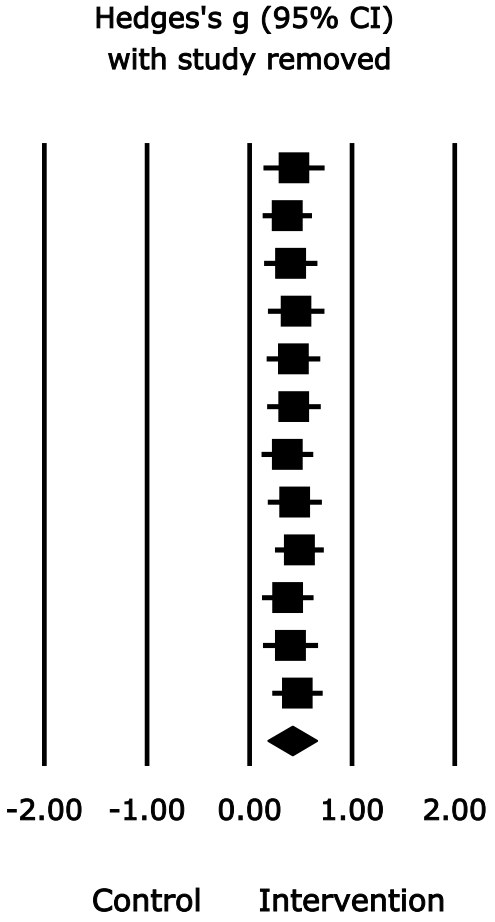
Model	Study name	Comparison	Outcome	Statistics for each study			Sample size	
				Hedges's g	Lower limit	Upper limit	Group-A	Group-B
	Ryan (1964)	parent_vs_control	Combined	0.347	0.088	0.605	5	5
	Aronson (1966)	Combined	Read_Ach	1.109	0.421	1.798	18	18
	Clegg (1971)	Combined	Combined	0.776	-0.098	1.651	10	10
	Hirst (1974)	parent_vs_control	Combined	0.181	-0.217	0.579	48	48
	Henry (1974)	Combined	Combined	0.281	-0.677	1.239	7	11
	O'Neil (1975)	Combined	Combined	0.223	-0.724	1.169	7	9
	Tizard (1982)	Combined	Read_Comp	0.879	0.369	1.390	26	43
	Miller (1993)	Combined	Combined	0.164	-0.557	0.884	16	13
	Ellis (1996)	parent_vs_control	Combined	-0.220	-0.756	0.316	20	38
	Peeples (1996)	parent_vs_control	Combined	0.920	0.345	1.495	25	25
	Hewison (1988)	Combined	Read_Comp	0.646	0.089	1.203	21	35
	Powell-Smith (2000)	Combined	Combined	-0.298	-1.076	0.480	12	12
Fixed				0.398	0.247	0.549		
Random				0.421	0.183	0.659		



Heterogeneity Statistics for a Fixed Effects Model: Q =22.5, df = 11, p = 0.023, and I squared = 50.5%

Figure 6. Efficacy of Parent Involvement on Reading Achievement: One Study Removed

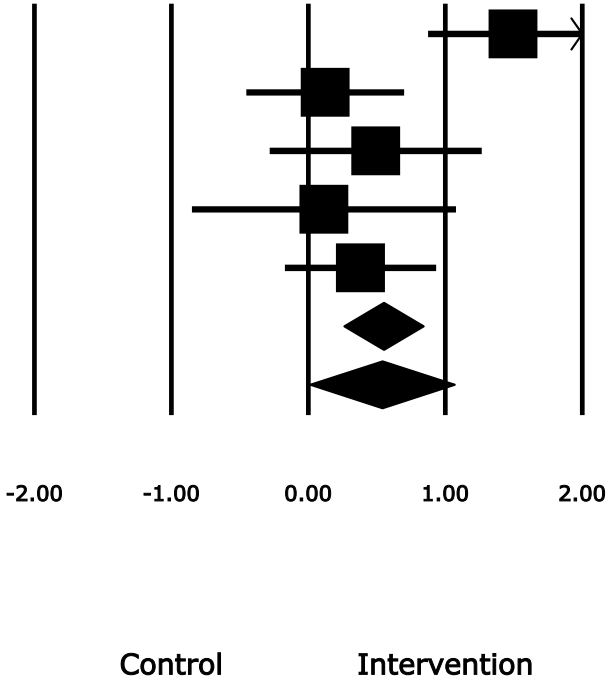
Study name	Comparison	Outcome	Point	Lower limit	Upper limit
Ryan (1964)	parent_vs_control	Combined	0.434	0.146	0.721
Aronson (1966)	Combined	Read_Ach	0.367	0.137	0.598
Clegg (1971)	Combined	Combined	0.401	0.152	0.650
Hirst (1974)	parent_vs_control	Combined	0.454	0.189	0.719
Henry (1974)	Combined	Combined	0.428	0.177	0.680
O'Neil (1975)	Combined	Combined	0.431	0.180	0.682
Tizard (1982)	Combined	Read_Comp	0.369	0.127	0.610
Miller (1993)	Combined	Combined	0.440	0.186	0.695
Ellis (1996)	parent_vs_control	Combined	0.486	0.258	0.713
Peeples (1996)	parent_vs_control	Combined	0.371	0.131	0.612
Hewison (1988)	Combined	Read_Comp	0.398	0.141	0.656
Powell-Smith (2000)	Combined	Combined	0.466	0.230	0.702
			0.421	0.183	0.659



Heterogeneity Statistics for a Fixed Effects Model: Q =22.5, df = 11, p = 0.023, and I squared = 50.5%

Figure 7. Effect of Parent Involvement on Math Achievement

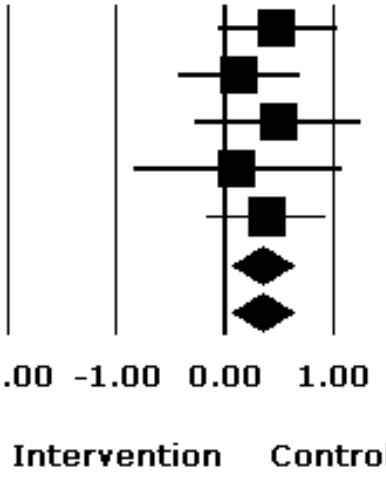
Model	Study name	Comparison	Outcome	Statistics for each study		
				Hedges's g	Lower limit	Upper limit
	Heller (1993)	parentrpt_vs_control	Combined	1.496	0.881	2.110
	Roeder (1993)	parent_vs_control	Math_Ach	0.123	-0.445	0.692
	Fantuzzo (1995)	Combined	Combined	0.492	-0.274	1.258
	Joy (1996)	Combined	Cr_Math_Ach	0.114	-0.842	1.071
	Meteyer (1998)	parent_vs_control	Combined	0.381	-0.164	0.925
Fixed				0.553	0.264	0.843
Random				0.542	0.016	1.068



Heterogenity Statistics for a Fixed Effects Model: Q = 12.5, df = 4, p = 0.014, I squared = 67.9%.

Figure 8. Effect of Parent Involvement on Math Achievement: Heller Study Windso

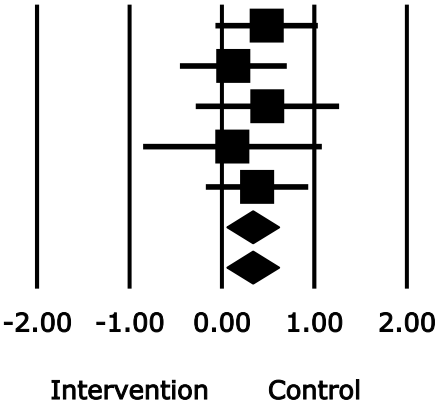
Model	Study name	Comparison	Outcome	Statistics for each study		
				Hedges's g	Lower limit	Upper limit
	Heller (1993)	parentrpt_vs_control	Combined	0.484	-0.059	1.028
	Roeder (1993)	parent_vs_control	Math_Ach	0.123	-0.445	0.692
	Fantuzzo (1995)	Combined	Combined	0.492	-0.274	1.258
	Joy (1996)	Combined	Cr_Math_Ach	0.114	-0.842	1.071
	Meteyer (1998)	parent_vs_control	Combined	0.381	-0.164	0.925
Fixed				0.337	0.056	0.619
Random				0.337	0.056	0.619



Heterogeneity Statistics for a Fixed Effects Model: Q = 1.2, df = 4, p = 0.876, I squared = 0.0%.

Figure 8. Effect of Parent Involvement on Math Achievement: Heller Study Windsorized

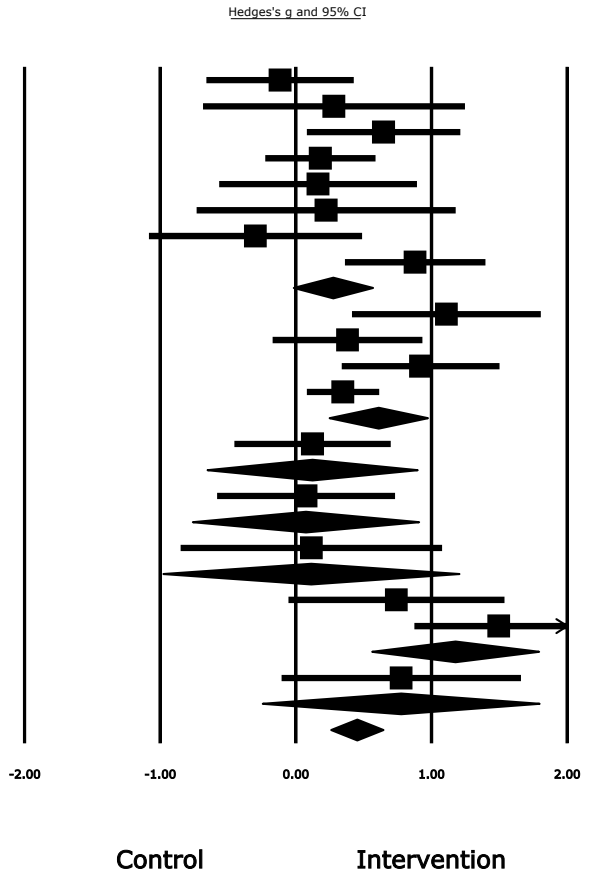
Model	Study name	Comparison	Outcome	Statistics for each study		
				Hedges's g	Lower limit	Upper limit
	Heller (1993)	parentrpt_vs_control	Combined	0.484	-0.059	1.028
	Roeder (1993)	parent_vs_control	Math_Ach	0.123	-0.445	0.692
	Fantuzzo (1995)	Combined	Combined	0.492	-0.274	1.258
	Joy (1996)	Combined	Cr_Math_Ach	0.114	-0.842	1.071
	Meteyer (1998)	parent_vs_control	Combined	0.381	-0.164	0.925
Fixed				0.337	0.056	0.619
Random				0.337	0.056	0.619



Heterogeneity Statistics for a Fixed Effects Model: Q = 1.2, df = 4, p = 0.876, I squared = 0.0%.

Figure 9. Effect of Method of Parent Involvement

Group by Method of Parent Involvement	Study name	Comparison	Outcome	Statistics for each study: Hedges's g	Lower limit	Upper limit	Sample size: Group-A	Group-B
Collaborative Reading	Ellis (1996)	parent_vs_control	Combined	-0.116	-0.652	0.420	20	38
Collaborative Reading	Henry (1974)	Combined	Combined	0.281	-0.677	1.239	7	11
Collaborative Reading	Hewison (1988)	Combined	Read_Comp	0.646	0.089	1.203	21	35
Collaborative Reading	Hirst (1974)	parent_vs_control	Combined	0.181	-0.217	0.579	48	48
Collaborative Reading	Miller (1993)	Combined	Combined	0.164	-0.557	0.884	16	13
Collaborative Reading	O'Neil (1975)	Combined	Combined	0.223	-0.724	1.169	7	9
Collaborative Reading	Powell-Smith (2000)	Combined	Combined	-0.298	-1.076	0.480	12	12
Collaborative Reading	Tizard (1982)	Combined	Read_Comp	0.879	0.369	1.390	26	43
Collaborative Reading				0.276	-0.016	0.568		
Education & Training	Aronson (1966)	Combined	Read_Ach	1.109	0.421	1.798	18	18
Education & Training	Meteyer (1998)	parent_vs_control	Combined	0.381	-0.164	0.925	25	27
Education & Training	Peeples (1996)	parent_vs_control	Combined	0.920	0.345	1.495	25	25
Education & Training	Ryan (1964)	parent_vs_control	Combined	0.347	0.088	0.605	5	5
Education & Training				0.611	0.250	0.973		
Education & Training (Math)	Roeder (1993)	parent_vs_control	Math_Ach	0.123	-0.445	0.692	23	23
Education & Training (Math)				0.123	-0.651	0.897		
Education & Training (Science)	Kosten (1997)	parent_vs_control	Science_Ach	0.075	-0.573	0.723	17	18
Education & Training (Science)				0.075	-0.760	0.909		
Math Games	Joy (1996)	Combined	Cr_Math_Ach	0.114	-0.842	1.071	10	9
Math Games				0.114	-0.977	1.206		
Parent Reward/Incentives	Fantuzzo (1995)	Combined	Combined	0.741	-0.047	1.529	13	13
Parent Reward/Incentives	Heller (1993)	parentrpt_vs_control	Combined	1.496	0.881	2.110	26	26
Parent Reward/Incentives				1.178	0.563	1.793		
Reading Games	Clegg (1971)	Combined	Combined	0.776	-0.098	1.651	10	10
Reading Games				0.776	-0.244	1.797		
Overall				0.453	0.260	0.645		



Heterogenity Statistics for a Fixed Effects Model: Q = 35.61, df = 17, p = 0.005, I squared = 52.3%.

Figure 10. **Regression of intervention length on Hedges's g**

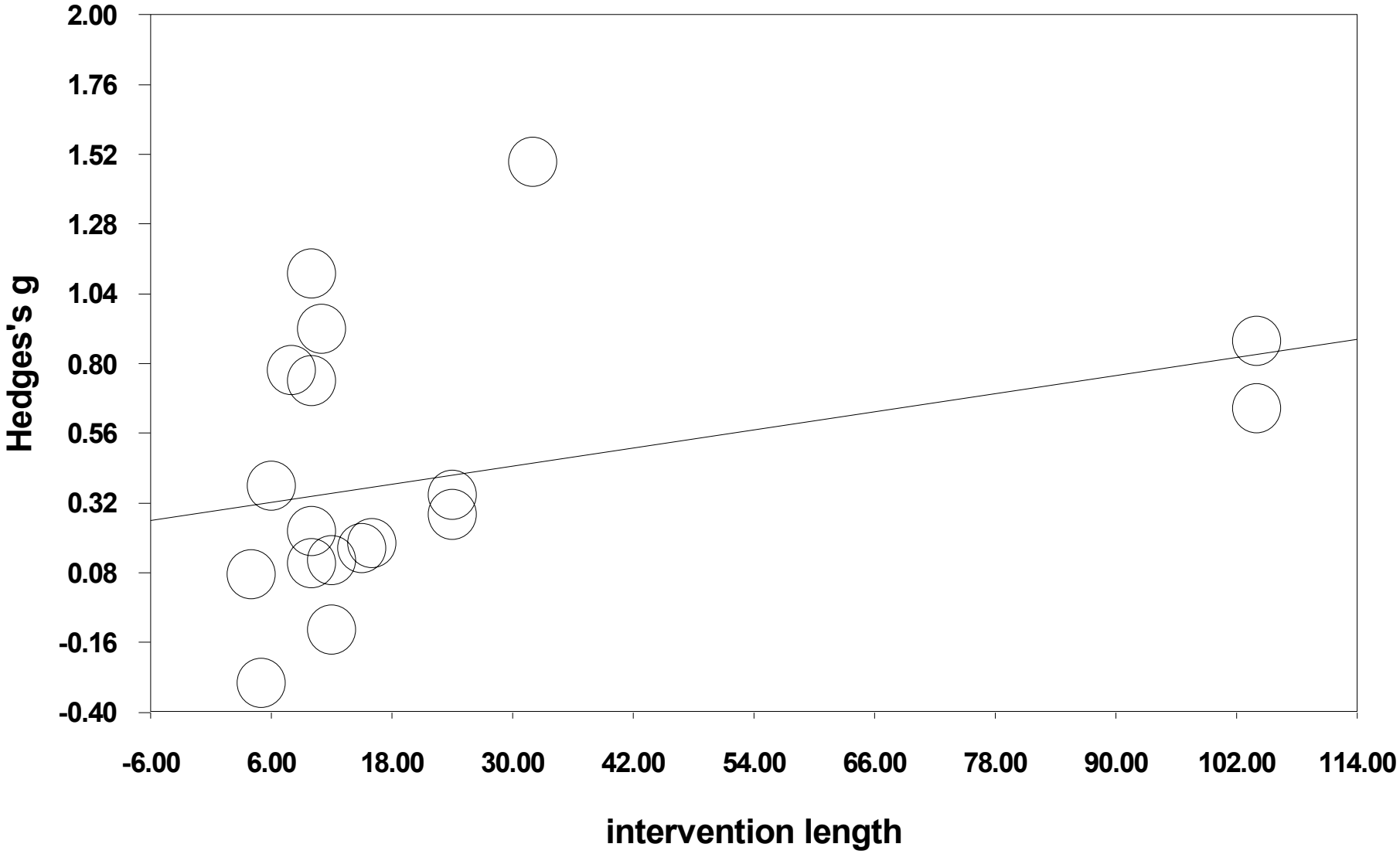
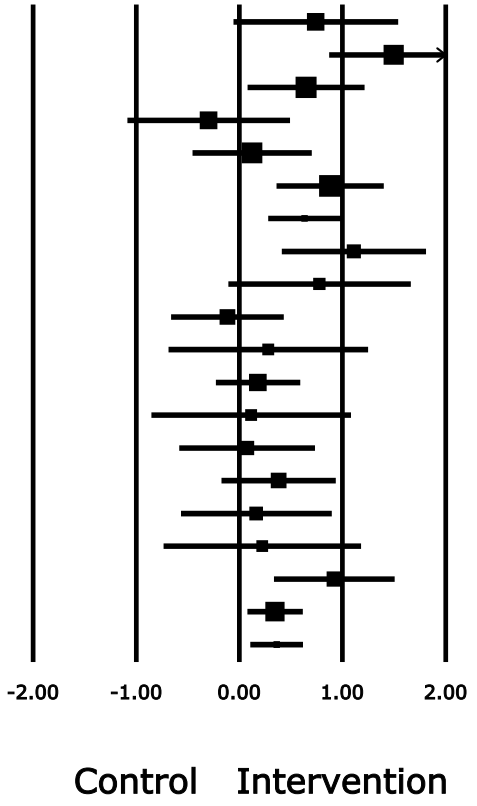


Figure 11. Efficacy of Parent Involvement on Achievement: By Publication Type

Group by publication type	Study name	Comparison	Outcome	Statistics for each study		
				Hedges's g	Lower limit	Upper limit
journal	Fantuzzo (1995)	Combined	Combined	0.741	-0.047	1.529
journal	Heller (1993)	parentrpt_vs_control	Combined	1.496	0.881	2.110
journal	Hewison (1988)	Combined	Read_Comp	0.646	0.089	1.203
journal	Powell-Smith (2000)	Combined	Combined	-0.298	-1.076	0.480
journal	Roeder (1993)	parent_vs_control	Math_Ach	0.123	-0.445	0.692
journal	Tizard (1982)	Combined	Read_Comp	0.879	0.369	1.390
journal				0.633	0.288	0.977
unpublished	Aronson (1966)	Combined	Read_Ach	1.109	0.421	1.798
unpublished	Clegg (1971)	Combined	Combined	0.776	-0.098	1.651
unpublished	Ellis (1996)	parent_vs_control	Combined	-0.116	-0.652	0.420
unpublished	Henry (1974)	Combined	Combined	0.281	-0.677	1.239
unpublished	Hirst (1974)	parent_vs_control	Combined	0.181	-0.217	0.579
unpublished	Joy (1996)	Combined	Cr_Math_Ach	0.114	-0.842	1.071
unpublished	Kosten (1997)	parent_vs_control	Science_Ach	0.075	-0.573	0.723
unpublished	Meteyer (1998)	parent_vs_control	Combined	0.381	-0.164	0.925
unpublished	Miller (1993)	Combined	Combined	0.164	-0.557	0.884
unpublished	O'Neil (1975)	Combined	Combined	0.223	-0.724	1.169
unpublished	Peeples (1996)	parent_vs_control	Combined	0.920	0.345	1.495
unpublished	Ryan (1964)	parent_vs_control	Combined	0.347	0.088	0.605
unpublished				0.362	0.117	0.607



Heterogeneity Statistics for a Fixed Effects Model: Q =35.6, df = 17, p = 0.005, and I squared = 52.3%